Preliminary Regulatory Economic Analysis

For

Lowering Miners' Exposure to Respirable Coal Mine Dust Including Continuous Personal Dust Monitors

Proposed Rule

(RIN 1219-AB64)

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Mine Safety and Health Administration
Office of Standards, Regulations, and Variances

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I. EXECUTIVE SUMMARY

INTRODUCTION

The proposed rule would lower miners' exposure to respirable coal mine dust by revising the Mine Safety and Health Administration's (MSHA) existing standards on miners' occupational exposure to respirable coal mine dust. The major provisions of the proposed rule would lower the existing exposure limit from 2.0 mg/m^3 to 1.0 mg/m^3 over a two-year phase-in period; provide for full-shift sampling; redefine the term "normal production shift;" and add reexamination and decertification requirements for persons certified to sample, and maintain and calibrate sampling devices. In addition, the proposed rule would provide for single shift compliance sampling (single sample) under the mine operator and MSHA's inspector sampling programs, and would establish sampling requirements for use of the Continuous Personal Dust Monitor (CPDM) and expanded requirements for medical surveillance.

BACKGROUND

MSHA's existing standards require coal mine operators to continuously maintain the average concentration of respirable dust to which each miner is exposed during each shift at or below 2.0 mg/m^3. Miners who have evidence of pneumoconiosis and are employed at underground coal mines or surface work areas of underground coal mines have the option to work in areas where average respirable dust concentrations do not exceed 1.0 mg/m^3. There is not a separate standard for respirable silica; rather, where the total respirable coal mine dust contains more than five percent quartz, the respirable coal mine dust standard is computed by dividing the percentage of quartz into the number ten. This formula was designed to limit a miner's exposure to respirable quartz by reducing the amount of respirable quartz in the air to 0.1 mg/m^3 (100 μg mg/m^3). For example, if the coal mine dust were 10 percent quartz, the formula would result in a reduced respirable dust standard of 1.0 mg/m^3 (Note: 10% of 1.0 mg/m^3 is 0.1 mg/m^3.)

Under MSHA's existing standards, compliance determinations are based on the average concentration of respirable dust measured by five valid respirable dust samples taken by the operator during five consecutive normal production shifts or five normal production shifts worked on consecutive days. Underground coal operators are required to collect bimonthly respirable dust samples and submit them to MSHA for analysis to determine compliance with applicable respirable dust standards. If compliance samples do not meet the requirements of the applicable dust standard, MSHA issues a citation for a violation of the standard. Similarly, operators of surface work areas of underground coal mines and surface coal mines are required to collect bimonthly samples from "designated work positions" (DWPs) designated by the District Manager.

Compliance determinations are also based on the average of multiple measurements taken by an MSHA inspector over a single shift (multiple, single-shift samples) or on the average of multiple measurements obtained for the same occupations on successive days (multiple-shift samples).

MINING SECTORS COVERED BY THE PROPOSED RULE

The proposed rule would apply to all underground and surface coal mines in the United States. The average number of active underground coal mines for the 12 months ending January 2010, was 424. These mines employed approximately 47,000 miners and contractors (excluding office workers). The average number of active surface coal mines for the 12 months ending January 2010, was 1,123. These mines employed approximately 32,300 miners (excluding office workers).

SUMMARY OF THE REQUIREMENTS OF THE PROPOSED RULE

The proposed rule would:

- For underground and surface coal mines, lower the limit from 2.0 mg/m^3 to 1.0 mg/m^3 over an 8-hour shift, over a 24-month phase in period. Also, for intake air and for Part 90 miners, lower the limit from 1.0 mg/m^3 to 0.5 mg/m^3 over a 6-month phase in period.
- Over an 18-month period, phase in the use of the CPDM, a new technology that provides a direct, real-time measurement of respirable coal mine dust. Operators would use CPDMs to monitor underground miners in occupations exposed to the highest dust concentrations and miners who have evidence of pneumoconiosis, every day for the full shift. Use of the CPDM would be optional for surface miners and for underground miners in non-production areas (such as outby areas). The CPDM stores data that would be electronically sent to MSHA.
- Require that single, full-shift samples, collected by the Agency or the operator, be used to determine noncompliance with MSHA's dust standards.
- Require dust samples to include the entire time the miner works, rather than a maximum of 8 hours required by the existing standard.
- Change the existing definition of normal production shift, which requires operator sampling at 50 percent of production, to a more reliable representation of the operator's actual production, which would be based on the last 30 production shifts.
- Extend the existing x-ray surveillance program for underground coal miners to surface miners. Also, add a new examination for Spirometry, occupational history, and symptom assessment.

BENEFITS

The proposed rule would significantly improve health protections for coal miners by reducing their occupational exposure to respirable coal mine dust and lowering the risk that they will suffer material impairment of health or functional capacity over their working lives.

To estimate the benefits of the proposed rule, MSHA's QRA compared the risks for two hypothetical cohorts of miners with the same occupation/coal rank distribution. The cohort designed to characterize risks to current workforce was assigned 45-year life-time exposures based on current monitoring data. The comparison cohort was assigned 45-year life-time exposures designed to represent risks associated with two provisions of the proposed rule (i.e.,

lowering the limit from 2.0 mg/m^3 to 1.0 mg/m^3 and basing determinations of noncompliance on single samples rather than the average of 5 samples). Since the two cohorts being compared are independent, it is important to note two important caveats: 1) no benefits were projected for slowing or stopping the progression of disease among the population that has experienced current (or historical) exposures during their working lifetime; and 2) due to the latency between exposure and disease, especially for such endpoints as severe emphysema, a large portion of the benefits estimated by this analysis would not be expected to accrue for many years into the future.

In summary, MSHA estimates that over a 45-year working lifetime two provisions of the proposed rule (i.e., lowering the limit from 2.0 mg/m^3 to 1.0 mg/m^3 and basing determinations of noncompliance on single samples rather than the average of 5 samples) would prevent: 1,301 cases of coal workers' pneumoconiosis (CWP 1+); 985 cases of CWP 2+; 641 cases of progressive massive fibrosis (PMF); 556 cases of severe emphysema; and 106 deaths from non-malignant respiratory disease (NMRD). MSHA projects that there would be additional reductions in cases of CWP, PMF, severe emphysema, and NMRD resulting from other proposed changes. If the proposed requirement for full-shift sampling and the proposed definition of normal production shift had been in effect in 2009, the amount of dust on the samples would have been higher because of the longer time and the higher levels of production. Lowering exposures from these higher levels to the levels being proposed would result in additional benefits beyond those associated with the actual recorded sampling results. MSHA used additional data from the feasibility assessment to extrapolate the further impact of these two provisions. The results suggest an increase in the number of cases prevented to: 1,607 cases of CWP 1+; 1,216 cases of CWP 2+; 791 cases of PMF; 687cases of severe emphysema; and 131 deaths from non-malignant respiratory disease (NMRD).

MSHA did not quantify the benefits associated with several provisions of the proposed rule (e.g., sampling the designated occupations (DOs) and Part 90 miners on every production shift using the CPDM, periodic examinations, expanding the Part 90 option to surface miners). MSHA also projects that there would be reductions in cases of other adverse health effects that result from exposure to respirable coal mine dust, such as silicosis and chronic bronchitis, which the Agency has not quantified.

To estimate the monetary values of the reductions in cases of CWP1+, CWP2+, PMF, severe emphysema and deaths from NMRD, MSHA performed an analysis of the imputed value of illnesses and fatalities avoided based on a willingness-to-pay approach. This approach relies on the theory of compensating wage differentials (i.e., the wage premium paid to workers to accept the risk associated with various jobs) in the labor market. MSHA estimates that the proposed rule would result in a low of $99 to $197 million in benefits over a 45-year working lifetime.

When estimating the annual benefits it is necessary to take into account the timing of when the health benefits accrue. However, gauging the timing of reductions in chronic diseases that may not develop until years after initial exposure, and whose progression may not be instantly stopped even if exposure were completely eliminated, is quite difficult. MSHA did not have the data necessary to project the timing of CWP and related diseases. Furthermore, MSHA does not have data on the historical exposures of the current workforce of coal miners; they have already been exposed to various levels of respirable coal mine dust and some lung damage has invariably already been done.

See Chapter III of this analysis for a detailed explanation of the benefits of the proposed rule.

TECHNOLOGICAL FEASIBILITY

To meet the requirements of the proposed rule, operators would have to develop and follow well-designed dust control plans, train miners and certified persons, monitor concentrations of respirable coal mine dust over a full work shift using approved sampling devices, take corrective actions in the case of overexposures, report sampling results and plan changes to MSHA and the miners' representative, and conduct medical surveillance.

Sampling data indicate that not only are mine operators keeping miners' exposures at or below the levels required under the existing standards, but dust exposures at most operations average less than the proposed standard of 1.0 mg/m³. The majority of miners' exposures are at or below the limits in the proposed rule when sampling is conducted under the requirements of the existing standard. MSHA understands that these data reflect measurements under the existing sampling program and that requirements under the proposed rule (e.g., use of single full-shift samples to determine noncompliance, change in the definition of normal production shift) would result in higher measured exposures compared to the existing sampling program. However, existing engineering controls including ventilation, sprays and environmentally controlled cabs along with changes in work practices can be used to further reduce dust levels. MSHA acknowledges that in rare instances, some operators, after taking these actions, may encounter implementation issues as they attempt to comply with the proposed requirements and need to take additional measures to comply with the proposed standard. However, MSHA believes with the two-year phase-in period to allow mine operators time to come into compliance with the proposed 1.0 mg/m³ standard all coal mines will have sufficient time to either upgrade existing controls or to install additional measures to meet the proposed requirements.

The proposed rule would also require implementation of new and improved dust monitoring technology, the CPDM. The CPDM provides real-time information on respirable coal mine dust (respirable dust) levels to which miners are exposed. The proposal would require the operator to use the CPDM to sample certain underground occupations, after a 12- or 18-month phase-in period, unless notified by the Secretary. MSHA believes that the proposed phase-in periods would allow manufacturers enough time to produce the necessary quantity of CPDMs, and MSHA and operators enough time to train necessary personnel in the use and care of the device.

See Chapter IV of this analysis for the detailed evaluation of the technological feasibility of the proposed rule.

COST SUMMARY

MSHA estimates that the first year cost of the proposed rule would be approximately $72.4 to $93.2 million and the annualized cost of the proposed rule would be approximately $40.4 to $44.5 million.

The estimated first year costs of the proposed rule for underground coal mine operators would be approximately $63.6 to $84.4 million. Costs associated with the proposed requirement to use CPDMs ($51.5 million) and upgrading and maintaining existing engineering controls and work practices ($12.6 to $33.4 million) represent the most significant first year costs for underground coal operators.

The first year costs of the proposed rule for surface coal mine operators would be approximately $8.8 million. The proposed expansion of the Part 90 transfer option to surface miners represents the most significant first year cost for surface operators.

MSHA estimates that at a 7% discount rate, the annualized costs of the proposed rule for underground coal mine operators would be approximately $35.6 to 39.7 million. Costs associated with the proposed requirement to use CPDMs ($24.8 million) and upgrading and maintaining existing engineering controls and work practices ($5.1 to 9.1 million) represent the most significant annualized costs for underground coal operators.

MSHA estimates that at a 7% discount rate, the annualized costs of the proposed rule for surface coal operators would be approximately $4.8million. Costs associated with the proposed expansion of the Part 90 transfer option to surface miners ($1.9 million) represent 40 percent of the total annualized costs for surface operators.

For a detailed explanation of the estimated costs of the proposed rule see Chapter V of this analysis.

ECONOMIC FEASIBILITY

MSHA has traditionally used a revenue screening test—whether the annualized compliance costs of a regulation are less than 1 percent of revenues, or are negative (i.e., provide net cost savings)—to establish presumptively that compliance with the regulation is economically feasible for the mining industry. Based upon this test, MSHA has concluded that the requirements of the proposed rule are economically feasible since the estimated compliance costs for both underground and surface coal mines are below one percent of their estimated annual revenue.

EXECUTIVE ORDER 12866 AND THE REGULATORY FLEXIBILITY ACT

Executive Order 12866 requires that regulatory agencies assess the costs and benefits of intended regulations. MSHA has fulfilled this requirement for the proposed rule and based on its analysis of compliance costs, the Agency has determined that the proposed rule is not an economically significant regulatory action in terms of compliance costs under §3(f)(1) of Executive Order 12866. However, benefit effects of the proposed rule are likely to exceed $100 million and would be economically significant in terms of benefits.

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

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

NET BENEFITS

This section presents a summary of estimated benefits and costs of the proposed rule for informational purposes only. Under the Mine Act, MSHA is not required to use estimated net benefits as the basis for its decision. MSHA's estimates suggest, however, that net benefits are positive, with estimated annualized benefits ranging from $99 to $197 million and estimated annualized costs ranging from $40 to $44 million. The estimates of costs and benefits are only roughly comparable due to both limitations in the data and different underlying assumptions.

II. INDUSTRY PROFILE

INTRODUCTION

This chapter provides information concerning the structure and economic characteristics of the coal mining industry, including the number and type of mines and employees by type and size of mine. The source of these preliminary data is the U.S. Department of Labor, MSHA's Office of Program Evaluation and Information Resources (PEIR).

STRUCTURE OF THE MINING INDUSTRY

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

STRUCTURE OF THE UNDERGROUND COAL MINING INDUSTRY

The average number of active underground coal mines for 12 months ending January 2010, was 424. These mines employed 47,204 miners, excluding office workers. As of May 2010, there were 232 underground coal mine contractor firms with 6,685 employees, excluding office workers. Table II-1 presents the number of underground coal mines and miners, by size of mine.

Table II-1: Underground Coal Mines, Miners and Contractors (Excluding Office Employees), 12 month average By Employment Size

Size of Mine	UG Coal Mines	Employment at Underground Coal Mines, Excluding Office Employees
1-19 Employees	81	1,179
20-500 Employees	331	29,432
501+ Employees	12	9,708
Contractors	--	6,885
Total	424	47,204

There was an average of 881 active MMUs in underground coal mines during the 12 months ending January 2010. Table II-2 presents the 881 MMUs by employment size.

Table II-2: MMUs in Underground Coal Mines
12 Month Average by Employment Size

Size of Mine	Non-Longwall MMUs	Longwall MMUs	Total
1-19 Employees	81	0	81
20-500 Employees	686	22	708
501+ Employees	72	20	92
Total	839	42	881

STRUCTURE OF THE SURFACE COAL MINING INDUSTRY

The average number of active surface coal mines for the 12 month ending January 2010, was 1,123. These mines employed 56,067 miners, excluding office workers. As of May 2010, there were 2,431 surface coal mine contractor firms. These 2,431 firms had 23,817 employees, excluding office workers. Table II-3 presents the number of surface coal mines and miners, by size of mine.

Table II-3: Surface Coal Mines, Facilities, Miners and Contractors (Excluding Office Employees), 12 month average By Employment Size

Size of Mine	Surface Coal Mines	Employment at Surface Coal Mines, Excluding Office Employees
1-19 Employees	620	4,837
20-500 Employees	491	23,881
501+ Employees	12	3,532
Contractors	--	23,817
Total	1,123	56,067

ECONOMIC CHARACTERISTICS OF THE COAL MINING INDUSTRY

The estimated value of coal produced in U.S. underground coal mines in 2009 was $17 billion. The average open market U.S. sales price of underground coal for 2008 was $51.35 per short ton. The estimated value of coal produced in U.S. surface coal mines for 2009 was $16.6 billion. The average open market U.S. sales price of surface coal for 2008 was $22.35 per short ton. The price per short ton for underground and surface coal is from the Department of Energy (DOE), Energy Information Administration (EIA), *Annual Coal Report 2008*, October 2009, Table 28.

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

The U.S. surface coal sector produced an estimated 742.5 million short tons in 2009. The average price of coal in surface mines in 2008 was $22.35 per short ton. The U.S. underground coal sector produced an estimated 331.9 million short tons in 2009. The average price of coal in underground mines in 2008 was $51.35 short per ton. Table II-4 presents the coal production and revenues for 2009.

Table II-4: Coal Production in Short Tons and Coal Revenues in 2009

Coal Production in Short Tons			
Mine Size	Coal-Surface	Coal-UG	Total
1-19 Employees	19,713,676	5,036,046	24,749,722
20-500 Employees	475,066,642	236,566,737	711,633,379
500+ Employees	247,760,869	90,256,010	338,016,879
Grand Total	742,541,187	331,858,793	1,074,399,980
Total Coal Revenues, Apportioned by Coal Tonnage Produced			
Mine Size	Coal-Surface	Coal-UG	Total
1-19 Employees	$440,600,659	$258,600,962	$699,201,621
20-500 Employees	$10,617,739,449	$12,147,701,945	$22,765,441,394
500+ Employees	$5,537,455,422	$4,634,646,114	$10,172,101,536
Grand Total	$16,595,795,530	$17,040,949,021	$33,636,744,551

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

III. BENEFITS

INTRODUCTION

This section presents a summary of the adverse health effects from exposure to respirable coal mine dust; health risks under the existing standard; estimated health risks under the proposed standard; and the estimated benefits resulting from proposed changes to Part 70 (underground coal mines), Part 71 (surface coal mines and surface work areas of underground coal mines), and Part 90 (coal miners who have evidence of the development of pneumoconiosis). The proposed changes are designed to lower miners' exposures by: phasing in reduced respirable coal mine dust standards; ensuring that sampling results more accurately represent conditions to which coal miners are exposed; providing for the use of a single, full-shift sample, by MSHA or the operator, to make compliance determinations; and phasing in the use of the continuous personal dust monitor (CPDM), a new sampling technology which provides real-time exposure measurement.

1. Lower Standard: Proposed §§ 70.100 and 71.100 would lower the standard over a period of 24 months from the existing 2.0 milligrams of respirable coal mine dust per cubic meter of air (mg/m^3) for 8 hours to 1.0 mg/m^3. Proposed § 90.100 would lower the standard for Part 90 miners (i.e., miners who have evidence of the development of pneumoconiosis) from the existing 1.0 mg/m^3 to 0.5 mg/m^3 over a period of 6 months. In addition, the proposed rule would lower the existing standards from 1.0 mg/m^3 to 0.5 mg/m^3 over a period of 6 months for intake air and belt air courses.

2. Compliance Determinations Based on a Single Shift Sample: Under proposed § 72.800, MSHA would base a determination of non-compliance on a single, full-shift sample of respirable coal mine dust. This compliance sampling strategy, applicable to both MSHA and the operator's programs, would replace the existing method of issuing citations based on the average of multiple samples. Averaging multiple measurements can mask overexposures by diluting a measurement of high dust exposure with lower measurements.

3. Compliance Determinations Based on Full-Shift Sampling: Proposed §§ 70.201(e), 71.201(b), and 90.201(b) would require that sampling devices be worn from portal to portal during the entire length of each sampled shift, so that the sample would account for all the time that a miner works. For shifts longer than 8 hours, the measured concentration would be adjusted to an 8-hour exposure. Under the existing standards, sampling devices are worn for a maximum of 8 hours.

4. Compliance Determinations Based on Normal Production: Under proposed § 70.201(i), MSHA would change the definition of "normal production shift" to reflect a more reliable representation of the operator's actual production, as determined by the average over the 30 most recent production shifts. The existing standards require sampling during production of at least 50 percent of average production.

5. Use of the Continuous Personal Dust Monitor (CPDM): The proposal would phase-in, over an 18-month period, the use of the CPDM for underground production miners and Part 90 miners. Because all samples taken for compliance purposes with the approved coal mine dust personal sampler units must be transmitted to MSHA for processing, the results are not known for days after sampling. If the results require the operator to take corrective action to reduce respirable coal mine dust concentrations, those efforts would affect only exposures on subsequent work shifts. The CPDM would provide mine operators and miners with information about the actual dust levels in the workplace on a real-time basis. This would permit mine management and miners to be proactive in taking corrective action during the shift to prevent overexposures by implementing appropriate measures to correct problems as they arise.

To estimate the benefits of the proposed regulation MSHA's QRA compared the risks for two hypothetical cohorts of miners with the same occupation/coal rank distribution. The cohort designed to characterize risks to current workforce was assigned 45-year life-time exposures based on current monitoring data. The comparison cohort was assigned 45-year life-time exposures designed to represent risks associated with two provisions of the proposed rule (i.e., lowering the limit from 2.0 mg/m^3 to 1.0 mg/m^3 and basing determinations of noncompliance on single samples rather than the average of 5 samples). Since the two cohorts being compared are independent, it is important to note two important caveats: 1) no benefits were projected for slowing or stopping the progression of disease among the population that has experienced current (or historical) exposures during their working lifetime; and 2) due to the latency between exposure and disease, especially for such endpoints as severe emphysema, a large portion of the benefits estimated by this analysis would not be expected to accrue for many years into the future.

In summary, MSHA estimates that over a 45-year working lifetime, two provisions of the proposed rule (i.e., lowering the limit from 2.0 mg/m^3 to 1.0 mg/m^3 and basing determinations of noncompliance on single samples rather than the average of 5 samples) would prevent: 1,301 cases of coal workers' pneumoconiosis (CWP 1+); 985 cases of CWP 2+; 641 cases of progressive massive fibrosis (PMF); 556 cases of severe emphysema; and 106 deaths from non-malignant respiratory disease (NMRD). MSHA projects that there would be additional reductions in cases of CWP, PMF, severe emphysema, and NMRD resulting from other proposed changes. The proposed requirement for full-shift sampling and the proposed definition of normal production shift had been in effect in 2009, then the amount of dust on the samples would have been higher the because of the longer time and the higher levels of production. Lowering exposures from these higher levels to the levels being proposed would result in additional benefits beyond those associated with the actual recorded sampling results. MSHA used additional data from the feasibility assessment to extrapolate the further impact of these two provisions. The results suggest an increase in the number of cases prevented to: 1,607 cases of CWP 1+; 1,216 cases of CWP 2+; 791 cases of PMF; 687cases of severe emphysema; and 131 deaths from non-malignant respiratory disease (NMRD).

MSHA did not quantify the benefits associated with several provisions of the proposed rule (e.g., sampling the designated occupations (DOs) and Part 90 miners on every production shift using the CPDM, periodic examinations, expanding the Part 90 option to surface miners). MSHA also projects that there would be reductions in cases of

other adverse health effects that result from exposure to respirable coal mine dust, such as silicosis and chronic bronchitis, which the Agency has not quantified.

The basis for these estimates is presented below.

ADVERSE HEALTH EFFECTS FROM EXPOSURE TO RESPIRABLE COAL MINE DUST

Exposure to excessive levels of respirable coal mine dust, which includes quartz in varying proportions, imposes significant health risks on miners. These include the following adverse health effects: coal workers' pneumoconiosis (CWP), progressive massive fibrosis (PMF), silicosis, and chronic obstructive pulmonary disease (COPD) (e.g., chronic bronchitis, emphysema). Cumulative exposure to respirable coal mine dust is the main determinant in the development of both simple CWP and PMF, although other factors, such as the percentage of quartz in the respirable coal mine dust and the type of coal, also affect the risk of miners developing respiratory disease.

Three documents that examined the program to control respirable coal mine dust in U.S. mines were MSHA's Respirable Dust Task Group Report, the National Institute for Occupational Safety and Health's (NIOSH) Criteria Document on Occupational Exposure to Respirable Coal Mine Dust, and the Report of the Secretary of Labor's Advisory Committee on the Elimination of Pneumoconiosis Among Coal Mine Workers. While recognizing that significant progress had been made to reduce respirable coal mine dust levels in coal mines, these documents concluded that there are existing practices in the dust program that should be changed to provide miners with increased health protection. This proposed rule would address many of the recommendations made in those documents. The primary benefit of the proposed rule is the reduction of occupational lung disease among coal miners from improving the existing program to control respirable coal mine dust and quartz, and reducing miners' exposure to these hazards.

DETERMINING THE HEALTH RISKS OF EXPOSURE UNDER EXISTING EXPOSURE CONDITIONS AND APPROACH FOR DETERMINING COMPLIANCE

In 2000 and 2003, MSHA conducted quantitative assessments of the health risks (referred to hereafter as QRAs) associated with exposures to respirable coal mine dust under the existing standard, and possible reductions in exposures under proposed rules at that time, including possible reductions in adverse health effects. In 2010, the Agency conducted a new QRA, which was peer-reviewed by the Occupational Safety and Health Administration and NIOSH. The 2010 QRA estimated the effects of the proposed lowering of the standard to 1.0 mg/m^3 for most miners (0.5 mg/m^3 for Part 90 miners) and the proposed use of single samples to determine noncompliance.

Source of Exposure Data

As was done in MSHA's two previous QRAs, the Agency based its 2010 QRA on the existing exposures for the coal mining population. MSHA primarily limited the data

used for the 2010 QRA to valid samples taken by MSHA inspectors on the first day of sampling (Day-1 samples) to reduce biases that could result from using samples taken during subsequent days of multiple-day sampling when conditions might have been altered. From a database of nearly 200,000 inspector samples in the MSHA Standardized Information System that were taken during the period 2004 – 2008, the Agency excluded approximately 18,000 samples that had been voided. An additional 14,000 samples were removed because they were within 21 days of a prior inspection and they could not be considered to have come from independent inspections. 10,000 Day-1 intake air samples were excluded and 11,000 other Day-1 samples were removed because they could not be linked to an occupational exposure. After the exclusion, approximately 147,000 valid Day-1 inspector samples remained in the dataset.

Methods for Estimating Existing Exposures

MSHA limited its 2000 and 2003 QRAs to underground mines exhibiting a group of recurrent exposures (recurrency measure), which was defined as two or more samples that exceeded the applicable standard in a year. In the earlier QRAs, the Agency used three exposure groups: designated occupation (DO), non-designated occupation (NDO), and roof-bolter designated area (RB-DA).

MSHA's approach in the earlier QRAs was based on the assumption that the designated occupation would have the highest exposure at each mechanized mining unit (MMU) and that reducing exposure for a DO would also reduce exposures for the NDOs at that MMU by a commensurate amount. However, later statistical analyses revealed that at least one NDO exposure exceeded the associated DO exposure on more than 50 percent of MSHA's Day 1 respirable coal mine dust sampling inspections during 2000-2002 (Kogut, 2003) and that at least one NDO exposure exceeded the associated DO exposure on 55 percent of the Day-1 shifts inspected during 2004 – 2008, (2010 QRA, p. 7).

Based on these findings and to better reflect the variability among exposures, MSHA used a more disaggregated approach for the 2010 QRA. Specifically, for the 2010 QRA, MSHA developed estimates for many more categories or groups of exposures, according to work location, coal "rank" (carbon content), and recurrency (how frequently measurements exceeded 2.0 mg/m^3 or 1.0 mg/m^3), as explained below.

MSHA stratified the 2004-2008 exposure data according to work location (WL). Each WL consisted of miners in the same job category who worked in the same general area. There were 12,634 WLs in underground mines, 7,811 WLs in surface mines, and 3,585 WLs in surface processing facilities. When there were fewer than two inspector samples for a specific job category in a specific work location, or the average of the inspector samples was less than the average of the operator samples, MSHA combined inspector and operator samples to estimate exposures. MSHA then sorted the data within each WL according to three factors:

- By occupation -- The 2010 QRA used 33 occupational categories, plus a separate category for Part 90 miners.

- By coal rank -- Rank is a measure of carbon content. Higher rank is associated with higher risk of lung disease. MSHA's 2010 QRA used three coal rank categories:
    - Anthracite;
    - High-rank bituminous, containing less than 4% of moisture in air-dried coal or more than 84 percent of carbon in dry, ash-free coal; and
    - Low/medium rank.
- By recurrency class -- MSHA's 2010 QRA used three recurrency classes:
    - WLs with at least two valid samples greater than 2.0 mg/m^3 in 2008;
    - WLs with at least two samples between 1.0 mg/m^3 and 2.0 mg/m^3 in 2008; and
    - WLs with no more than one valid sample greater than 1.0 mg/m^3 in 2008.

Together, these three factors defined groupings of work environments that presented similar health risks to miners. The use of disaggregated data (i.e., data stratified by three factors), permits the identification of high risk combinations that would likely be missed if just the average exposures of large groups with dissimilar risks were considered.

Estimated Adverse Health Effects

MSHA estimated the numbers of adverse health effects that would result from a 45-year working life-time of exposures to respirable coal mine dust under existing conditions, using the existing approach to determining compliance by applying statistical modeling techniques to the estimated average exposures for groupings of WLs. MSHA's 2010 QRA used three exposure models to estimate the risks of five adverse health effects:

- The risk of developing CWP 1+;
- The risk of developing CWP 2+;
- The risk of developing PMF;
- The risk of developing severe emphysema; and
- The risk of dying from non-malignant respiratory disease (NMRD), which includes emphysema, chronic bronchitis, CWP, PMF, and silicosis.

Model 1. As was done in its 2000 and 2003 QRAs, MSHA used the 1995 Attfield-Seixas model to relate constant levels of exposure to respirable coal mine dust for 45 years to cases of CWP and PMF. The more detailed categorization of exposures in the 2010 QRA compared to the previous QRAs improved the accuracy of estimates, for example, by enabling separate equations for high-rank and low/medium rank coal. More data points allowed estimates to more closely track the nonlinear nature of the exposure-response model.

Model 2. The Agency used the model in the 2009 Kuempel *et al.* study of the relationship between emphysema severity at autopsy and impaired lung function during life to estimate the number of cases of severe emphysema that would result from 45 years of levels of exposure to respirable coal mine dust under existing conditions and the existing methods of determining compliance.

Model 3. Mortality due to non-malignant respiratory disease (NMRD) includes deaths ascribed to either pneumoconiosis or any of the various chronic obstructive pulmonary diseases (COPD) including emphysema, bronchitis, and chronic airways obstruction. The Agency used the model in the 2008 Attfield-Kuempel *et al.* study of the relationship between cumulative exposure to respirable coal mine dust among working coal miners and causes of death as recorded on their death certificates to estimate cases of NMRD.

Estimated Cases per Thousand Miners based on Existing Conditions

- Pneumoconioses. Among every one-thousand miners who work 45 years in coal mines under existing conditions, MSHA estimates that there would be between 2 and 652 cases of CWP 1+, between 1 and 715 cases of CWP 2+, and between 1 and 643 cases of PMF by age 73, depending on occupation. The occupation associated with the lowest rate of illness is the utility man at surface anthracite mines and the occupation associated with the highest rate of illness is classified as other underground workers in high rank bituminous mines. (See Tables 13 – 15 in the 2010 QRA.)
- Emphysema. Among every one-thousand white miners who work 45 years in coal mines under existing conditions and never smoked, MSHA estimates that there would be between 6 and 306 cases of severe emphysema by age 73, depending on occupation. The occupation associated with the lowest rate of illness is the crane/dragline operator at surface and the occupation associated with the highest rate of illness is classified as other underground workers. (See Table 16 in the 2010 QRA. MSHA developed separate estimates of the risk of developing severe emphysema per thousand exposed miners for whites and non-whites. However, since MSHA does not have employment data by race, the Agency used the risk factors for white miners, which are lower than for non-whites, to estimate the benefits.)
- Non–Malignant Respiratory Disease. Among every one-thousand miners who work 45 years in coal mines under existing conditions, MSHA estimates that there would be between 1 and 164 deaths from NMRD by age 73, depending on occupation. Several occupations at low rank surface mines are associated with the lowest rate of illness and the utility man that surface anthracite mines is associated with the highest rate of illness. (See Table 17 in the 2010 QRA.)

The 2010 QRA only evaluated the three adverse health effects noted above and did not address other adverse health effects that could result from exposure to respirable coal mine dust.

ESTIMATED IMPACT OF THE PROPOSED RULE ON MINERS' EXPOSURES

In the 2010 QRA, MSHA projected average exposures in each WL for a cohort of miners assumed to be exposed only to conditions consistent with the proposed reduction in the PEL and the proposed application of single sample to determine noncompliance for a 45-year working life-time. That is, the cohort modeled in this portion of the assessment was assumed not

to have had the prior exposures that the actual current population of miners has experienced to date over their working lifetime.

Furthermore, MSHA's 2010 did not consider other changes in the proposed rule (e.g., sampling for the full-shift, changes in the definition of normal production shift, and sampling the DOs and Part 90 miners on every production shift using the CPDM). The Agency then aggregated the projections by the same groupings of work environments as used in evaluating existing risks. MSHA assumed that exposures for samples that currently exceed the proposed standards of 1.0 mg/m^3, or of 0.5 mg/m^3 for Part 90 miners would be reduced to exactly the proposed standards. For non-Part 90 miners, all samples greater than 1.0 mg/m^3 were replaced by a value of 1.0 mg/m^3 and for Part 90 miners all samples greater than 0.5 mg /m^3 were replaced by a value of 0.5 mg /m^3.

In estimating the impact of the proposed rule, MSHA assumed that exposures that currently exceed the proposed standard of 1.0 mg/m^3 for non-Part 90 miners would be lowered to exactly 1.0 mg/m^3. Although the majority of miners' exposures are currently at or below 1.0 mg/m^3, the percentage of samples above 1.0 mg/m^3 taken at the WLs ranges from less than 1 percent for a few surface occupations to more than 70 percent for longwall tailgate operators.

MSHA also assumed that exposures that currently exceed the proposed standard of 0.5 mg/m^3 for Part 90 miners would be lowered to exactly 0.5 mg/m^3. For Part 90 miners, exposures currently exceed 0.5 mg/m^3 at more than 20 percent of WLs.

MSHA projected that average exposures in each WL with exposures under existing standards between 1.0 mg/m^3 and 2.0 mg/m^3 would be lowered by an average of nearly one third. MSHA projected that most Part 90 miners would experience a reduction in average dust concentration of about 40 percent.

MSHA used the models based on the Attfield-Seixas, Kuempel *et al.*, and Attfield-Kuempel *et al.* studies described above to estimate the adverse health effects under conditions consistent with two provisions of the proposed rule. With the average exposures that would occur under the lower limit and single, full-shift sample provisions of the proposed rule, MSHA's 2010 QRA estimated the following risks among every one-thousand exposed miners who work 45 years in coal mines:

- Pneumoconioses. Among every one-thousand miners who work 45 years in coal mines, MSHA projects that there would be between 2 and 178 cases of CWP 1+, between 1 and 141 cases of CWP 2+, and between 1 and 97 cases of PMF by age 73, depending on occupation. The occupation associated with the lowest rate of illness is the utility man at surface anthracite mines and the occupation associated with the highest rate of illness is the utility man in high rank bituminous mines. (See Tables 21 – 23 in the 2010 QRA.)
- Emphysema. Among every one-thousand white miners who work 45 years in coal mines and never smoked, MSHA projects that there would be between 5 and 94 cases of severe emphysema by age 73, depending on occupation. The occupation associated with the lowest rate of illness is the crane/dragline operator at surface and the occupation associated with the highest rate of

illness is the utility man in high rank bituminous mines. (See Table 24 in the 2010 QRA.)

- Non–Malignant Respiratory Disease. Among every one-thousand miners who work 45 years in coal mines, MSHA projects that there would be between 1 and 110 deaths from NMRD by age 73, depending on occupation. Several occupations at surface mines are associated with the lowest rate of illness and other surface workers at anthracite mines is associated with the highest rate of illness. (See Table 25 in the 2010 QRA.)

REDUCTION IN RISK UNDER THE PROPOSED RULE

By subtracting the risk estimated under exposure conditions consistent with the proposed rule from the estimated risks based on average exposures from 2004 – 2008 using the existing approach to compliance, MSHA estimated the change in risk that might be associated with two provisions of the proposed rule. Table III-1 shows the reduction in risks by age 73 per one-thousand exposed miners who work 45 years in coal mines would be as follows:

- Pneumoconioses. Among every one-thousand miners who work 45 years in coal mines, MSHA projects that there would be a reduction of between 1 and 105 cases of CWP 1+, between 1 and 102 cases of CWP 2+, and up to 75 cases of PMF, by age 73, depending on occupation. Several occupations at surface mines are associated with the lowest reductions of illness and the cutting machine operator at underground mines is associated with the highest reduction of illness.
- Emphysema. Among every one-thousand white miners who work 45 years in coal mines and never smoked, MSHA projects that there would be a reduction of up to 35 cases of severe emphysema by age 73, depending on occupation. Several occupations at surface mines are associated with the lowest reductions of illness and the cutting machine operator at underground mines is associated with the highest reduction of illness.
- Non–Malignant Respiratory Disease. Among every one-thousand miners who work 45 years in coal mines, MSHA projects that there would be a reduction of between 1 and 6 deaths from NMRD by age 73, depending on occupation. Several occupations at surface mines are associated with the lowest reductions of illness and the cutting machine operator at underground mines is associated with the highest reduction of illness.

Application of Risk Reduction Estimates to Population of Miners

MSHA then applied these risk estimates (i.e., the numbers of cases and deaths prevented per thousand exposed miners) to the current number of coal miners estimated to be in each occupation2. As shown in Table III-2, over a 45-year period, MSHA

[2] Employment estimates by occupation were developed by MSHA's Coal Division of Health.

estimates that there would be 1,301 cases of CWP 1+, 985 cases of CWP 2+, 641 cases of PMF, 556 cases of severe emphysema, and 106 deaths from NMRD prevented.

These are chronic diseases requiring many years to develop. The literature on the health effects resulting from exposure to respirable coal mine dust indicates that there are various latency periods associated with the various effects, and that the latency may be associated with the intensity of exposure. Due to the latency periods, one would not expect all benefits to materialize immediately after exposures have been substantially reduced or eliminated. To illustrate the impact of our uncertainty about the latency, when MSHA monetizes the stream of benefits (below) two alternative values are provided: one using a 10 year latency and one using no latency.

Similarly, because MSHA's analysis compares two separate cohorts who experience two different life-time exposure scenarios, it is not possible to quantify the reduction in risk that would occur to a population with who experienced a reduction in exposures. Such a calculation would require validated information on the shape of the cessation lag for each endpoint. For instance, in the case of cigarette smoking, we know that risks drop off dramatically five years after ceasing exposure. However the situation with coal miner exposure is not as straight forward in the mining context, where exposures are being reduced but not eliminated and where it is not clear how whether disease progression is halted or only slowed. Thus, no benefits were projected for slowing or stopping the progression of disease among the population with previous exposures and an underlying disease burden.

Table III-1: Estimated Reduction in Risk (Defined as Adverse Health Effects per 1,000 Exposed Miners) from the Proposed Lowering of the Limit from 2.0 mg/m^3 to 1.0 mg/m^3 and from Basing Determinations of Noncompliance on Single Samples, By Occupation

Occupation	CWP 1+	CWP 2+	PMF	Severe Emphysema	Deaths from NMRD
Underground Coal Miners:					
Auger Operator	46	38	25	18	3
Continuous Miner Operator	68	57	38	27	4
Cutting Machine Operator	105	102	75	35	6
Drill Operator	28	22	16	10	2
Electrician & Helper	18	12	7	8	1
Laborer	30	21	14	12	3
Loading Machine Operator	7	5	4	3	0.4
LW Headgate Operator	50	39	26	20	3
LW Jacksetter	55	46	30	22	3
LW Tailgate Operator	82	76	54	30	5
Mechanic & Helper	24	17	11	10	2
Mobile Bridge Operator	27	22	14	10	2
Roof Bolter	32	24	16	13	2
Scoop Car Operator	24	18	11	10	2
Section Foreman	13	10	6	5	1
Shuttle Car Operator	24	17	11	10	2
Uni-Hauler Operator	13	10	6	5	1
Utility Man	25	18	11	11	2
All Other Underground Jobs	43	35	25	17	3
Surface Coal Miners:					
Auger Operator	3	2	1	2	0.2
Backhoe Operator	1	1	0	0.4	0.1
Bulldozer Operator	1	1	1	0.3	0.04
Cleaning Plant Operator	9	6	1	1	0.3
Crane/Dragline Operator	2	1	3	5	1
Highwall Drill Operator	5	3	1	3	0.4
Electrician & Helper	5	3	1	3	0.4
Highlift/Front End Loader Opr	2	1	1	1	0.2
Laborer/Blacksmith	9	6	4	4	1
Mechanic/Helper	8	4	2	4	1
Tipple Operator	5	2	1	3	0.4
Truck Driver	1	1	1	0.3	0.04
Utility Man	9	6	3	5	1
All Other Surface Jobs	5	4	2	3	1
Part 90 Coal Miners	35	27	19	14	2

Source: MSHA 2010 QRA

Table III-2: Estimated Number of Adverse Health Effects Prevented[2] Over 45 years from Two Provisions of the Proposed Rule (Lowering the Limit from 2.0 mg/m^3 to 1.0 mg/m^3 and Basing Determinations of Noncompliance on Single Samples)

Occupation	Employment[1]	CWP 1+	CWP 2+	PMF	Severe Emphysema	Deaths from NMRD
Underground Coal Miners:	33,042	1,065.3	823.4	550.8	430.3	74.9
Auger Operator	10	0.5	0.4	0.3	0.2	0.03
Continuous Miner Operator	2,305	156.7	131.4	87.6	62.2	9.2
Cutting Machine Operator	26	2.7	2.7	2.0	0.9	0.2
Drill Operator	28	0.8	0.6	0.4	0.3	0.1
Electrician & Helper	3,474	62.5	41.7	24.3	27.8	3.5
Laborer	2,287	68.6	48.0	32.0	27.4	6.9
Loading Machine Operator	307	2.1	1.5	1.2	0.9	0.1
LW Headgate Operator	253	12.7	9.9	6.6	5.1	0.8
LW Jacksetter	386	21.2	17.8	11.6	8.5	1.2
LW Tailgate Operator	133	10.9	10.1	7.2	4.0	0.7
Mechanic & Helper	830	19.9	14.1	9.1	8.3	1.7
Mobile Bridge Operator	900	24.3	19.8	12.6	9.0	1.8
Roof Bolter	5,550	177.6	133.2	88.8	72.2	11.1
Scoop Car Operator	2,009	48.2	36.2	22.1	20.1	4.0
Section Foreman	1,866	24.3	18.7	11.2	9.3	1.9
Shuttle Car Operator	5,053	121.3	85.9	55.6	50.5	10.1
Uni-Hauler Operator	198	2.6	2.0	1.2	1.0	0.2
Utility Man	613	15.3	11.0	6.7	6.7	1.2
All Other UG Jobs	6,814	293.0	238.5	170.4	115.8	20.4
Surface Coal Miners:	51,257	233.4	159.6	89.2	124.8	31.1
Auger Operator	166	0.5	0.3	0.2	0.3	0.03
Backhoe Operator	1,055	1.1	1.1	0.0	0.4	0.1
Bulldozer Operator	3,958	4.0	4.0	4.0	1.2	0.2
Cleaning Plant Operator	596	5.4	3.6	0.6	0.6	0.2
Crane/Dragline Operator	612	1.2	0.6	1.8	3.0	0.6
Highwall Drill Operator	1,422	7.1	4.3	1.4	4.3	0.6
Electrician & Helper	2,416	12.1	7.2	2.4	7.2	1.0
Highlift/Front End Loader Opr	4,080	8.2	4.1	4.1	4.1	0.8
Laborer/Blacksmith	2,943	26.5	17.7	11.8	11.8	2.9
Mechanic/Helper	4,907	39.3	19.6	9.8	19.6	4.9
Tipple Operator	720	3.6	1.4	0.7	2.2	0.3
Truck Driver	9,179	9.2	9.2	9.2	2.8	0.4
Utility Man	4,865	43.8	29.2	14.6	24.3	4.9
All Other Surface Jobs	14,338	71.7	57.4	28.7	43.0	14.3
Part 90 Coal Miners	66	2.3	1.8	1.3	0.9	0.1
Total All Coal Miners	84,365	1,301.0	984.7	641.3	556.0	106.2

[1] Employment estimates by occupation were developed by MSHA's Coal Division of Health

[2] Number of adverse health effects prevented = (Employment/1000) x (Reduction in excess risk per 1000 exposed miners)

Extrapolation of Additional Benefits from Shift and Production Adjustments to Determining Compliance

MSHA's 2010 QRA presents estimates for two of the proposed changes – lowering the limit from 2.0 mg/m^3 to 1.0 mg/m^3 and basing determinations of noncompliance on single samples rather than the average of 5 samples. However, as is explained in the Technological Feasibility section, if the proposed requirement for full-shift sampling and the proposed definition of normal production shift had been in effect in 2009, the amount of dust on the samples would have been higher the because of the longer time and the higher levels of production. Lowering exposures from these higher levels to the levels being proposed would result in additional benefits beyond those associated with the recorded sampling results.

To illustrate how much these two requirements could increase the benefits, MSHA assumed that the additional reduction in health effects would be proportional to the additional reduction in exposure associated with the two additional proposed provisions. MSHA used the factors developed for adjusting exposures to assess technological feasibility (see IV. Technological Feasibility for the derivation of these factors) to also adjust the benefit estimates. For underground and Part 90 miners, MSHA multiplied the benefits by a factor of 1.13 to account for the application of full shift sampling and by a factor of 1.09 to account for the application of the proposed definition of normal production shift. For surface miners, MSHA multiplied the benefits by a factor of 1.25 to account for the application of full shift sampling. The benefit estimates presented in Table III-3 are the estimates in Table III-2, plus the estimates associated with two other provisions of the proposed rule (i.e., adjusted by the factors from the Feasibility Assessment to account for full-shift sampling and the proposed definition of normal production shift).

Table III-3: Estimated Number of Adverse Health Effects Prevented Over 45 years from the Four Provisions of the Proposal (Lowering the Limit from 2.0 mg/m^3 to 1.0 mg/m^3, Two Changes to the Sampling Strategy and the Revised Definition of Normal Production Shift)

Miner	CWP 1+	CWP 2+	PMF	Severe Emphysema	Deaths from NMRD
Underground and Part 90	1,315	1,016	680	531	92
Surface	291	200	111	156	39
Total	1,606	1,216	791	687	131

ESTIMATED MONETIZED VALUE OF FATALITIES AND ILLNESSES PREVENTED

To estimate the monetary values of the reductions in cases of CWP 1+, CWP 2+, PMF, severe emphysema and deaths from NMRD, MSHA performed an analysis of the imputed value of illnesses and fatalities avoided based on a willingness-to-pay approach. This approach relies on the theory of compensating wage differentials (i.e., the wage

premium paid to workers to accept the risk associated with various jobs) in the labor market. A number of studies have shown a correlation between higher job risk and higher wages, suggesting that employees demand monetary compensation in return for incurring a greater risk of illness or fatality.

Viscusi & Aldy (2003) conducted an analysis of studies that use a willingness-to-pay methodology to estimate the imputed value of life-saving programs (i.e., meta-analysis) and found that each fatality avoided was valued at approximately $7 million and each lost work-day injury was approximately $50,000 in 2000 dollars. Using the GDP Deflator (U.S. Bureau of Economic Analysis, 2010), this yields an estimate of $8.7 million for each fatality avoided and $62,000 for each injury avoided in 2009 dollars. MSHA is using the $8.7 million estimate for the value of a death prevented and $62,000 for each case of CWP 1+ or CWP 2+ prevented. This value of a statistical life (VSL) estimate is within the range of the substantial majority of such estimates in the literature ($1 million to $10 million per statistical life), as discussed in OMB Circular A-4 (OMB, 2003).

Given the disabling consequences of PMF and severe emphysema, MSHA does not believe that limiting the value to the estimate for lost workday injuries is appropriate. Instead, MSHA based the value of a case of PMF and severe emphysema prevented on the work of Magat, Viscusi & Huber (1996), which estimated the value of a non-fatal cancer avoided. The Occupational Safety and Health Administration (OSHA) used this approach in the Final Economic Analysis (FEA) supporting its hexavalent chromium final rule, and Environmental Protection Agency (EPA) used this approach in its Stage 2 Disinfectants and Disinfection Byproducts water rule (EPA, 2003). Although PMF and severe emphysema are not non-fatal cancers, MSHA believes that they have a similar impact on the quality of life and would thus result in similar valuations. Based on Magat, Viscusi & Huber (1996), EPA valued the prevention of a case of nonfatal cancer at 58.3 percent of the value of a fatal cancer avoided. MSHA estimates the value of a case of PMF or severe emphysema prevented to be $5.1 million ($5.1 million = 58.3 percent of $8.7 million).

Although MSHA is using the willingness-to-pay approach as the basis for monetizing the expected benefits of the proposed rule, the Agency does so with several reservations, given the methodological difficulties involved in estimating the compensating wage differentials (see Hintermann, Alberini and Markandya, 2008). Furthermore, these estimates pooled across different industries may not capture the unique circumstances faced by coal miners. For example, some have suggested that VSL models be disaggregated to account for different levels of risk, as might occur in coal mining (see Sunstein, 2004). In addition, coal miners may have few options of alternative employers and in some cases only one employer (near-monopsony or monopsony) that may depress wages below those in a more competitive labor market.

MSHA developed the estimates in Table III-4 by multiplying the number of adverse health effects in Tables III-2 and III-3 by the monetized value of each adverse health effect.

Table III-4: Estimated Value of Adverse Health Effects Prevented

Over a 45-Years[1] Work Lifetime (Millions of 2009 Dollars)

	CWP 1+	CWP 2+	PMF	Severe Emphysema	Deaths from NMRD	Total
Benefits Based Upon Table III-2 (i.e., based on 2010 QRA)						
Underground and Part 90 Miners	66	51	2,815	2,198	653	5,783
Surface Miners	14	10	454	638	270	1,386
Total	80	61	3,269	2,836	923	7,169
Benefits Based Upon Table III-3 (i.e. includes additional provisions extrapolated from 2010 QRA results)						
Underground and Part 90 Miners	82	63	3,467	2,707	804	7,123
Surface Miners	18	12	567	797	337	1,731
Total	100	75	4,034	3,504	1,141	8,854

[1]Estimate is for a cohort of workers who begin working in mines after the proposed changes are in place.

Estimated Annualized Monetized Benefits

The monetized benefits in Table III-4 cover a 45-year period. When estimating the annual benefits it is necessary to take the timing of when the health benefits accrue into account. However, it is quite difficult to gauge the timing of reductions in chronic diseases that may not develop until years after initial exposure and whose progression may not be instantly stopped even if exposure were completely eliminated. MSHA did not have the data necessary to project the timing of CWP and related diseases. Furthermore, MSHA does not have data on the historical exposures of the current workforce of coal miners; they have already been exposed to various levels of respirable coal mine dust and some lung damage has invariably already been done. In the absence of this data and the information on the latency and cessation lags, MSHA estimated the monetized benefits under two alternative assumptions to illustrate some of the uncertainty in its estimates.

- First, MSHA made the assumption that benefits begin immediately and that annual benefits equal lifetime benefits divided by 45 years. This assumption is equivalent to assuming that the benefits begin to accrue in the first year after the provisions are put into effect, which MSHA admits is highly unrealistic.
- Second, MSHA assumed that no benefits would occur for the first 10 years and that the annualized benefit for each of the next 35 years would be equal to the projected benefits divided by 35 years.

The impact of each of these assumptions is calculated using a 7 percent discount rate, consistent with OMB's Circular A-4.

Table III-5 Annualized Benefits (Millions of 2009 Dollars)

Distribution Assumptions:	**7% Discount Rate, 45 years**	
	2 provisions	4 provisions
Immediate, evenly distributed		
Underground/Part 90	$128.5	$158.3
Surface	$30.8	$38.5
….Total	$159.3	$196.8

10-year latency, evenly distributed		
Underground/Part 90	$79.9	$98.5
Surface	$19.2	$24.0
….Total	$99.1	$122.4

Uncertainties in the Benefits Estimates

The analysis numbers presented in Table III-5 might be viewed as incomplete estimates because they do not include the potential impacts of other provisions of the proposed rule. In addition, MSHA's estimates are based on a series of simplifying assumptions. The impact of these assumptions on the total benefits depends on the degree of the mismatch between the assumption and reality. Unfortunately, MSHA does not have the data to quantify this uncertainty. However, the impact of assumptions about the timing of the benefits probably has the most significant impact on the estimated monetized benefits.

Summary of Limitations and Assumptions:

- MSHA did not quantify the benefits associated with several provisions of the proposed rule (e.g., sampling the designated occupations (DOs) and Part 90 miners on every production shift using the CPDM, periodic examinations, expanding the Part 90 option to surface miners).
- MSHA does not have data from which to predict disease latency, thus it is not clear how soon the benefits estimated in this analysis will accrue.
- MSHA's analysis compares two separate cohorts who experience two different life-time exposure scenarios, thus, it is not clear whether the actual cohort of miners (who already have prior exposures) are likely to experience the magnitude of "avoided" adverse health effects documented.
- On the other hand, the lack of information on the distribution of cumulative exposures of current miners (e.g., the distribution of the number of years that the current population of miners has worked in coal mines) and the lack of information from which to specify a cessation lag means that no benefits were projected for slowing or stopping the progression of disease associated with historical exposures.
- In the QRA, MSHA assumes that operators would bring single-shift exposures that under existing standards exceed the proposed standard of 1.0 mg/m^3 (or 0.5 mg/m^3 for Part 90 miners) down to exactly the proposed standard. It is possible that exposures would be reduced to even lower levels.
- MSHA's methodology did not take into account that the measures that operators may take to avoid having exposures on any shift exceed the proposed standards would also likely lower exposures that are now below the proposed exposure limit. Specifically, the proposed rule would require that the CPDM be used to monitor dust levels of the DOs and Part 90 miners on every shift. The CPDM

would enable mine management to be proactive and take immediate preventive action to avoid potentially excessive exposures.

- The Agency's QRA uses average exposures by occupation, coal rank, and recurrency class to estimate risk.
- Since MSHA does not have data on the racial composition of the mining population, the Agency applies the risk factors for whites to all miners when calculating the number of cases of severe emphysema that would be prevented. As shown in Table 28 of the 2010 QRA, the reduction in excess risk of severe emphysema per thousand exposed miners is greater for non-whites than for whites.
- MSHA's 2010 QRA does not take into account potential reductions in other adverse health effects associated with coal dust, particularly when the dust has high levels of certain minerals such as silica that might be reduced by the provisions of the proposed regulation.

IV. TECHNOLOGICAL FEASIBILITY

INTRODUCTION

This chapter discusses MSHA's evaluation of the technological feasibility of the proposed rule. Based on the analysis that follows, MSHA has determined that the proposed rule is technologically feasible.

To meet the requirements of the proposed rule, operators would have to develop and follow well-designed dust control plans, train miners and certified persons, monitor concentrations of respirable coal mine dust over a full work shift using approved sampling devices, take corrective actions in the case of overexposures, report sampling results and plan changes to MSHA and the miners' representative, and conduct medical surveillance.

The most significant change would require operators to meet dust exposure limits 50 percent lower than the existing limits. However, sampling data (see Table IV-1) indicate that not only are mine operators keeping miners' exposures at or below the levels required under the existing standards, but dust exposures at most operations average less than the proposed standard of 1.0 mg/m³. Thus the majority of miners' exposures are at or below the limits in the proposed rule. MSHA understands that these data reflect measurements under the existing sampling program and that requirements under the proposed rule (e.g. use of single full-shift samples to determine noncompliance, change in the definition of normal production shift) would result in higher exposures compared to the existing sampling program. However, existing engineering controls including ventilation, sprays and environmentally controlled cabs along with changes in work practices can be used to further reduce dust levels. MSHA acknowledges that in rare instances, some operators, after taking these actions, may encounter implementation issues as they attempt to comply with the proposed requirements and need to take additional measures to comply with the proposed standard.

To facilitate operator implementation of the requirements in the proposed rule related to the lower exposure limits, MSHA has included a two-year phase-in period to allow mine operators time to come into compliance with the proposed 1.0 mg/m³ standard. During this phase-in period, MSHA will work with the mining industry to help them identify, develop, and implement feasible engineering controls, and train miners and supervisors in new technology.

The proposal would also require implementation of new and improved dust monitoring technology, the CPDM. The CPDM provides real-time information on respirable coal mine dust (respirable dust) levels to which miners are exposed. Use of the CPDM, in conjunction with currently available control measures, would enable the operator to better monitor dust exposures during the shift and be proactive in taking appropriate corrective measures during the shift to prevent possible overexposures.

The proposal would require the operator to use the CPDM to sample certain underground occupations, after a 12- or 18-month phase-in period, unless notified by the Secretary. MSHA believes that the proposed phase-in periods would allow

manufacturers enough time to produce the necessary quantity of CPDMs, and MSHA and operators enough time to train necessary personnel in the use and care of the device.

MSHA acknowledges that, initially, some mines would encounter implementation issues as they attempt to comply with the proposed requirements. However, MSHA believes that most coal mines, regardless of their size and type of mining system being used, would be able to address any implementation issues and meet the requirements of the proposed rule within the proposed two-year phase-in period for the standards and 18 month phase-in period for the CPDM. MSHA believes that as a result of the proposed phase-in of the requirements, all coal mines, including longwall operations with the highest dust concentrations, would have sufficient time to either upgrade existing controls or to install additional measures to meet the proposed requirements.

FEASIBILITY OF COMPLYING WITH THE PROPOSED STANDARDS

This section presents MSHA's evaluation of the feasibility of maintaining miners' respirable dust exposures during each work shift at or below the exposure limits prescribed in the proposed rule. The evaluation is based on (1) an analysis of results of respirable coal mine dust samples (unadjusted and adjusted for full-shift and normal production, if applicable) that were collected by MSHA inspectors and mine operators during calendar year 2009; (2) review of the best practices currently available to control respirable coal mine dust in underground and surface coal mining operations; and (3) Agency enforcement experience.

On the basis of the Agency's evaluations of the 2009 sampling data, best practices, and the effectiveness of existing engineering controls that have developed into industry standards, MSHA has concluded that it is technologically feasible for the coal mining industry to reduce miners' exposure to the proposed respirable dust limits and maintain compliance on each work shift as prescribed in the proposed rule.

The proposed rule would reduce the respirable coal mine dust standards in phases from the existing 2.0 mg/m^3 to 1.0 mg/m^3 over a two-year period. The proposed rule would also reduce the standards for Part 90 miners and intake air from the existing 1.0 mg/m^3 to 0.5 mg/m^3 over a six month period.

There are two other changes in the proposed rule that merit discussion as the Agency addresses feasibility: (1) the proposed requirements to base determinations of noncompliance on single full-shift samples taken during normal production, and (2) the proposed requirement to use the CPDM to sample designated occupations (DO) and Part 90 miners on every shift after the 12 month phase-in period.

MSHA's evaluation of the technological feasibility of keeping miner exposures to respirable coal mine dust during each work shift in all active workings of underground and surface operations at or below the proposed standards of 1.0 mg/m^3 for most miners and 0.5 mg/m^3 for Part 90 miners and intake air is presented below.

Dust Exposure Conditions in Coal Mines under the Existing Standards

In assessing the ability of the coal mining industry to meet the lower proposed standards on each shift, MSHA evaluated the industry's experience in complying with the existing dust standards. Under the existing standards, both inspector and operator

compliance sampling in the MMUs is performed (1) over time periods no longer than eight hours and (2) at production levels of at least 80 percent of average production when sampled by an MSHA inspector or at least 50 percent of the production reported during the collection of the last five valid bimonthly samples when sampled by the operator. Sampling of other entity types such as designated areas (DAs), DWPs, and Part 90 miners conducted by MSHA and operators are also carried out over eight hours and under operating conditions involving normal mining activity.

MSHA's accumulated enforcement experience suggests that past performance remains an important predictor of how the mining industry will respond to more challenging health regulations such as those being proposed. Table IV-1 provides a summary of the key respirable dust performance metrics for each type of entity sampled in surface and underground coal mining operations by MSHA inspectors and mine operators during CY 2009. The average concentrations across all entity types in surface and underground operations were well below existing standards, as well as below the proposed standards of 1.0 mg/m^3 (or 0.5 mg/m^3 for Part 90 miners and intake air) for all entities sampled, except for longwall MMUs. Average concentrations ranged from a high of 0.481 mg/m^3 to 0.229 mg/m^3 for surface occupations, with at least 88% of individual samples below 1.0 mg/m^3. At underground mines, average concentrations ranged from 0.748 mg/m^3 for non-longwall DOs to 1.206 mg/m^3 for longwall DOs, while the percentage of individual samples below 1.0 mg/m^3 ranged from a high of 77% to a low of 40%. Longwall mining operations are the highest coal producers in underground mining and as a result, tend to generate significant levels of respirable coal mine dust in the process.

Although longwall MMUs as a group averaged dust concentrations that exceeded the proposed standard of 1.0 mg/m^3 by approximately 21 percent, when each observed concentration measurement was compared to its applicable standard, the reported concentrations were, on average, significantly below the applicable standard - 0.725 mg/m^3 lower for MSHA inspector samples and 0.791 mg/m^3 lower for operator compliance samples. This indicates that longwall MMUs effectively maintained dust concentrations well below the applicable standards on sampled shifts, very few of which were below the existing 2.0 mg/m^3 standard due to quartz.

Other important indicators of the operators' ability to maintain dust concentrations below the existing standards are presented in Table IV-2. Fewer than 230 noncompliance decisions were issued during 2009, less than one tenth of one percent of the over 26,000 compliance determinations estimated to have been processed that year. Overall compliance rates on shifts sampled by both MSHA and operators exceeded an estimated 95 percent, even on longwall MMUs that historically have had difficulty maintaining compliance due to the large amounts of dust that they generate.

Table IV-1: Summary of Key Respirable Dust Performance Metrics during CY 2009

Entity Types Sampled	MSHA Inspector Program					Operator Program[1]				
	Sample Count	Concentration (mg/m^3) Avg	Avg Diff[2]	% of Samples ≤ 1.0	≤ 0.5	Sample Count	Concentration (mg/m^3) Avg	Avg Diff[2]	% of Samples ≤ 1.0	≤ 0.5
Surface DWPs										
Bulldozer Opr (Occ 368)	380	0.237	-0.791	96	N/A	457	0.229	-0.690	98	N/A
Highwall Drill Opr (Occ 384)	144	0.360	-0.739	94	N/A	260	0.390	-0.595	93	N/A
Other Occupations	1,184	0.400	-1.456	91	N/A	1,187	0.481	-1.339	88	N/A
Surface NDWPs										
Bulldozer Opr (Occ 368)	1,973	0.185	-1.815	98	N/A					
Highwall Drill Opr (Occ 384)	607	0.274	-1.726	96	N/A					
Other Occupations	8,348	0.183	-1.817	99	N/A					
Underground Operations										
Intake Air	4,127	0.173	-0.835	99	94	581	0.408	-0.589	94	76
Roof Bolter DAs	2,213	0.578	-0.995	87	N/A	2,235	0.566	-1.039	86	N/A
Other DAs	1,565	0.482	-1.479	90	N/A	2,839	0.487	-1.484	89	N/A
Non-Longwall MMUs										
Designated Occupations (DO)	3,833	0.798	-1.003	74	N/A	23,488	0.748	-1.074	77	N/A
Non-DO	15,273	0.575	-1.231	87	N/A					
Longwall MMUs										
Designated Occupations (DO)	192	1.206	-0.725	40	N/A	1,181	1.143	-0.791	49	N/A
Non-DO	865	1.032	-0.903	56	N/A					
Part 90 Miners	249	0.358	-0.638	92	78	484	0.301	-0.736	96	84

Data Source: MSHA Standardized Information System (MSIS)

[1] Only valid bimonthly samples (Sample Usage Code 1)

[2] Average deviation of sample concentrations from applicable standards (Concentration - Std)

Adjusted Equivalent Concentrations Compared to Proposed Standards

Under proposed §§ 70.201(e), 71.201(b) and 90.201(b)), sampling would be carried out over the entire work shift. Since the work shift for many miners normally extends beyond eight hours, it is likely that the reported sampling results for CY 2009 understate miners' everyday respirable dust exposures. Also, since selected occupations on each MMU would be sampled every production shift when using the new CPDM, the sampling results would better reflect actual dust exposures under everyday production conditions. These regulatory changes would result in more representative monitoring of dust concentrations to which miners are being exposed on a daily basis in the active workings.

Assuming all other variables being constant, one would expect the observed dust concentrations to increase as a result of these changes. In order to evaluate the impact of these changes for feasibility purposes, MSHA applied two adjustments to the CY 2009 data. The first adjustment involved multiplying each concentration value by the appropriate industry-wide average full-shift factor to estimate the equivalent concentration, as defined in the proposed rule, to which miners were being exposed if sampling had been carried out over a full work shift instead of eight hours. This yielded an estimated quantity that was equivalent in dosage to the concentration as measured by an approved sampler on an 8-hour work shift. This quantity underwent a second adjustment by applying an industry-wide production factor, if it involved an underground sampling entity (excluding intake air), to compensate for differences between the production rate on the sampling shift and the production rate when sampling is not taking place. The derivation of these adjustment factors is discussed below.

In deriving the industry-wide average full-shift factors, MSHA assumed that the dust generation rate during the first eight hours would be similar to the rate during the extended period, resulting in the dust accumulated during the extended period to be solely a function of the additional time. Using 2009 shift length information for each mine stored in the MSHA Standardized Information System (MSIS) database, MSHA determined that the average shift length across all surface operations regardless of type or size of operation was approximately 10 hours. The average for longwall MMUs was 10 hours. The average for non-longwall MMUs was 9 hours. These calculated values for underground operations were comparable to the shift lengths reported by MSHA inspectors during an enforcement activity carried out in October 2009. This special activity involved sampling approximately 25% of the active MMUs or some 193 MMUs and collecting production and other information for use in this rulemaking.

The average shift lengths were then divided by the 8-hour sampling time to arrive at an adjustment factor for full-shift sampling. The 10 hour average for surface and longwall shifts resulted in an adjustment factor of 1.25 (i.e., 10/8). The 9 hour average shift in non-longwalls resulted in an adjustment factor of 1.13 (i.e., 9/8). The individual inspector and operator sampling results from 2009 were then multiplied by the appropriate factor to adjust for the proposed requirement to sample over a full-shift.

Table IV-2: Compliance Determinations during CY 2009

Entity Types Sampled	MSHA Inspector Program			Operator Program[1]		
	Compliance Determinations	Times Cited	Compliance Rate (Percent)	Compliance Determinations	Times Cited	Compliance Rate (Percent)
Surface DWPs	1,708	1	99^{+}	1,904	6	99^{+}
Underground Operations						
Intake Air	4,127	0	100	581	0	100
Roof Bolter DAs	2,213	1	99^{+}	2,235	10	99^{+}
Other DAs	1,565	1	99^{+}	2,839	1	99^{+}
Non-Longwall MMUs	3,833	31	99	4,698	157	97
Longwall MMUs	192	5	97	236	9	96
Part 90 Miners	249	1	99^{+}	484	1	99^{+}

Data Source: MSHA Standardized Information System (MSIS)

[1] Only valid initial bimonthly samples (Sample Usage Code 1)

In deriving the normal production factor for underground mines, MSHA applied a conservative method using production data for the previous 30 production shifts collected from mine operators during the Agency's enforcement activities in October 2009. First, the 30-shift average production was calculated for each of the 193 MMUs that were inspected. These production values were then averaged across all non-longwall and longwall MMUs, yielding estimated overall 30-shift averages of 921 tons and 7,355 tons, respectively. These averages were then divided by the average shift length applicable to the MMU type established earlier to estimate average production rate in tons per hour. For example, to estimate the overall longwall MMU production rate, 7,355 tons, which represents the full-shift production, was divided by 10 hours, yielding an estimated production rate of 736 tons/hour. The same calculation was performed for non-longwall MMUs resulting in a production rate of 102 tons/hour.

Next, the actual production reported for each MSHA inspector and operator sample collected during CY 2009 was averaged across all non-longwall and longwall MMUs. This yielded overall 8-hour averages of 672 tons and 5,537 tons, respectively, for MSHA inspector samples, and 703 tons and 5,398, respectively, for operator compliance samples. These averages were then divided by 8 hours, yielding estimates of the average production rate across the respective MMU types. For example, the non-longwall production rate for operator samples was estimated at 88 tons/shift (703 tons ÷ 8) and 675 tons/shift (5,398 tons ÷ 8) for longwall MMUs.

These estimates of average production rates were used to derive the industry-wide production factors by dividing the estimated overall 30-shift average production rate by the overall CY 2009 average production rate. In the case of non-longwall MMUs, each operator DO concentration that was previously adjusted to an equivalent full-shift concentration was multiplied by 1.16 (102 tons/hr ÷ 88 tons/hr). And each longwall MMU sample was multiplied by 1.09 (735 tons/hr ÷ 675 tons/hr). These production factors were applied to each previously adjusted sample for the MMUs to generate the final estimated equivalent concentration levels. The resulting effects of these adjustments are shown in Table IV-3 and examined for each entity type in surface and underground operations.

Surface DWPs and NDWPs - The adjusted data show that at least 88% of exposures for each entity type at surface operations are already meeting the proposed 1.0 mg/m^3 standard. The average deviation of sample concentrations from the applicable standard as measured by the average difference, which ranged from a high of -1.356 mg/m^3 for other DWP occupations to -0.498 mg/m^3 for highwall drill operators, indicates that operators were effective in maintaining dust concentrations well below the applicable standard in effect during the sampled shifts.

The data indicate that, by diligent application of available engineering controls and following good work practices, the dust concentrations at all work locations can be maintained consistently in compliance with the proposed exposure limit of 1.0 mg/m^3 on each shift. For example, one of the most effective ways to control dust generated during drilling operations is to equip the highwall drill with a properly designed and maintained dry dust collection system. Enclosing the drill operator in an environmentally controlled cab would also protect the miner from exposure to respirable coal mine dust that may escape capture or that may be generated by other mobile equipment working nearby.

Like highwall drill operators, operators of most mobile equipment being used at surface mines and facilities, such as bulldozers, can be protected from exposure to excessive dust concentrations with properly installed and maintained environmental cabs. Dust from haulage roads can be suppressed with water or a variety of chemical agents.

Likewise, workers in surface facilities can be protected by enclosing the dust-generating processes, placing the operator in an environmentally controlled booth, using dust collectors to limit the amount of dust that becomes airborne, ensuring that the equipment is being maintained and functioning properly, and following good work practices.

Part 90 Miners – The adjusted data show that the Part 90 miner adjusted average concentrations were below the proposed standard of 0.5 mg/m^3 and that on average Part 90 miners are being exposed to concentrations that are 0.5 to 0.6 mg/m^3 below the existing standard of 1.0 mg/m^3. Approximately 69% of MSHA samples and 76% of operator samples are at or below 0.5 mg/m^3, which suggests that operators are capable of complying with the proposed limit on the non-compliant shifts. The use of the new CPDM, in conjunction with currently available control measures, would enable the operator to better monitor dust exposures during the shift and be proactive in taking appropriate corrective measures during the shift to prevent possible overexposures of Part 90 miners.

Underground Operations – The adjusted data indicate that a substantial number of shifts at work locations in underground mines experience exposure levels above the proposed limits. Therefore, instead of conducting the analysis at the mine level, MSHA examined the data on specific entity types in underground mines.

Intake Air – The adjusted operator intake air concentrations, which primarily reflect the dust concentration in the belt air prior to mixing with regular intake air used to ventilate the working faces, averaged 0.535 mg/m^3 or slightly above the proposed standard of 0.5 mg/m^3. Approximately 59% of the adjusted concentrations were at or below the proposed standard.

On the other hand, the quality of the intake air reaching the working faces was significantly better as measured by MSHA inspectors, averaging 0.196 mg/m^3 or approximately 61% less dusty than would be permitted under the proposed limit. In fact, 93% of the adjusted concentrations were at or below 0.5 mg/m^3. The dust levels in the intake air can be further reduced by employing currently available engineering controls such as wetting roads and following good work practices such as limiting vehicle movement. Thus, the adjusted inspector data clearly show that most mines are currently meeting the proposed limit for intake air and all should be able to comply on a consistent basis.

Table IV-3: Summary of Key Respirable Dust Performance Metrics Based on Adjusted CY 2009 Samples

Entity Types Sampled	MSHA Inspector Program					Operator Program[2]				
	Sample Count	Adj Conc (mg/m^3)		% of Adj Conc		Sample Count	Adj Conc (mg/m^3)		% of Adj Conc	
		Avg	Avg Diff[3]	≤ 1.0	≤ 0.5		Avg	Avg Diff[3]	≤ 1.0	≤ 0.5
Surface DWPs										
Bulldozer Opr (Occ 368)	380	0.296	-0.732	94	N/A	457	0.286	-0.632	96	N/A
Highwall Drill Opr (Occ 384)	144	0.450	-0.649	90	N/A	260	0.487	-0.498	88	N/A
Other Occupations	1,184	0.500	-1.356	88	N/A	1,187	0.602	-1.219	82	N/A
Surface NDWPs										
Bulldozer Opr (Occ 368)	1,973	0.231	-1.769	97	N/A					
Highwall Drill Opr (Occ 384)	607	0.342	-1.658	94	N/A					
Other Occupations	8,348	0.229	-1.771	97	N/A					
Underground Operations										
Intake Air	4,127	0.196	-0.812	99	93	581	0.535	-0.462	88	59
Roof Bolter DAs	2,213	0.797	-0.776	74	N/A	2,235	0.742	-0.863	77	N/A
Other DAs	1,565	0.664	-1.297	80	N/A	2,839	0.639	-1.333	82	N/A
Non-Longwall MMUs										
Designated Occupations (DO)	3,833	1.101	-0.701	55	N/A	23,488	0.980	-0.841	66	N/A
Non-DO	15,273	0.793	-1.014	74	N/A					
Longwall MMUs										
Designated Occupations (DO)	192	1.614	-0.318	23	N/A	1,181	1.557	-0.377	26	N/A
Non-DO	865	1.380	-0.554	40	N/A					
Part 90 Miners	249	0.494	-0.502	88	69	484	0.395	-0.643	92	76

Data Source: MSHA Standardized Information System (MSIS)

[1] Reported observed dust concentrations adjusted to reflect expected dust exposures when sampling for the full work shift and under normal production conditions.

[2] Only valid initial bimonthly samples (Sample Usage Code 1)

[3] Average deviation of sample concentrations from applicable standards (Concentration - Std)

Many of the high dust concentrations for intake air represented samples taken while belt entries were being used as intake air courses. Dust concentrations in the belt entry course, when used as an intake air course, can be consistently maintained below the proposed limit by employing currently available engineering controls such as water sprays at transfer points to adequately wet the conveyer belt and transported coal, combined with regular belt maintenance and cleaning of the belt entry. Moreover, no mine is required to use belt entries as intake air courses. In fact, relatively few operators use belt entries as intake air courses. If maintaining the belt entries proves to be too burdensome for some of these operators, they have the option of using another entry for intake air.

Roof Bolter DAs – Both the average adjusted inspector and operator concentrations (0.797 mg/m^3 and 0.742 mg/m^3, respectively) were below the proposed standard of 1.0 mg/m^3. No fewer than 74% of the individual adjusted concentrations were at or below the proposed limit.

The experience of roof bolter operations required to comply with the reduced standards of 1.0 mg/m^3 or less due to the presence of quartz is a further indication of the ability to comply with the proposed standard. As shown in Table IV-4, 20% or some 442 of the roof bolter DA samples were collected when the applicable standard in effect was 1.0 mg/m^3 or less. Almost three quarters of these samples had adjusted concentrations that were at or below the proposed limit of 1.0 mg/m^3. This serves as further evidence that operators can maintain exposures of roof bolter operators at or below 1.0 mg/m^3 using currently available engineering controls and work practices such as properly maintaining the roof bolter dry dust collector system in approved condition; cleaning the dust box and replacing the filter media and other components when necessary; and following a mining cycle that limits roof bolting downwind of any dust generation sources. Furthermore, the use of the CPDM would allow operators to make necessary alterations during the shift to prevent exposing roof bolter operators to excessive levels of respirable coal mine dust.

Non-longwall MMUs – As a group, non-longwall MMUs represent approximately 96% of the active MMUs in operation today, the vast majority of which employ continuous mining machines for coal extraction. During 2009, nearly 1,100 non-longwall MMUs were sampled by MSHA inspectors and mine operators. The adjusted DO concentrations averaged 1.101 mg/m^3 and 0.980 mg/m^3 based on MSHA and operator samples, respectively. Approximately 55% (MSHA) and 66% (operator) of the adjusted DO concentrations were at or below 1.0 mg/m^3. The estimated adjusted average concentrations are at or marginally above 1.0 mg/m^3. MSHA believes that mines can meet the proposed lower limits using available and properly maintained engineering controls.

To get additional insight regarding the industry's ability to meet the proposed exposure limit, MSHA examined the statistic "average difference," which estimates the average amount by which each adjusted concentration deviates below or above the applicable standard. According to Table IV-3, inspector and operator adjusted DO concentrations were on average 0.701 mg/m^3 and 0.841 mg/m^3 below the applicable standard. This important statistic indicates that, while not required to, operators chose to maintain concentrations well below the applicable standards in effect during the sampled

shifts. One would expect that practice to be continued when the proposed limits become effective.

Further confirmation of the industry's ability to meet lowered exposure limits is provided in Table IV-4, which shows the performance of MMUs required to comply with reduced standards of 1.0 mg/m^3 or less due to the presence of quartz. While the number of inspector (359 or 9%) and operator (1845 or 8%) DO samples taken at MMUs with applicable standards of 1.0 mg/m^3 or less is relatively small compared to the total number of collected samples, they do provide additional indications that mines are capable of complying with standards that are as low as those being proposed. It's important to keep in mind that the enforcement scheme in effect when these and other entities were sampled involved averaging multiple samples for determining noncompliance, which permitted excursions above the applicable standard on individual shifts. Even so, at least 61% of the adjusted DO concentrations were at or below 1.0 mg/m^3. On an MMU basis, the adjusted data show that of the 173 non-longwall MMUs required to comply with applicable standards of 1.0 mg/m^3 or less at some period during 2009, 19 of these MMUs submitted DO samples that were all at or below the reduced standards.

On the basis of these data, MSHA believes that it is technologically feasible for the non-longwall MMUs to meet the proposed 1.0 mg/m^3 limit on each shift using currently available engineering controls, implementing well-designed face ventilation systems and controls, and following good maintenance and work practices. Using the CPDM would permit operators to make necessary alterations to these controls during the shift to maintain dust concentration levels below the permissible exposure limit and prevent overexposures on individual shifts.

Longwall MMUs – 55 longwall MMUs were sampled during 2009. Based on the adjusted MSHA and operator data in Table IV-3, longwall DO concentrations averaged 1.614 mg/m^3 and 1.557 mg/m^3, respectively. The adjusted estimates are approximately 34% to 36% higher than the unadjusted average concentrations and significantly higher than the proposed limit of 1.0 mg/m^3. Approximately 77% (MSHA) and 74% (operator) of the adjusted DO concentrations exceeded the proposed limit, which represents a greater than 43% increase compared to the unadjusted concentrations.

Table IV-4, Summary of Key Respirable Dust Performance Metrics of MMUs Operating Under Reduced Standards of 1.0 mg/m^3 or less due to the Presence of Quartz in CY 2009

Entity Types Sampled	MSHA Inspector Program					Operator Program[1]				
	Sample Count	w/Appl Stds ≤ 1.0		≤ Applicable Std		Sample Count	w/Appl Stds ≤ 1.0		≤ Applicable Std	
		N	%	N	%		N	%	N	%
Surface DWPs										
Bulldozer Opr (Occ 368)	380	232	61	196	84	457	316	69	276	87
Highwall Drill Opr (Occ 384)	144	87	60	74	85	260	178	68	146	82
Other Occupations	1,184	96	8	85	89	1,187	133	11	126	95
Underground Operations										
Roof Bolter DAs	2,213	442	20	320	72	2,235	395	18	298	75
Other DAs	1,565	28	2	21	75	2,839	44	2	35	80
Non-Longwall MMUs										
Designated Occupations (DO)	3,833	359	9	220	61	23,488	1845	8	1325	72
Non-DO	15,273	1408	9	1107	79					
Longwall MMUs										
Designated Occupations (DO)	192	2	1	1	50	1,181	10	1	2	20
Non-DO	865	8	1	5	63					

Data Source: MSHA Standardized Information System (MSIS)

[1] Only valid initial bimonthly samples (Sample Usage Code 1)

The fact that the longwall MMUs as a whole are not currently meeting the proposed limit is not an indication of whether or not it is feasible for these MMUs to meet the 1.0 mg/m^3 proposed limit on each shift. As noted previously, these MMUs were operating under the existing standards. The "average difference" statistic shows that DO concentrations were on average 0.3 mg/m^3 or more lower than the existing standards that were in effect at the time the samples were taken. This confirms the operator's ability to maintain concentrations below the existing standards on sampled shifts.

Also, as it was pointed out previously, the enforcement scheme currently in effect permits excursions above the applicable standard on individual shifts. The fact that longwall MMUs had a compliance rate exceeding 95%, having been cited only 14 times during 2009, provides evidence of their ability to comply with the exposure limit that was in effect at the time the samples were taken. While this is not proof that the longwall operators can meet the proposed limits, it does indicate that these operators are not having difficulty meeting the existing limits.

Ventilation is the most effective control to reduce the dust levels in the longwall MMUs. The amount of ventilation reaching the MMUs can be increased by better maintenance and positioning of the line curtains and stoppings, increasing the size and number of fans, and reducing the restrictions in the air intake. In some case, operators may have to switch to exhaust ventilation or develop additional airways. In addition to ventilation, sprays and work practices are critical to holding down the amount of respirable dust in the air. Dust concentrations could be further reduced at some MMUs by installing more efficient and better positioned nozzles as well as increasing the water pressure and volume. Work practices, such as proper positioning of the miner as well as the cleaning and maintenance of the dust controls would further reduce dust levels. Using the CPDM would permit operators to make necessary alterations to these controls during the shift to maintain dust concentration levels below the permissible exposure limit and prevent overexposures on individual shifts.

MSHA acknowledges that in rare instances, some operators after taking these actions may encounter implementation issues as they attempt to comply with the proposed requirements and need to take additional measures to comply with the proposed standard. However, while these implementation issues may be challenging for some longwall operators, given the advancements in longwall mining technology and automation achieved to date, and the available proven engineering controls, MSHA believes that the proposed exposure limit of 1.0 mg/m^3 is technologically feasible for longwall MMUs.

FEASIBILITY OF USING THE CPDM

The CPDM has undergone extensive testing in a variety of underground coal mines. This testing was conducted by the National Institute for Occupational Safety and Health (NIOSH) through an informal partnership with industry, labor, and MSHA. The in-mine testing verified the new sampling device to be accurate and reliable, ergonomically acceptable to miners, and sufficiently durable to withstand the rigors of

the underground environment. This testing demonstrated that the new CPDM is suitable for use in coal mines to monitor and prevent overexposure to respirable coal mine dust.[3]

MSHA recognizes that the CPDM is a new technology and that there are only a few hundred of these devices currently in use. However, the proposed rule would require the operator to use the CPDM to sample certain underground occupations, after a 12 or 18-month phase-in period, unless notified by the Secretary. MSHA believes that the proposed phase-in periods would allow the manufacturer enough time to produce the necessary quantity of CPDMs, and MSHA and operators enough time to train necessary personnel in the use and care of the device.

MSHA recognizes that availability of the device may present logistical and other issues at the time the final rule becomes effective. The Agency intends to address the issue of availability in two ways. First, the proposal would require the use of the CPDM to sample (1) the Designated Occupation in each MMU, and (2) each Other Designated Occupation, within a 12-month and 18-month period, respectively, unless notified by the Secretary. If, during the phase-in periods, MSHA determines that there would be logistical and feasibility issues surrounding the availability of CPDMs by the time these provisions of the final rule would become effective, the Agency will, through publication in the *Federal Register*, notify the public of the Agency's plans. Second, assuming no logistical or feasibility issues concerning the availability of CPDMs, and depending on manufacturer projections, if CPDMs are not available in sufficient quantities, MSHA would accept, as good faith evidence of compliance with the final rule, a valid, bona fide, written purchase order with a firm delivery date for the CPDMs. Finally, the Agency has specifically included a request for comment on the proposed phase-in period in the preamble to the proposed rule.

CONCLUSION

Sampling data indicate that not only are mine operators keeping miners' exposures at or below levels required under the existing standards, but dust exposures at most operations average less than the proposed standard of 1.0 mg/m^3. Thus, the majority of miners' exposures are at or below the limits in the proposed rule. In addition, existing engineering controls including ventilation, sprays and environmentally controlled cabs along with changes in work practices can be used to further reduce dust levels. Therefore, MSHA has preliminarily concluded that it is technologically feasible for the coal mining industry to reduce miners' exposure in underground and surface coal mines to the proposed respirable dust limits and maintain compliance on each work shift as prescribed in the proposed rule.

While technologically feasible, MSHA acknowledges that operators will encounter implementation issues, in particular those operations in which average exposures currently exceed the proposed lower limit, as they attempt to achieve

[3] See: Volkwein, J.C., Vinson R.P., Page S.J, McWilliams L.J., Joy G.J., Mischler S.E., and Tuchman D.P. Laboratory and Field Performance of a Continuously Measuring Personal Respirable Dust Monitor. CDC. NIOSH. RI 9669. September 2006. pp 47. and Volkwein, J.C., Vinson R.P., McWilliams L.J., Tuchman D.P., and Mischler S.E. Performance of a New Personal Respirable Dust Monitor for Mine Use. CDC. NIOSH. RI 9663. June 2004.

compliance with the new limits. MSHA believes that using currently available dust controls, which NIOSH studies indicate offer substantial exposure reduction, in combination with good work practices, will permit these operations to achieve compliance on each shift. These dust controls are discussed in several NIOSH publications and available as free downloads from the Agency's web site (http://www.cdc.gov/niosh/mining/topics/topicpage3.htm). Furthermore, MSHA believes that the two-year phase-in period to allow operators time to come into compliance with the proposed 1.0 mg/m^3 standard would give operators sufficient time to either upgrade controls or to install additional measures to comply with the proposed standard.

Lowering the exposure limits in phases, as has been proposed, would permit all operators to properly assess and implement control measures appropriate for their mines and make necessary operational modifications to meet the proposed limits on each work shift when they become effective. Use of the CPDM, over the 12 to 18 month phase-in period required by the proposed rule and in conjunction with currently available control measures, would enable the operator to better monitor dust exposures during the shift and be proactive in taking appropriate corrective measures during the shift to prevent possible overexposures. MSHA also believes that the proposed phase-in period for the CPDM would allow manufacturers enough time to produce the necessary quantity of devices, and MSHA and operators enough time to train necessary personnel in the use and care of the CPDM.

V. COMPLIANCE COSTS

INTRODUCTION

This section presents MSHA's estimates of costs that would be incurred by underground and surface coal operators to comply with the proposed coal mine dust rule. These costs are based on the assessment of MSHA staff of the most likely actions that would be necessary to comply with the proposed rule. MSHA acknowledges that in rare instances, after taking these projected actions, some mine operators may need to take additional measures to comply. In order to illustrate the full range of possible compliance costs, this section also includes a discussion of three potential situations where some operators could incur additional costs. All three of the following situations are in underground coal mines: (1) longwall mines that have two entries; (2) mines that have multiple MMUs on a single split of air; and (3) mines operating under reduced respirable coal dust standards below 1.0 mg/m^3 due to the presence of quartz.

MSHA presents two values for the engineering and work practice estimates and the total cost estimates for underground coal mines. The lower value represents MSHA's most likely estimate. The higher value includes additional costs for those rare instances where some operators after taking these actions may encounter implementation issues as they attempt to comply with the proposed requirements and need to take additional measures to comply with the proposed standard.

MSHA estimates that the first year cost of the proposed rule would be approximately $72.4 to $93.2 million (see Table V-1) and the annualized cost of the proposed rule would be approximately $40.4 to $44.5 million (see Table V-2).

Table V-1: First Year Costs of Proposed Rule

Requirements	1-19	20-500	501+	Totals
Underground Operators				
Engineering Controls and Work Practices	$386,000	$10,753,900 to $26,909,300	$1,449,000 to $6,127,100	$12,588,800 to $33,422,200
Abatement Costs	$206,800	$1,686,100	$226,100	$2,119,000
Certify to Sample & Maintain	$74,900	$888,600	$132,100	$1,095,600
Record of Production	$118,500	$2,294,500	$0	$2,413,000
Record of Shift Length	$1,500	$16,600	$18,000	$36,100
Using Gravimetric Sampler	-$824,300	-$8,751,200	-$1,004,700	-$10,508,200
CPDM Plans at UG Mines	$32,800	$141,200	$5,400	$179,400
Using CPDMs at UG Mines	$3,448,200	$42,615,100	$5,482,500	$51,545,400
On Shift Exams (75.362)	$131,400	$3,062,300	$675,000	$3,868,600
Periodic Examinations	$9,700	$131,900	$37,900	$179,500
Respiratory Training	$7,100	$110,300	$20,800	$138,200
Totals	$3,592,600	$52,949,300 to $69,104,700	$7,042,100 to $11,720,200	$63,583,400 to $84,416,800
Surface Operators				
Engineering Controls and Work Practices	$53,200	$224,000	$116,000	$393,100

Abatement Costs	$106,700	$85,000	$16,200	$207,900
Certify to Sample & Maintain	$333,000	$356,200	$15,900	$705,100
Record of Shift Length	$147,200	$561,200	$23,800	$732,200
Using Gravimetric Sampler	$650,800	$1,131,300	$43,700	$1,825,800
Periodic Examinations	$177,400	$401,200	$50,900	$629,500
Respiratory Training	$3,300	$2,700	$500	$6,400
Expansion of Part 90 Option to Surface Mines	$643,400	$3,175,800	$470,000	$4,289,100
Totals	$2,115,000	$5,937,400	$737,000	$8,789,100

First Year Costs = First Year Costs + Annual Costs

The estimated first year costs of the proposed rule for underground coal mine operators would be approximately $63.6 to $84.4 million. Costs associated with the proposed requirement to use CPDMs ($51.5 million) and upgrading and maintaining existing engineering controls and work practices ($12.6 to $33.4 million) represent the most significant first year costs for underground coal operators.

The first year costs of the proposed rule for surface coal mine operators would be approximately $8.8 million. The proposed expansion of the Part 90 transfer option to surface miners represents the most significant first year cost for surface operators.

Table V-2: Annualized Costs of Proposed Rule at a 7% Discount Rate

Requirements	1-19	20-500	501+	Totals
Underground Operators				
Engineering Controls and Work Practices	$141,200	$4,452,000 to $7,373,900	$465,100 to $1,606,500	$5,058,300 to $9,121,700
Abatement Costs	$29,400	$239,400	$32,100	$300,900
Certify to Sample & Maintain	$23,900	$275,300	$40,700	$339,900
Record of Production	$118,500	$2,294,500	$0	$2,413,000
Record of Shift Length	$1,500	$16,600	$18,000	$36,100
Using Gravimetric Sampler	-$117,100	-$1,242,700	-$142,700	$1,502,400
CPDM Plans at UG Mines	$6,100	$31,250	$1,650	$38,800
Using CPDMs at UG Mines	$1,270,900	$20,202,000	$3,282,900	$24,755,500
On Shift Exams (75.362)	$131,400	$3,062,300	$675,000	$3,868,600
Periodic Examinations	$8,600	$127,200	$37,800	$173,500
Respiratory Training	$7,100	$110,300	$20,800	$138,200
Totals	$1,621,500	$29,568,150 to $32,490,100	$4,431,350 to $5,572,800	$35,620,400 to $39,683,800
Surface Operators				
Engineering Controls	$46,900	$173,400	$96,200	$316,500
Abatement Costs	$15,100	$12,100	$2,300	$29,500
Certify to Sample & Maintain	$110,600	$116,800	$5,300	$232,700
Record of Shift Length	$147,200	$561,200	$23,800	$732,200
Using Gravimetric Sampler	$384,100	$660,200	$25,600	$1,069,900
Periodic Examinations	$138,900	$370,700	$50,100	$559,700
Respiratory Training	$200	$200	$100	$500
Expansion of Part 90 Option to Surface Mines	$278,500	$1,373,900	$203,500	$1,855,800

Totals	$1,121,500	$3,268,500	$406,900	$4,796,800

MSHA estimates that at a 7% discount rate, the annualized costs of the proposed rule for underground coal mine operators would be approximately $35.6 to 39.7 million. See Table V-2. Costs associated with the proposed requirement to use CPDMs ($24.8 million) and upgrading and maintaining existing engineering controls and work practices ($5.1 to 9.1 million) represent the most significant annualized costs for underground coal operators.

MSHA estimates that at a 7% discount rate, the annualized costs of the proposed rule for surface coal operators would be approximately $4.8 million. See Table V-2. Costs associated with the proposed expansion of the Part 90 transfer option to surface miners ($1.9 million) represent 40 percent of the total annualized costs for surface operators.

METHODOLOGY

For this Preliminary Regulatory Economic Analysis (PREA), MSHA annualized costs using the annualization formula:

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

where "a" equals the annualization factor, "i" equals the annual discount rate of 7% (as recommended by the Office of Management and Budget (OMB) for private investment discounting), and "n" equals the service life of the equipment or time horizon of the analysis.

MSHA used two specific annualization factors for equipment costs: 0.244 for equipment with a 5 year service life and 0.142 for equipment with a 10 year service life (both using a 7 percent discount rate). For example, the annualized cost of a $1,000 piece of equipment that has a service life of 5 years would be $244 ($1,000 x 0.244).

Several provisions result in costs that occur every year, but begin at some time in the future. For these provisions, MSHA calculated the present value of the costs occurring each year over a 10 year period[4], summed the present values and then annualized the sum of the present values. For example, the cost of filters for CPDMs to monitor the DOs would begin after 12 months and the costs for filters for CPDMs to monitor ODOs would begin after 18 months. If the cost of filters is $100 per year beginning in the second year, the present value of the costs of these filters for 10 years would be about $651 (the sum of the present value of a $100 expenditure in year two - about $93.50, the present value of $100 in year three - about $87.30…, the present value of $100 in year 10 - about $54.40). Annualizing the present value of $651 over 10 years yields an annualized cost of about $92.50 ($651 x 0.142). Since this is the same result as

[4] MSHA believes using a 10-year time horizon is a reasonable approach for converting costs beginning in the second year to equivalent costs beginning in the first year. The life span of individual mines varies significantly, with some operating for very short periods and others for many years. Assuming a longer time horizon would increase annualized costs (e.g., a 15-year time horizon would result in annualized costs of about $96.20 for a $100 expenditure beginning in the second year), while assuming a shorter time horizon would reduce annualized costs (e.g., a 5-year time horizon would result in annualized costs of about $82.60 for a $100 expenditure beginning in the second year).

multiplying by a single discount factor of 0.925, for ease of calculations MSHA used two discount factors to calculate the present value of annual costs that begin in the future: 0.925 for annual costs that begin in the second year and 0.859 for annual costs that begin after 18 months. Both factors are based on a 7 percent rate.

Costs that occur every year, such as maintenance and recordkeeping costs, are included in annualized costs.

With respect to underground coal mines, MSHA based many of the estimated costs on the average number of mechanized mining units (MMUs) in operation from February 2009 through January 2010. MSHA estimates that there are 881 MMUs: 81 MMUs were in mines with 1-19 employees; 708 MMUs in mines with 20-500 employees (of which 22 MMUs are longwall MMUs); and 92 MMUs in mines with 501+ employees (of which 20 MMUs are longwall MMUs).

Some of the costs were based on the number of underground and surface coal mines (see Chapter 2, Tables II-1 and II-3) and on the estimated number of production shifts. Based on MSHA data and experience, turnover rates of six percent for underground coal miners and three percent for surface coal miners were used in this analysis. Unless otherwise noted the term shift used in this analysis refers to production shifts. In addition, some of the totals in the tables may not sum due to rounding.

COMPLIANCE COSTS

Engineering Controls and Work Practices

Proposed §§ 70.100 & 101, 71.100 & 101, 90.100 & 101, 75.350(b)(3) & 75.332

Cost to Install Engineering Controls to Meet Lower Respirable Dust Standards

The proposed rule would lower the respirable dust standard for surface and underground mines. The proposal would phase in the lower standards from 2.0 mg/m^3 to 1.0 mg/m^3 over a 24 month period as follows:

- 2.0 mg/m^3 on the effective date of the final rule;
- 1.7 mg/m^3 6 months after the effective date of the final rule;
- 1.5 mg/m^3 12 months after the effective date of the final rule; and
- 1.0 mg/m^3 24 months after the effective date of the final rule.

The proposal would also lower the dust levels allowed in intake air courses, where belt air is used as an intake air course, and in areas where a Part 90 miner is working. The standard would be lowered from 1.0 mg/m^3 to 0.5 mg/m^3 6 months after the effective date of the rule. In addition to lowering the standards, the proposal would also change the way compliance is determined.

- Proposed §§ 70.201(e), 71.201(b) and 90.201(b) would require full-shift sampling.

- Proposed § 70.207(a) would require gravimetric sampling of MMUs during normal production shifts.
- Proposed §§ 70.207(e), 70.208(d), 70.209(c), 71.207(i), 72.800, 90.208(c) and 90.209(c) would base noncompliance determinations on single samples.

The proposed rule would lower the respirable dust standard when quartz is present. As discussed previously for feasibility, these proposed changes would require mine operators to take additional steps to meet the proposed requirements. Costs are presented for both typical operations and for operations that MSHA anticipates would incur above average costs (such as some operations operating under an existing reduced standard of less than 1.0 mg/m^3). Costs are presented separately for surface and underground operations by mine size.

Some engineering controls would need to be applied throughout the mine, while others would be specific to an MMU. The types of engineering controls that operators are expected to implement as a result of the proposed rule are discussed below along with their unit cost. Tables are then presented showing MSHA's estimate of the total costs, by mine size, to implement the engineering controls. The discussion below first focuses on underground coal mines and then on surface coal mines.

Underground Coal Mines

The use of engineering controls to curb dust levels at mechanized mining units (MMUs) is paramount to controlling dust levels in mines. Traditionally, engineering controls have been successfully used to control respirable dust levels in mines. Comments to MSHA's 2003 proposed rules on the Determination of Concentration of Respirable Coal Mine Dust (68 FR 10940) and Verification of Underground Coal Mine Operators' Dust Control Plans and Compliance Sampling for Respirable Dust (68 FR 11770) noted how engineering controls have been used to address dust levels at MMUs. Changing air flows, redesigning cutting heads, controlling shearer speed, use of water sprays on shearers and belts, assessing the way water was being controlled at the stage loader, and even implementing water infusion with wetting agents that saturate the coal block, were mentioned in the comments as engineering controls that have been shown to decrease dust levels at MMUs.

In order to comply with the lower proposed dust standards, coal operators would need to change or adjust dust control parameters that affect dust levels in the mine atmosphere. In general, changing or adjusting dust control parameters focuses on the following areas: ventilation; dust suppression; and dust collection.

Controls Applied to Surface Areas of Underground Coal Mines

Dust concentrations associated with mobile equipment and fixed locations at surface areas of underground coal mines can be controlled through the use of environmental cabs or enclosures. The cabs and enclosures are outfitted with a filtration unit that removes dust from the outside air and provides a means to pressurize the cab to prevent outside dust from migrating inside.

Based on data and enforcement experience, MSHA believes that all of the equipment currently being used at the surface areas of underground coal mines come

equipped with the necessary cabs, but some cabs would require additional maintenance to meet the proposed standard. MSHA estimates that the cab of 1 bulldozer operating at a mine with 1-19 employees would need to be refurbished by changing the interior lining of the cab and sealing all cracks and holes at a cost of $4,000.

The cab of a bulldozer has two filters. Air inside a cab can be compromised as a result of these filters not being changed at the appropriate time. MSHA estimates that more frequent filter changes would be needed for: 1 bulldozer at a mine with 1-19 employees; 1 bulldozer at a mine with 20-500 employees and 1 bulldozer at a mine with 501+ employees. Current practice is to change these filters once per month. MSHA believes that in order to meet the proposed requirements, the filters would need to be changed once a week. Thus, these filters would need to be changed an additional 3 times per month and it would take about 45 minutes (0.75 hours) to change the 2 filters. At a cost of $50 per filter, MSHA estimates that the annual cost for more frequent filter changes would be $4,860 per machine [3 additional changes per mo. x 12 mos. x ((2 filters x $50 per filter) + (0.75 hrs. x $35.98 hourly wage rate)].

MSHA estimates that 2 processing plants at mines with 20-500 employees and 2 processing plants at mines with 501+ employees would need to repair 2 enclosures per plant. Repairs consist of an underground surface mechanic, earning $35.98 per hour, working, on average, 4 hours to seal cracks and leaks. MSHA estimates that the cost to repair 2 enclosures per plant would be $288 (4 hours of repairs x $35.98 hourly wage rate x 2 enclosures x 1 plant). Also, MSHA estimates that 1 plant in a mine with 20-500 employees would need a portable fan and associated tubing to capture localized welding fumes and/or grinding dust.

Controls Applied at Underground Coal Mines

Dust concentrations in underground coal mines can be controlled through a combination of ventilation, sprays and work practices. Based on data and enforcement experience, MSHA has determined that all of these controls are currently in use at underground coal mines. In order to comply with the proposed standard, most operators would have to make minor modifications and adjustments to existing equipment. At some mines, particularly long walls and mines operating under reduced standards, operators would have to install additional equipment and modify their methods of mining. (Comments to MSHA's 2003 proposed rules on the Determination of Concentration of Respirable Coal Mine Dust and Verification of Underground Coal Mine Operators' Dust Control Plans and Compliance Sampling for Respirable Dust expressed concern over the excessive levels of respirable coal mine dust on longwall MMUs due to the amounts of dust being generated and the extended faces of some longwalls.)

MSHA estimates that all underground mines (81 mines with 1-19 employees, 331 mines with 20-500 employees, and 12 mines with 501+ employees) would need to adjust regulators to increase the air flow at the working areas of the mine. MSHA estimates that it would cost $200 per mine to adjust regulators and take air readings to ensure that adjustments are correct.

MSHA estimates that approximately 25 percent of mines (20 mines with 1-19 employees, 83 mines with 20-500 employees; and 3 mines with 501+ employees)

would need to install a water pressure pump to increase the flow rate and pressure of the water delivered to the MMU. MSHA estimates that pumps range from $7,500 to $10,000 (for an average of $8,750). Each affected mine with 1-19 employees would need 1 additional pump costing $8,750, while each mine with 20 or more employees would need 3 additional pumps per mine costing $26,250 (3 pumps x $8,750).

MSHA estimates that 331 mines with 20-500 employees and 12 mines with 501+ employees would need to adjust fan blades to increase the quantities of air delivered by the main and bleeder fans. MSHA estimates that adjusting fan blades would cost $600 per mine.

MSHA also determined that some mines operating under an existing reduced standard due to the presence of quartz would incur additional costs to meet the proposed requirements. Based on 2009 operator sample results, it is MSHA's best judgment that 3 mines (each with 20-500 employees) were on a reduced standard of 0.5 mg/m^3 or below with 50% or more of their 2009 sample results exceeding the applicable standard. MSHA has determined that these 3 mines would need to take the additional step of installing a surfactant system to reduce the quartz content of the dust. A surfactant system dispenses soaps and/or detergents at regular intervals into a water supply at a surface location of the mine and can then be delivered to MMUs operating in the mine. Surfactants are beneficial in controlling quartz after all other engineering controls have been implemented to control respirable dust. Mixing water with surfactants decreases the surface tension of water, which allows the available moisture to wet more particles per unit volume. MSHA estimates that the initial cost of constructing a surfactant system would be approximately $10,000. Assuming 2 MMUs are operating per affected mine, MSHA estimates that the annual cost for chemicals to dispense into the water would be $96,000 ($4,000 per month x 12 months x 2 MMUs per mine).

MSHA acknowledges that it is possible that additional mines operating under an existing reduced standard of below 1.0 mg/m^3 may incur additional compliance costs because the proposed changes to the sampling strategy would take effect immediately (basing non-compliance on single full-shift samples; definition of normal production shift) before these operators have time to implement the engineering controls and work practices presented above. It is possible that for the first year, some of these mines could be required to alter their production to minimize quartz exposures.

Extracting coal from its natural deposits is currently being conducted by mining the full seam of coal and rock at a desired height. The coal and rock are extracted simultaneously as the continuous mining machine cuts the coal and rock. This process generates dust containing silica in addition to coal dust. Under the proposed rule, some operators mining coal in this manner may need to change the way they mine coal to reduce the amount of silica in the air by using a technique called "cutting to an open face." This technique involves extracting the coal from its natural deposits without cutting the rock at the same time. Once the coal is mined to the desired depth of the cut, the mining machine is brought back to the beginning of the cut to extract the rock resulting in less dust generation.

MSHA estimates that this change in mining practices would decrease the amount of coal mined per shift by about 5 percent which would in turn result in increasing the operator's cost per ton of coal mined. This coal is not lost; the recovery of the coal is

only delayed by the change to cutting to an open face. MSHA has determined that, on average, the recovery of the coal will be delayed by about 5 years.

MSHA projects that the operations with more than half of their samples above the applicable standard are the ones most likely to encounter problems during the transitional period. In 2009, MSHA determined that 38 MMUs operating on a reduced standard below 1.0 mg/m^3 had 50% or more of the operator sampling results exceeding the applicable standard. All of these MMUs were in mines with 501+ employees and produced an average of 334,134 tons of coal.

If half of the 38 MMUs would need to change their method of mining, this could result in additional compliance costs of $ 4.7 million (334,134 tons per year per MMU x 0.05 x $51.35 per ton x 0.287 x 19 MMUs). Amortizing these costs at 7 percent over 5 years would result in additional annualized compliance costs of $1.1 million ($4.7 million x an annualization factor of 0.244).

Controls Applied to MMUs in Underground Coal Mines

MSHA estimates that all MMUs operating in underground coal mines (81 MMUs in mines with 1-19 employees, 708 MMUs in mines with 20-500 employees, and 92 MMUs in mines with 501+ employees) would need to adjust the type and/or pressure of water sprays and increase the flow rate of sprays by changing the orifice size of the spray. MSHA estimates that: adjusting water sprays would cost $800 on a non-longwall MMU and $2,000 on a longwall MMU; increasing the flow rate of sprays by changing the orifice size of the spray would cost $300 on a non-longwall MMU and $800 on a longwall MMU.

All non-longwall MMUs (81 MMUs in mines with 1-19 employees, 686 non-longwall MMUs in mines with 20-500 MMUs and 72 non-longwall MMUs in mines with 501+ employees) would need to place belting over the throat of the continuous mining machine to reduce dust concentrations at an estimated cost of $300 per MMU.

All longwall MMUs (22 MMUs in mines with 20-500 employees and 20 MMUs in mines with 501+ employees) would need to install headgate shield detectors at a cost of $1,300 per MMU and a headgate scrubber system at a cost of $30,000 per MMU.

MSHA estimates that 34 non-longwall MMUs in mines with 20-500 employees and 4 non-longwall MMUs in mines with 501+ employees need exhaust fans to operate on the MMU. MSHA estimates that an exhaust fan costs $100,000 per MMU and tubing needed for the exhaust fan costs $7,500. In addition, due to damage to tubing $750 of replacement tubing would be needed each year. Also, additional electrical costs to operate an exhaust fan would be $100 per day. MSHA estimates that additional annual electrical cost to operate an exhaust fan would be: $30,000 per year for an MMU in a mine with 20-500 employees ($100 per day x 300 days); and $35,000 per year for an MMU in a mine with 501+ employees ($100 per day x 350 days).

In addition, based upon the 2009 data, MSHA estimates that 4 non-longwall MMUs in mines with 1-19 employees and 25 non-longwall MMUs in mines with 20-500 employees that operated on a reduced standard of 0.5 mg/m^3 or less in 2009 would need to change to a larger scrubber screen on the continuous mining machine and retrofit dust collectors on roof bolters to accommodate a bagging system in order to

reduce the quartz content of dust on the MMU. MSHA estimates that changing the scrubber screen size would cost $800 per continuous mining machine and retrofitting a dust collector on two roof bolter machines to accommodate a bagging system would cost $3,000 (1,500 per dust collector x 2 roof bolters per MMU). The cost per MMU would be $3,800. There is also an annual costs related to the bags for the dust collectors. Two roof bolters operating on an MMU are assumed to use a total of 8 bags during a shift. At a cost of $9 per bag, MSHA estimates that annual cost of bags for roof bolters per MMU would be: $14,400 for an MMU in a mine with 1-19 employees (8 bags x $9 per bag x 200 days); and $43,200 for an MMU in a mine with 20-500 employees (8 bags x $9 per bag x 300 days x 2 shifts per day).

MSHA acknowledges that even with these controls, some longwall operators may have difficulty complying with the proposed standard. In particular, the limited number of entries currently available at some longwall operations, may make it difficult to provide sufficient ventilation at the face. Four underground coal mines in District 9 with 20-500 employees operating longwall MMUs have only two entries. In order to comply with the proposed rule, some of these mines may have to substantially increase the amount of air at the face. Although MSHA believes that these mines have sufficient capacity to increase the amount of air delivered to their working sections, it may be possible that under the proposed rule one of these mines would find it necessary to sink an additional shaft and install additional fan capacity to provide the necessary ventilation. The cost of sinking a shaft and increasing fan capacity could range up to $10 million per mine. The additional first year cost for this mine would be $10 million. Amortizing this cost at 7 percent over 10 years would result in additional annualized compliance costs of $1.4 million.

Proposed § 75.332 Working sections and working places

Proposed § 75.332(a)(1) would require each MMU where mechanized mining equipment is being installed or removed to be ventilated by a separate split of intake air directed by overcasts, undercasts or other permanent ventilation controls. The proposed definition of an MMU in § 70.2 states that when two sets of mining equipment are used in a series of working places within the same working section and only one production crew is employed, the two sets of equipment are identified as a single MMU but when two or more production crews are employed, each set of mining equipment would be identified as a separate MMU. Under the existing standard, multiple sets of mining equipment are permitted to operate as a single MMU using a single split of air as long as they are not operating simultaneously. The proposed changes would allow multiple sets of mining equipment to operate as a single MMU as long as one production crew is employed.

MSHA believes that operators are unlikely to incur any increased costs for this proposal, since operators can use either one or two sets of equipment at each MMU, as long as they use only one production crew. MSHA acknowledges, however, that during the transition to the new operating procedures, it is possible that some mines may experience production delays. MSHA does not believe that any necessary production delay would be significant because, under the existing standard, the multiple sets of equipment can not be operated simultaneously if the MMU is supplied by a single split of

air. So the delay in production would be limited to the time it takes for one crew to move from one set of equipment to another. MSHA estimates that the delay would average about 5 percent of the production and that it would take mine operators an average of one year to completely reconfigure their operations so that each MMU operates on a single set of equipment.

MSHA assumes that the recovery of the coal will occur on average in about 5 years. Therefore, the cost of delaying production is the price of the coal production delayed minus the price of the coal expected to be recovered in 5 years discounted to its present value at 7 percent, which is determined by using a factor of 0.287 [1-(1/1.07^5)].

MSHA estimates that about 50 MMUs at mines with 20-500 employees currently have multiple MMUs on a single split of air. If half of these MMUs would incur production delays of 5 percent during the first year, this could result in additional compliance costs of $ 6.2 million (334,134 tons per year per MMU x 0.05 x $51.35 per ton x 0.287 x 25 MMUs). Amortizing these costs over at 7 percent 5 years would result in additional annualized compliance costs of $1.5 million ($6.2 million x an annualization factor of 0.244).

Engineering Control Costs for Underground Coal Mines by Mine Size

Underground Coal Mines with 1-19 Employees

Table V-3 shows the costs of the engineering controls that would be expected to be used both underground and on the surface for underground coal mine operators with 1-19 employees to meet the proposed standards requirements. Table V-4 shows, for the same mine size, the costs for the engineering controls that would need to be implemented at each MMU. The total costs for underground coal mine operators with 1-19 employees to implement engineering controls to meet with the proposed requirements are the sum of the costs from Tables V-3 and V-4. First year costs are approximately $323,800 ($195,200 from Table V-3 + $128,600 from Table V-4). First year costs were multiplied by a 5 year annualization factor of 0.244 based on 7 percent to arrive at approximately $79,000 ($47,600 from Table V-3 + $31,400 from Table V-4). Annual costs are approximately $62,200 ($4,600 from Table V-3 + $57,600 from Table V-4).

Table V-3: Costs for Engineering Controls Implemented in the Mine and on the Surface for Underground Coal Mines with 1-19 Employees

Controls for Mine Size 1-19	Cost per Mine	Mines	First Year Costs	Annualized Costs	Annual Costs
Adjust Regulators	$200	81	$16,200	$3,953	
Buy and Install Pump	$8,750	20	$175,000	$42,700	
Surface Area of Ug. Mines		Machines			
Refurbish Cab	$4,000	1	$4,000	$976	
Change Filters	$4,571	1			$4,571

Total First Year Costs	$195,200		
Total First Year Costs Annualized		$47,629	
Total Annual Costs			$4,571

Table V-4: Costs for Engineering Controls Implemented for MMUs in Underground Coal Mines with 1-19 Employees

Controls for Mine Size 1-19	Cost per MMU	MMUs	First Year Costs	Annualized Costs	Annual Costs
Adjust Water Sprays	$800				
Increase Orifice Size	$300				
Put Belting Over Cont. Miner	$300				
Cost per MMU	$1,400	81	$113,400	$27,670	
Change Scrubber Screen Size	$800				
Retrofit Dust Collector	$3,000				
Cost per MMU	$3,800	4	$15,200	$3,709	
Purchase Bags	$14,400	4			$57,600
Total First Year Costs			$128,600		
Total First Year Costs Annualized				$31,379	
Total Annual Costs					$57,600

Underground Coal Mines with 20-500 Employees

Table V-5 shows the engineering controls and their costs, which would need to be implemented for underground coal mines with 20-500 employees to meet the proposed standards requirements. Table V-6 shows, for the same mine size, the costs of the engineering controls that would need to be implemented by each MMU. The total costs for underground coal mines with 20-500 employees to implement engineering controls to comply with the proposed requirements are the sum of the costs from Tables V-5 and V-6. First year costs are approximately $8.3 million ($2.9 million from Table V-5 + $5.4 million from Table V-6). First year costs were annualized by multiplying them by a 5 year annualization factor of 0.244 based on 7 percent to arrive at $2.0 million ($0.7 million from Table V-5 + $1.3 million from Table V-6). Annual costs are approximately $2.4 million ($0.3 million from Table V-5 + $2.1 million from Table V-6).

Table V-5: Costs for Engineering Controls Implemented in the Mine and on the Surface for Underground Coal Mines with 20-500 Employees

Controls for Mine Size 20-500	Cost per Mine	Mines	First Year Costs	Annualized Costs	Annual Costs
Adjust Fan Blades	$600				
Adjust Regulators	$200				

Cost per Mine	$800	331	$264,800	$64,611	
Buy and Install Pump	$26,250	83	$2,178,750	$531,615	
Install Surfactant System	$10,000	3	$30,000	$7,320	
Surfactant System Chemicals	$96,000	3			$288,000
Rehabilitate Air Ways	$200,000	2	$400,000	$97,600	
Surface Areas of Ug. Mines		Machines or Plants			
Change Filters	$4,571	1			$4,571
Repair Enclosures	$144	1	$144	$35	
Portable Exhaust Fan & Tubing	$1,500	1	$1,500	$366	
Total First Year Costs			$2,875,194		
Total First Year Costs Annualized				$701,547	
Total Annual Costs					$292,571

Table V-6: Costs for Engineering Controls Implemented for MMUs in Underground Coal Mines with 20-500 Employees

Controls for Mine Size 20-500	Cost per MMU	Non-LGW MMUs	LGW MMUs	First Year Costs	Annualized Costs	Annual Costs
Adjust Water Sprays	$800					
Increase Orifice Size	$300					
Put Belting Over Cont. Miner	$300					
Cost per MMU	$1,400	686		$960,400	$234,338	
Exhaust Fan	$100,000					
Initial Tubing Required	$7,500					
Cost for Fan & Tubing	$107,500	34		$3,655,000	$891,820	
Increase Electrical Cost	$30,000	34				$1,020,000
Tubing	$750	34				$25,500
Change Scrubber Screen Size	$800					
Retrofit Dust Collector	$3,000					
Cost per MMU	$3,800	25		$95,000	$23,180	
Purchase Bags	$43,200	25				$1,080,000
Adjust No. & Location of Sprays	$2,000					
Change Sprays to Inc. Air Flow	$800					
Install Headgate Shield Deflectors	$1,300					
Install a Headgate Scrubber Syst.	$30,000					
Cost per MMU	$34,100		22	$750,200	$183,049	
Total First Year Costs				$5,460,600		

Total First Year Costs Annualized	$1,332,387	
Total Annual Costs		$2,125,500

Underground Coal Mines with 501+ Employees

Table V-7 shows the costs of the engineering controls that would need to be implemented for underground coal mines with 501+ employees to meet the proposed standards requirements. Table V-8 shows, for the same mine size, the costs for the engineering controls that would need to be implemented by each MMU. The total costs for underground coal mines with 501+ employees to implement engineering controls to comply with the proposed requirements are the sum of the costs from Tables V-7 and V-8. First year costs are approximately $1.3 million ($0.1 million from Table V-7 + $1.2 million from Table V-8). First year costs were annualized by multiplying them by a 5 year annualization factor of 0.244 based on 7 percent to arrive at $318,000 ($22,000 from Table V-7 + $296,000 from Table V-8). Annual costs are approximately $147,600 ($4,600 from Table V-7 + $143,000 from Table V-8).

Table V-7: Costs for Engineering Controls Implemented in the Mine and on the Surface for Underground Coal Mines with 501+ Employees

Controls for Mine Size 501+	Cost per Mine	Mines	First Year Costs	Annualized Costs	Annual Costs
Adjust Fan Blades	$600				
Adjust Regulators	$200				
Cost per Mine	$800	12	$9,600	$2,342	
Buy and Install Pump	$26,250	3	$78,750	$19,215	
Surface Area of Ug. Mines		Machines or Plants			
Change Filters	$4,571	1			$4,571
Repair Enclosures	$288	1	$288	$70	
Total First Year Costs			$88,638		
Total First Year Costs Annualized				$21,628	
Total Annual Costs					$4,571

Table V-8: Costs for Engineering Controls Implemented for MMUs in Underground Coal Mines with 501+ Employees

Controls for Mine Size 501+	Cost per MMU	Non-LGW MMUs	LGW MMUs	First Year Costs	Annualized Costs	Annual Costs
Adjust Water Sprays	$800					
Increase Orifice Size	$300					
Put Belting Over Cont. Miner	$300					

Cost per MMU	$1,400	72		$100,800	$24,595	
Exhaust Fan	$100,000					
Initial Tubing Required	$7,500					
Cost for Fan & Tubing	$107,500	4		$430,000	$104,920	
Increase Electrical Cost	$35,000	4				$140,000
Tubing	$750	4				$3,000
Adjust No. & Location of Sprays	$2,000					
Change Sprays to Inc. Air Flow	$800					
Install Headgate Shield Deflectors	$1,300					
Install a Headgate Scrubber Sys.	$30,000					
Cost per MMU	$34,100		20	$682,000	$166,408	
Total First Year Costs				$1,212,800		
Total First Year Costs Annualized					$295,923	
Total Annual Costs						$143,000

Surface Coal Mines (including Surface Facilities)

Most surface coal mine operators would not need to implement additional engineering controls to meet the proposed requirements. However, there are some surface mines that MSHA has determined would need additional engineering controls for equipment (either bulldozers and/or highwall drills), plants and in shops that are on surface mine property. The types of engineering controls along with their unit costs and where they apply are discussed below. After the discussion, a table is presented showing cost estimates for the additional engineering controls that would be needed to meet the proposed requirements.

MSHA estimates that 3 machines at mines with 20-500 employees and 1 machine at a mine with 501+ employees would need a new cab either because the machine currently does not have a cab or because the existing cab cannot be refurbished or repaired. On average, MSHA estimates that installing a new cab on a machine would cost about $8,000.

MSHA estimates that: 2 machines at mines with 1-19 employees; 8 machines at mines with 20-500 employees; and 4 machines at mines with 501+ employees would need refurbished cabs. Refurbishing a cab would entail installing new interior, sealing cracks, and thoroughly cleaning the inside cab area. On average, MSHA estimates that refurbishing a cab would cost about $4,000 (including labor).

MSHA estimates that: 8 machines at mines with 1-19 employees; 24 machines at mines with 20-500 employees; and 8 machines at mines with 501+ employees would need cab repair. Repairing an existing cab would entail sealing all cracks and cleaning the cab interior. On average, MSHA estimates that it would take a surface mechanic, earning $32.97 per hour, 1 hour to repair an existing cab.

The need to frequently change the cabin and air conditioning filters on machines was discussed earlier when talking about operating machines efficiently at surface areas

of underground coal mines. Frequently changing these filters on machines for purposes of efficiency also applies to machines operated at surface coal mines. MSHA estimates that: 10 machines in mines with 1-19 employees; 35 machines in mines with 20-500 employees; and 20 machines in mines with 501+ employees would need more frequent filter changes. Current practice is to change these filters once per month. MSHA believes that in order to meet the proposed requirements, the filters would need to be changed once a week. Thus, 3 additional changes per month are needed. MSHA estimate that a surface mechanic would take 45 minutes (0.75 hours) to change both filters and that each filter cost about $50. MSHA estimates that the annual costs to change these filters more frequently would be $4,490 [3 additional filter changes per mo. x 12 mos. x ((2 filters x $50 per filter) + (0.75 hrs. x $32.97 hourly wage rate))].

Engineering controls would also need to be installed in processing plants. MSHA estimates that operators of 4 plants in surface mines with 20-500 employees and 1 plant in a mine with 501+ employees would need to repair 3 enclosures per plant. In many cases operators place miners inside enclosures that are located inside the plant. These enclosures protect miners from encountering the air outside the enclosure (which is the air inside the plant) that is compromised by dust and other airborne particles. MSHA estimates that it would take a surface mechanic 4 hours to repair an enclosure. MSHA estimates that the cost to repair 3 enclosures in a plant would be approximately $396 (4 hrs. x $32.97 hourly wage rate x 3 enclosures).

In addition, MSHA estimates that 1 processing plant and 2 shops in mines with 20-500 employees and 1 plant in a mine with 501+ employees would need a portable exhaust fan and tubing to capture welding fumes and/or grinding dust. The portable exhaust fan and tubing is mobile and can be place in different areas of the plant when problems with airborne particles arise. MSHA estimates that each plant or shop would need 1 portable exhaust fan and tubing costing approximately $1,500.

In areas of a plant or shop that continually have problems with airborne particles, it is better to build a stationary exhaust system for the problem area rather than purchasing a portable exhaust fan. MSHA estimates that 4 shops in mines with 20-500 employees would need to construct a stationary exhaust system. MSHA estimates that it would take a surface welder, earning $34.49 per hour, an average of 8 hours to construct a stationary exhaust system. The system would require $400 worth of sheeting material and $300 for a motor and exhaust fan. MSHA estimates that constructing a stationary exhaust system in a shop would cost $976 [($400 for sheeting materials + $300 for exhaust motor and fan + (8 hours x $34.49 hourly wage rate)].

Engineering Costs for Surface Coal Mines by Mine Size

Table V-9 shows the breakdown of MSHA's estimated total cost for surface coal mines to implement engineering controls to comply with the proposed rule. First year costs would be approximately $101,000, which when annualized are about $25,000. Annual costs are $292,000, and annualized costs (annualized first year costs plus annual costs) would be approximately $317,000 ($25,000 + $292,000).

Table V-9: Costs for Engineering Controls Implemented in Surface Mines

Controls by Mine Size	Unit Cost	Machines	Plants	Shops	First Year Cost	Annualized Costs	Annual Costs
1-19							
Refurbish Cab	$4,000	2			$8,000	$1,952	
Repair Cab	$32.97	8			$264	$64	
More Frequent Filter Changes	$4,490	10					$44,900
Sub-total					$8,264	$2,016	$44,900
20-500							
Install New Cab	$8,000	3			$24,000	$5,856	
Refurbish Cab	$4,000	8			$32,000	$7,808	
Repair Cab	$32.97	24			$791	$193	
More Frequent Filter Changes	$4,490	35					$157,150
Repair Enclosures in Plants	$396		4		$1,584	$386	
Buy Exhaust Fan & Tubing	$1,500		1	2	$4,500	$1,098	
Build Exhaust System	$976			4	$3,904	$953	
Sub-Total					$66,779	$16,294	$157,150
501+							
Install New Cab	$8,000	1			$8,000	$1,952	
Refurbish Cab	$4,000	4			$16,000	$3,904	
Repair Cab	$32.97	8			$264	$64	
More Frequent Filter Changes	$4,490	20					$89,800
Repair Enclosures in Plants	$396		1		$396	$97	
Buy Exhaust Fan & Tubing	$1,500		1		$1,500	$366	
Sub-Total					$26,160	$6,383	$89,800
Total					$101,203	$24,693	$291,850

Table V-10 shows that the costs for implementing engineering controls in the first year that the final rule is effective would be approximately $12.6 million for underground coal operators and $393,000 for surface coal operators (costs in the first year are the sum of the first year costs and annual costs).

Table V-10: Costs for Implementing Engineering Controls In the First Year

Detail	1-19	20-500	501+	Total
Underground Coal Operators				
Cost of Implementing Engineering Controls	$386,000	$10,753,900	$1,449,000	$12,588,800
Surface Coal Operators				
Cost of Implementing Engineering Controls	$53,200	$224,000	$116,000	$393,100

Costs in the First Year = First Year Costs + Annual Costs

Table V-11 shows that the annualized costs for implementing engineering controls would be approximately $5.1 million for underground coal operators and $317,000 for surface coal operators (annualized costs are the sum of annualized first year costs plus annual costs).

Table V-11: Annualized Costs for Implementing Engineering Controls

Detail	1-19	20-500	501+	Total
Underground Coal Operators				
Cost of Implementing Engineering Controls	$141,200	$4,452,000	$465,100	$5,058,300
Surface Coal Operators				
Cost of Implementing Engineering Controls	$46,900	$173,400	$96,200	$316,500

Annualized Costs = Annualized First Year Costs + Annual Costs

Estimated Abatement Costs

MSHA expects that operators would put in place additional engineering controls to comply with the proposed rule. During the first few years that the proposed rule is in effect, operators would have to make adjustments to these engineering controls as they become more familiar with the appropriate controls. During this transition, MSHA expects that operators would receive more citations for coal dust overexposures than under the existing standards.

Under the proposed rule, an operator would receive a citation if the sample result exceeded the equivalent concentration value (ECV). (An ECV is the lowest equivalent concentration measurement demonstrating that the applicable dust standard has been exceeded at a confidence level of at least 95 percent.) If an operator receives a citation for excessive dust, the operator would be required to take corrective actions to address the problem. After taking corrective actions, the operator would be required to sample to ensure that the problem has been corrected and that dust concentrations are at an acceptable level.

Several provisions are triggered whenever sampling results exceed the applicable standard. The requirements of proposed §§ 70.207(g), 70.207(h), 70.208(f), 70.209(e), 70.209(f), 71.207(k), 71.207(l), 90.208(e), 90.208(f) and 90.209(e) would be triggered whenever a citation has to be abated. The requirements of proposed §§ 70.207(i), 70.208(g), 70.209(g), 71.207(m), 71.207(n), 90.208(g), and 90.209(f) would be triggered when sampling results exceed the applicable standard but are below the ECV. In order to estimate the cost of these provisions, MSHA had to estimate the number of times the applicable standards would be exceeded.

MSHA's estimates are based on valid respirable dust samples collected by coal mine operators and processed by MSHA's Standardized Information System (MSIS) during calendar year 2009. Since the current 2.0 mg/m^3 standard was in effect at the time the samples were collected, MSHA had to make several adjustments to the data to

account for the proposed changes in both the level of the standard and the manner in which non-compliance determinations would be made.

Under proposed § 72.800, MSHA would issue citations based on a single full-shift sample of respirable coal mine dust rather than the average of five 8-hour samples. Using the same approach that was used previously for the single sample proposed rule (65 FR 42074), MSHA determined the number of additional violations that would occur if a single sample in each group of sampling results (usually 5 samples) exceeded the applicable ECV. Only one violation was counted, even if multiple samples in the group exceeded the ECV.

Under proposed §§ 70.201(e), 71.201(b) and 90.201(b) sampling devices would be worn from portal to portal and be required during the entire length of each sampled shift. Since operator sampling in 2009 was for only 8 hours, MSHA adjusted the sampling results to account for full-shift sampling.

Proposed § 70.2, would define "normal production shift" for underground mines as a production shift during which production equals either (1) at least the average production for the 30 most recent production shifts or (2) at least the average production for the "most recent production shifts" if 30 shifts of production data were not available. The underground operator sampling in 2009 only had to be conducted when production was at least 50 percent of the average production reported for the last set of five valid samples. With all else being equal, higher production levels result in higher exposure levels, so MSHA also adjusted the underground results to account for higher levels of production.

Estimated Number of Additional Violations

Due to the uncertainty involved in projecting dust levels several years in the future based upon these adjustments, MSHA only estimated the number of times the sampling results would result in violations of the applicable standards and did not try to estimate the small number of times the applicable standards would be exceeded but the results would be below the ECV. MSHA believes that very few results (probably less than 5% of the projected number of citations) would be in the narrow range of exceeding the standard but below the ECV. For similar reasons, MSHA only estimated the number of violations that would occur from exceeding the applicable ECVs and did not attempt to estimate the number of times a weekly accumulated exposure would exceed the permissible weekly accumulated exposure when none of the individual results exceed the applicable ECV. Again, this number is likely to be quite small, probably less than 1% of the projected number of violations.

Surface Coal Mines

Under proposed § 72.800, noncompliance determinations would be based on single samples rather than the average of multiple samples. MSHA used the experience gained during the 1998 Interim Single-Sample Enforcement Policy (ISSEP) to assess the impact of this proposed change. As was noted in the preamble to the Single Sample Proposed Rule (65 FR 42074), MSHA only found 14 of the 4,500 surface entities (0.3%) sampled during the ISSEP to be out of compliance with the 2.0 mg/m^3 standard when determinations of noncompliance were based on single samples. Even though conditions

have improved since ISSEP, MSHA used the noncompliance rate during that program to estimate the number of citations that would occur under the proposed rule. Proposed § 71.207(b) would increase the number of DWPs from 497 in 2009 to an estimated 3,019. MSHA applied the 0.3% rate during ISSEP to the 3,019 projected number of DWPs to arrive at an estimated 10 citations from basing noncompliance determinations on single samples.

The proposed § 71.201(b) would require operators to take full-shift samples rather than 8 hour samples. MSHA took 8-hour samples during ISSEP, so the estimate had to be adjusted to account for full-shift sampling. MSHA used 2009 operator samples to develop an adjustment factor. First MSHA determined that 40 individual 2009 samples were at or above the proposed ECV. Next, MSHA assumed that each miner works an average shift of 10 hours and adjusted the data by multiplying each sample result by 1.25 (i.e., 10 hours/8 hours). This resulted in a doubling of the number of operator samples at or above the ECV. Therefore, MSHA doubled the 10 citations projected from the ISSEP rate to arrive at an estimated 20 citations in a sampling period.

Under the proposed rule, surface operators would have to sample each DWP four times during the first year. MSHA inspects surface mines twice per year. So there would be 6 sampling cycles per DWP during the first year. MSHA projects that the number of estimated citations would decline by about 15% per sampling period, so that the number of violations would decline to 9 by the sixth sampling period, a reduction of 55% compared to the projected 20 citations in the first sampling period.

This resulted in an estimated 83 citations in the first year. Although this estimate does not account for the proposed reduction of the standard to 1.7 mg/m^3 after 6 months, based upon its feasibility assessment, MSHA projects that this would have a negligible impact on the number of citations given the current dust levels and the 6 month period mine operators would have to prepare for this standard.

After one year, proposed § 71.100 would reduce the standard in the active workings of each surface mine to 1.5 mg/m^3. Based upon the 2009 data, MSHA estimates that the number of adjusted samples at or above the ECV would increase by 75% under a 1.5 mg/m^3 standard. Multiplying the 9 citations projected in the last sampling period of the first year by 1.75, MSHA estimates that 16 citations would occur in the first sampling period of the second year. MSHA again projects that the number of estimated citations would decline by about 15% per sampling period, so that the number of violations would decline to 7 by the sixth sampling period of the second year, a reduction of 55% compared to the projected 16 citations in the first sampling period.

After two years, proposed § 71.100 would reduce the standard in the active workings of each surface mine to 1.0 mg/m^3. The number of adjusted 2009 operator samples at or above the ECV is 45% higher under a 1.0 mg/m^3 standard compared to a 1.5 mg/m^3 standard. Multiplying the estimated 7 citations projected during the last sampling period of the second year standard by 1.45, MSHA estimates that 10 citations would occur during the first sampling period of the third year. MSHA projects that the number of estimated citations would decline by about 15% per sampling period, so that the number of violations would decline to 4 by the sixth sampling period of the third year, a reduction of 55% compared to the projected 10 citations in the first sampling

period. This would result in a projected total of 42 citations during the third year. MSHA expects that the number of citations would remain at about 4 per sampling period or 24 per year thereafter.

Table V-12: Projected Number of Citations, Compliance Determinations and Compliance Rates at Surface Mines by Year

	Estimates			
	First Year	Second Year	Third Year	Thereafter
Total Citations	83	66	42	24
Baseline Level of Citations	7	7	7	7
Additional Citations	76	59	35	17
1-19 Employees	38	30	18	9
20-500 Employees	32	25	15	7
501+ Employees	6	4	3	1
Compliance Determinations[1]	18,114	18,114	18,114	18,114
Compliance Rate[2]	99+%	99+%	99+%	99+%

Numbers in Table may not sum due to rounding.

[1] The estimated number of compliance determinations is based on 3,019 DWPs being sampled 6 times per year.

[2] The estimated compliance rate = 1 – (estimated number of citations divided by the estimated number of compliance determinations).

In 2009 there were 7 citations. Subtracting this baseline of 7 citations from the projected number of citations yields an estimate of the additional citations, e.g., in the first year MSHA projects 76 additional citations.

Underground Coal Mines

Under the proposed rule underground mines would have to sample the MMUs, outby DAs and intake air. Based upon the feasibility analysis and an examination of the 2009 data, MSHA does not anticipate an increase in the number of citations related to intake air. The estimates for the additional citations related to the MMUs and the outby DAs are presented below.

MMUs

MSHA based the estimates of the additional citations related to the MMUs on sampling data for the DOs since the DOs are routinely exposed to the highest dust concentrations in the units. MSHA used an approach similar to that presented above for surface mines to estimate the number of additional citations that would occur at underground mines under the proposed rule. MSHA used the ISSEP experience and 2009 operator data to assess the impact of the proposed standard. However, as is discussed below, some slight differences in the methodology were necessary to account for the proposed requirement to use the CPDM.

Under proposed § 72.800 noncompliance determinations would be based on single samples rather than the average of multiple samples. The rate of noncompliance at underground mines during ISSEP was 11%. As was done for the surface mines, MSHA used the noncompliance rate during that program to estimate the number of citations that would occur under the proposed rule even though conditions have improved since ISSEP. MSHA multiplied the 881 MMUs by the 11% ISSEP rate of noncompliance to arrive at an estimated 97 citations if noncompliance determinations were based on single samples.

Since the proposed rule would also require that the samples be taken over a full-shift (proposed § 70.201(e)) during normal production (proposed § 70.207(d)), MSHA made two adjustments to the 2009 operator data. First, each sample result for non-longwall MMUs was multiplied by 1.13 and each sample result for longwall MMUs was multiplied by 1.25 to account for sampling on shifts longer than 8 hours. Then each adjusted result was multiplied by 1.16 (non-longwall) and 1.09 (longwall) to account for the change in the definition of normal production shift. (The derivation of these factors was previously presented in the feasibility assessment.) After applying the two factors to the 2009 sampling results, MSHA determined that the number of samples at or exceeding the ECV increased by 60% compare to the unadjusted data. So MSHA multiplied the estimated 97 citations by 1.6 to get the adjusted estimate of 155 citations in the first sampling period during the first year.

As mine operators and miners become familiar with the proposed methods of determining noncompliance based on full-shift single samples taken during normal production, the number of citations per sampling period should decrease. Under the proposed rule, underground operators would have to sample each MMU six times during the first year. MSHA inspects underground mines four times each year. So there would be 10 sampling cycles per MMU during the first year. MSHA projects that the number of estimated citations would decline by about 20% per sampling period during the first year, so that the number of violations would decline to 21 by the tenth sampling period, a reduction of 87% compared to the projected 155 citations in the first sampling period.

This resulted in an estimated 692 citations in the first year. Although this estimate does not account for the proposed reduction of the standard to 1.7 mg/m^3 after 6 months, based upon its feasibility assessment, MSHA projects that this would have a negligible impact on the number of citations given the current dust levels and the 6 month period mine operators would have to prepare for this standard.

After 12 months, two additional changes would occur under the proposed rule. Proposed § 70.100 would reduce the standard in active underground workings to 1.5 mg/m^3 and proposed § 70.201(a) would require the CPDM to be used for all sampling of the DOs. Using the CPDM would have two effects. First miners would be sampled on every production shift rather than for 5 consecutive shifts each bi-monthly sampling period. In addition, the CPDM would provide mine operators with information about the actual exposures of the DOs on a real-time basis and allow mine management to be proactive in taking corrective action during the shift to prevent possible overexposures. MSHA believes that after the mining community adjusts to the use of the CPDM no miner should ever be overexposed except due to the failure to pay attention to the CPDM display or due to some "emergency situation". However this adjustment would take some time.

Based upon the 2009 data, MSHA estimates that the number of adjusted samples at or above the ECV is 25% higher under a 1.5 mg/m^3 standard compared to the 2.0 mg/m^3 standard. MSHA multiplied the 21 citations projected during the last (i.e., 10th) sampling period in year 1 by 1.25 to arrive at an estimated 26.25 citations in the first sampling period in year 2. Proposed § 70.210(f) requires the CPDM sampling results to be transmitted to MSHA at the end of each week. Therefore, for this analysis MSHA is considering a week to be the sampling period for the CPDM, so there are 52 sampling periods in a year. As mine operators and miners become familiar with the CPDM, MSHA projects that the number of estimated citations would decline by about 2.0% per week during the second year. By the end of the second year, MSHA projects that the number of citations would decline to 9.4 per week compared to 26.25 in week 1, a reduction of about 65%. This would result in a projected total of 853 citations during the second year.

After 24 months, proposed § 70.100 would reduce the standard in active underground workings to 1.0 mg/m^3. Based upon the feasibility assessment, MSHA has determined that all mines should be able to meet the proposed standard. With operators having two years to prepare for the proposed 1.0 mg/m^3 standard combined with a full year of using the CPDM to sample DOs on every shift, there should not be a significant increase in the number of citations when the proposed standard would take effect.

Nevertheless, in recognition of the fact that some operators may delay the implementation of the necessary controls to meet the proposed 1.0 mg/m^3 standard (e.g., because they mistakenly believed the coal seam would be worked out before the standard took effect), MSHA projects a 50% increase in citations to 14.0 citations during the first week of the third year compared to 9.4 during the last week of the second year. Once again, as mine operators adjust to the new standard, MSHA projects that this number would decline by about 2% per week during the third year. By the end of the third year, MSHA projects that the number of citations would fall to 5 per week compared to 14 in week 1, a reduction of about 65%. This would result in a projected total of 458 citations during the third year. MSHA expects that the number of citations would remain at about 5 per week or 260 per year thereafter.

Table V- 13: Projected Number of Citations, Compliance Determinations and Compliance Rates at MMUs by Year

	Estimates			
	First Year	Second Year	Third Year	Thereafter
Total Citations	692	853	458	260
Baseline Level of Citations	225	225	225	225
Additional Citations	467	628	233	35
1-19 Employees	43	58	21	3
20-500 Employees	375	505	187	28
501+ Employees	49	66	24	4
Compliance Determinations	8,810[1]	45,812[2]	45,812[2]	45,812[2]

Compliance Rate[3]	92%	98%	99%	99%

Numbers in Table may not sum due to rounding.

[1] The estimated number of compliance determinations is based on 881 MMUs being sampled 10 times per year.

[2] The estimated number of compliance determinations is based on 881 MMUs transmitting the CPDM data to MSHA 52 times per year.

[3] The estimated compliance rate = 1 – (estimated number of citations divided by the estimated number of compliance determinations).

Outby DAs

Based upon the feasibility analysis and an examination of the 2009 data, MSHA anticipates few additional citations in the outby DAs. In 2009, dust concentrations in the outby DAs averaged less than 1 mg/m^3 and the compliance rate with the 2.0 mg/m^3 standard exceeded 99.5 percent. As the feasibility analysis indicates, MSHA expects that mine operators would have little trouble complying with the proposed standard in the outby DAs. For cost estimation purposes, MSHA assumed a 1% rate of noncompliance. Applying this rate to the 487 outby DAs and multiplying by 8 to account for the sampling periods each year (4 by the operator and 4 by MSHA) resulted in an estimated 39 citations per year.

Table V-14: Projected Number of Citations, Compliance Determinations and Compliance Rates at Outby DAs

Total Citations	39
Baseline Level of Citations	2
Additional Citations	37
1-19 Employees	5
20-500 Employees	28
501+ Employees	4
Compliance Determinations[1]	3,896
Compliance Rate[2]	99%

[1] The estimated number of compliance determinations is based on 487 DWPs being sampled 8 times per year (4 by the operator and 4 by MSHA).

[2] The estimated compliance rate = 1 – (estimated number of citations divided by the estimated number of compliance determinations).

Part 90 Miners

Proposed § 72.800 noncompliance determinations would be based on single samples rather than the average of multiple samples. Proposed § 90.201(b) would require that the samples be taken over a full-shift and proposed § 90.100 would reduce the standard from 1.0 mg/m^3 to 0.5 mg/m^3 after one year. However, based upon the feasibility analysis and an examination of the 2009 data, MSHA does not anticipate an increase in the number of citations related to Part 90 miners. Moreover, proposed § 90.201(a) would require the CPDM to be used for all sampling of Part 90 miners in the second year. Given the low exposures found in 2009 sampling results for Part 90 mines, the availability of areas with even lower concentrations and the required use of the

CPDM, MSHA believes that there is no reason for operators to allow the overexposure of Part 90 miners.

Estimated Abatement Costs Resulting from Proposed Rule

The estimated costs to abate the citations are presented below. The abatement costs consist of several items including modifying the mine ventilation and CPDM performance plans, taking corrective actions and validating the corrective actions by sampling the dust levels. MSHA did not estimate the cost of the penalties resulting from the citations because the Agency considers penalties to be transfer payments (as are taxes and subsidies) and not to be social costs. Moreover, based on the feasibility assessment, MSHA has determined that the technology exists to prevent miners from being exposed to respirable dust concentrations in excess of the proposed standards. The estimates presented above were based upon the assumption that some operators would delay the implementation of the necessary controls and incur the projected additional citations.

Costs in First Year - Resulting from Citations Received in the First Year

As noted in the Tables V-12 to V-14, in the first year that the final rule becomes effective MSHA estimates that underground coal operators would receive 504 additional MMU and outby DA citations (48 citations in mines with 1-19 employees, 403 citations in mines with 20-500 employees; and 53 citations in mines with 501+ employees). Surface coal operations would receive 76 additional citations (38 citations in mines with 1-19 employees, 32 citations in mines with 20-500 employees; and 6 citations in mines with 501+ employees). Under the proposed rule operators would receive a citation when they meet or exceed the excessive concentration value (ECV). To abate a citation operators would incur various costs for taking corrective actions, such as: conducting abatement sampling (if using a gravimetric sampler); revising mine ventilation, dust control or CPDM plans (whichever is applicable); and making a record under existing § 75.363.

However, under the proposed rule many of the above costs would also be incurred by operators if they did not receive a citation but rather had a sample result that was above the applicable standard but below the ECV. MSHA assumes that on average approximately 5 percent of the time an additional citation would be issued the sample exceeded the applicable standard but be below the ECV. MSHA estimates that the number of times a sample result would be above the applicable standard but below the ECV in underground coal mines would be: 2 in mines with 1-19 employees; 20 in mines with 20-500 employees; and 3 in mines with 501+ employees. MSHA estimates that the number of times sample results would be above the applicable standard but below the ECV in surface coal mines would be: 2 in mines with 1-19 employees; 2 in mines with 20-500 employees; and 1 in a mine with 501+ employees.

Since the CPDM is not required until 12 months after the effective date of the final rule, the costs for abating a citation or obtaining a sample above the applicable standard but below the ECV during the first year were based on sampling with a gravimetric sampler.

Submit Corrective Actions - Proposed §§ 70.207(g)(2), 70.208(f)(3), 70.209(e)(2), 71.207(k)(2), 90.208(e)(2), 90.209(e)(3) and Revising Mine Ventilation or Dust Control Plan – Proposed §§ 70.207(h), 70.209(f), 71.207(l), 71. 300(a), 90.208(f), and 90.300(a)

Underground coal operators (under proposed §§ 70.207(g)(2), 70.209(e)(2), and 90.208(e)(2)) and surface coal operators (under proposed § 71.207(k)(2)) would be required, during the abatement time fixed in a citation for violation of the applicable standard to submit corrective actions for MSHA approval. Underground coal operators under proposed §§ 70.208(f)(3) and 90.209(e)(3) would be required to submit corrective actions for MSHA approval when a valid end-of-shift equivalent concentration measurement meets or exceeds the applicable ECV, or exceeds a weekly permissible accumulated exposure.

Also, for underground coal operators (under proposed §§ 70.207(h), 70.209(f), 90.208(f) and 90.300(a)) and surface coal operators (under proposed § 71.207(l), 71.300(a), 90.208(f) and 90.300(a)), one of the conditions for terminating a citation for a violation of the applicable standard is when the underground operator has submitted revised dust control parameters as part of the mine ventilation plan, or a dust control plan or revisions, and when the surface operator has submitted a new or revised dust control plan applicable to the DWP or Part 90 miner identified in the citation.

For underground coal operators, MSHA estimates the number of corrective action submissions, in the first year that the final rule is effective, would be: 48 submissions in mines with 1-19 employees; 403 submissions in mines with 20-500 employees; and 53 submissions in mines with 501+ employees. For surface coal operators, MSHA estimates the number of corrective action submissions, in the first year that the final rule is effective, would be: 38 submissions in mines with 1-19 employees, 32 submissions in mines with 20-500 employees; and 6 submissions in mines with 501+ employees.

MSHA estimates that a supervisor (earning $84.70 per hour in an underground coal mine and $69.98 per hour in a surface coal mine) would take 15 minutes (0.25 hours) to write up the corrective actions for submission; and a clerical employee (earning $26 per hour in an underground coal mine and $25.45 in a surface coal mine) would take 6 minutes (0.1 hours) to submit the corrective actions. In addition, MSHA estimates that copy and postage costs are $1.30 per submission [(2 pages x $0.15 per page) + $1 postage].

MSHA estimates that the cost to submit corrective actions in the first year that the final rule is effective would be approximately $12,600 for underground coal operators and $1,600 for surface coal operators. These figures consist of:

Underground operators:

- $1,204 in mines with 1-19 employees [48 submissions x ((0.25 hrs. x $84.70 hourly wage rate) + (0.1 hrs. x $26 hourly wage rate) + $1.30)];
- $10,105 in mines with 20-500 employees [403 submissions x ((0.25 hrs. x $84.70 hourly wage rate) + (0.1 hrs. x $26 hourly wage rate) + $1.30)]; and,
- $1,329 in mines with 501+ employees [53 submissions x ((0.25 hrs. x $84.70 hourly wage rate) + (0.1 hrs. x $26 hourly wage rate) + $1.30)].

Surface operators:

- $811 in mines with 1-19 employees [38 submissions x ((0.25 hrs. x $69.98 hourly wage rate) + (0.1 hrs. x $25.45 hourly wage rate) + $1.30)];
- $683 in mines with 20-500 employees [32 submissions x ((0.25 hrs. x $69.98 hourly wage rate) + (0.1 hrs. x $25.45 hourly wage rate) + $1.30)]; and,
- $128 in mines with 501+ employees [6 submissions x ((0.25 hrs. x $69.98 hourly wage rate) + (0.1 hrs. x $25.45 hourly wage rate) + $1.30)].

Implement Corrective Actions - Proposed §§ 70.207(g)(3), 70.207(i)(2), 70.209(e)(3), 71.207(k)(3), 90.208(g)(2) and 90.208(e)(2)(i)

Underground coal operators (under proposed §§ 70.207(g)(3), 70.209(e)(3), and 90.208(e)(2)(i)) and surface coal operators (under proposed § 71.207(k)(3)) upon issuance of a citation for a violation of the applicable standard and after receiving the District Manager's approval of the submitted corrective actions would be required to implement the corrective actions. In addition, underground coal operators (under proposed §§ 70.207(i)(2) and 90.208(g)(2) would be required to take corrective action when the result of sample results collected by the operator indicate that the equivalent concentration of one or more valid samples are above the applicable standard but below the ECV.

The costs for meeting the proposed standards were presented previously. MSHA assumes that the corrective actions that would be taken by both underground and surface operators in response to samples above the standards would be to adjust the existing controls. In underground coal mines, these corrective actions could consist of: adjusting regulators and then taking readings; adjusting the type, flow rate and/or pressure of water sprays and changing sprays to increase flow rate. In surface coal mines, the corrective actions could consist of cleaning and/or repairing cabs; and changing filters. MSHA estimates that, on average, the cost (including labor) for corrective actions would be approximately $1,000 in an underground coal mine and $500 in a surface coal mine.

Since corrective actions would need to be implemented when sample results are above the applicable standard and when they meet or exceed the ECV, MSHA estimates that the number of corrective actions required in underground coal mines would be: 50 (48 + 2) in mines with 1-19 employees; 423 (403 + 20) in mines with 20-500 employees; and 56 (53 + 3) in mines with 501+ employees. In surface coal mines, MSHA estimates that the number of corrective actions required would be: 38 in mines with 1-19 employees; 32 in mines with 20-500 employees; and 6 in mines with 501+ employees.

MSHA estimates that the cost to implement corrective actions in the first year that the propose rule is effective would be approximately $529,000 for underground coal operators and $38,000 for surface coal operators. Costs for each mine size are shown below:

Underground operators:

- $50,000 in mines with 1-19 employees (50 corrective actions x $1,000);

- $423,000 in mines with 20-500 employees (423 corrective actions x $1,000); and,
- $56,000 in mines with 501+ employees (56 corrective actions x $1,000).

Surface operators:

- $19,000 in mines with 1-19 employees (38 corrective actions x $500);
- $16,000 in mines with 20-500 employees (32 corrective actions x $500); and,
- $3,000 in mines with 501+ employees (6 corrective actions x $500).

Conducting Sampling - Proposed §§ 70.207(c)(2), 70.207(g)(3), 70.209(b)(2), 70.209(e)(3), 90.208(b)(2), 90.208(e)(2)(i), 71.207(k)(3), and 71.207(m)

Underground coal operators (under proposed §§ 70.207(g)(3), 70.209(e)(3), and 90.208(e)(2)(i)) and surface coal operators (under proposed § 71.207(k)(3)) would be required to take five abatement samples upon issuance of a citation for a violation of the applicable standard. In addition, underground coal operators (under proposed §§ 70.207(c)(2), 70.209(b)(2) and 90.208(b)(2)) and surface coal operators (under proposed § 71.207(m)) would be required to take five samples if any sample result from the most recent bimonthly sampling period is above the new applicable standard.

Operators would be required to take additional samples whenever the standard is exceeded, whether or not this results in a citation for noncompliance. For underground coal mines, MSHA estimates that the number of occasions where five samples are taken would be: 50 occasions (48 + 2) in mines with 1-19 employees; 423 occasions (403 + 20) in mines with 20-500 employees; and 56 occasions (53 + 3) in mines with 501+ employees.

However, MSHA does not estimate any additional sampling for surface coal mines in the first year that the final rule is effective. Existing § 71.208(c) requires that 5 additional samples be taken whenever a result exceeds the applicable standard. Since the sampling required by the proposed rule when a sample exceeds the applicable standard during the first six months would have also been required under existing regulations, there is no change. After six months, the proposed rule would reduce the standard to 1.7 mg/m^3. Based upon an examination of 2009 operator sampling results, MSHA has determined that very little additional sampling would be needed during this six month period because very few results would fall in the narrow range of 1.7 mg/m^3 to 2.0 mg/m^3. During the first year of the final rule, MSHA assumes that very little additional sampling above what is currently being done would be needed at surface mines. MSHA did not take the existing sampling due to results above the existing applicable standard into account when developing the estimates in the subsequent years. Therefore, any underestimate of the costs during the first year would be more than compensated for by the overestimate of the costs during the subsequent years.

MSHA based the additional sampling costs for underground mines on the use of the gravimetric sampler. On average, MSHA estimates that it would take approximately 1 hour to prepare the gravimetric sampler and perform the required checks during sampling. This time period includes 50 minutes (0.8333 hours) of a certified dust technician's time to prepare, disassemble, and clean the sampling unit after completion of sampling. In addition, it would take a mine supervisor 10 minutes (0.1666 hours) to

make the required operational checks of the sampling device during the shift. A certified dust technician's hourly wage is estimated to be $31.77 per hour in an underground coal mine. A supervisor's hourly wage is estimated to be $84.70 in an underground mine. The cost for each filter for a gravimetric sampler is $19.89. Also with each sample a control filter is needed costing an additional $19.89. MSHA estimates that the cost to take a sample is $80.36 ($31.77 per hr. x 0.8333 hrs. + $84.70 per hr. x 0.1666 hrs. + $19.89 per filter + $19.89 per control filter) for underground mines. Five samples are taken each time sampling is conducted with the gravimetric sampler.

MSHA estimates that the cost to conduct sampling in the first year that the final rule is in effect would be approximately $212,600 for underground coal operators. Costs for each mine size are shown below:

Underground operators:

- $20,090 in mines with 1-19 employees (50 occasions x 5 samples x $80.36 cost to sample);
- $169,961 in mines with 20-500 employees (423 occasions x 5 samples x $80.36 cost to sample); and
- $22,501 in mines with 501+ employees (56 occasions x 5 samples x $80.36 cost to sample).

Completing Dust Data Card and Sending Sample and Card to MSHA – Proposed §§ 70.210(c), 71.208(c), and 90.210(c)

Underground coal operators (under proposed §§ 70.210(c) and 90.210(c)) and surface coal operators (under proposed § 71.208(c)) must complete a dust data card and submit the card to MSHA along with the sample. As noted above, since there is no additional sampling in surface coal mines in the first year of the final rule there is no cost for completing dust data cards and for sending them to MSHA along with the samples.

The person completing the dust data card in underground coal mines is a certified dust technician with an estimated hourly wage of $31.77. On average, MSHA estimates that a certified dust technician would take 6 minutes (0.1 hours) to complete the dust data card, sign it and send it along with the sample to MSHA. After filling out the dust data card, a certified person signs the card and writes the certification number on it. On average, MSHA estimates that a certified person (normally the mine safety inspector or an equivalent person) would take 1.5 minutes (0.025 hours) to review and sign the dust data card. A supervisor's hourly wage is estimated to be $84.70 in an underground mine. MSHA estimates postage costs at $1 per sample mailed.

The estimated number of dust data cards equals the number of samples taken. Therefore, for underground coal mines, MSHA estimates that the number of dust data cards to complete, sign, and send would be: 250 dust cards (50 occasions x 5 samples) in mines with 1-19 employees; 2,115 dust cards (423 occasions x 5 samples) in mines with 20-500 employees; and 280 dust cards (56 occasions x 5 samples) in mines with 501+ employees.

MSHA estimates that the cost to complete, sign, and send dust data cards, along with samples, to MSHA in the first year that the final rule is in effect would be

approximately $16,650 for underground coal operators. Costs for each mine size are shown below:

Underground operators:

- $1,574 in mines with 1-19 employees [250 dust cards x ((0.1 hrs. x $31.77 hourly wage rate) + (0.025 hrs. x $84.70 hourly wage rate) + $1)];
- $13,313 in mines with 20-500 employees [2,115 dust cards x ((0.1 hrs. x $31.77 hourly wage rate) + (0.025 hrs. x $84.70 hourly wage rate) + $1)]; and
- $1,762 in mines with 501+ employees [280 dust cards x ((0.1 hrs. x $31.77 hourly wage rate) + (0.025 hrs. x $84.70 hourly wage rate) + $1)].

Posting Sample Results – Proposed §§ 70.211(b), 71.209(b), and 90.211(b)

Underground coal operators (under proposed §§ 70.211(b)) and surface coal operators (under proposed § 71.209(b)) must post sample results. Proposed § 90.211(b) requires mine operators to provide Part 90 miners with a copy of the sample results. As noted above, since there is no additional sampling in surface coal mines in the first year of the final rule there is no cost for posting sample results.

For purposes of this cost analysis, MSHA assumes that it would take the same amount of time to provide a copy of the sample results to the Part 90 miner as it does to post the sample results on the mine bulletin board. On average, MSHA estimates that a clerical employee would take 0.1 hours (6 minutes) to copy and post the sample results. Photocopying costs are estimated to be $0.15 per page. MSHA's current practice is to transmit the sampling results to the operator in a group, so the number of postings equate to the number of occasions when samples have to be taken. In underground coal mines, MSHA estimates that there would be: 50 postings (48 + 2) in mines with 1-19 employees; 423 postings (403 + 20) in mines with 20-500 employees; and 56 postings (53 + 3) in mines with 501+ employees.

MSHA estimates that the cost to post sample results in the first year that the rule is in effect would be approximately $1,500 for underground coal operators. Costs by mine size are shown below:

Underground operators:

- $138 in mines with 1-19 employees [50 postings x ((0.1 hrs. x $26 hourly wage rate) + $0.15)];
- $1,163 in mines with 20-500 employees [423 postings x ((0.1 hrs. x $26 hourly wage rate) + $0.15)]; and
- $154 in mines with 501+ employees [56 postings x ((0.1 hrs. x $26 hourly wage rate) + $0.15)].

Make Existing § 75.363 Record - Proposed §§ 70.207(i)(3) and 90.208(g)(3)

Under proposed §§ 70.207(i)(3) and 90.208(g)(3), when sample results collected by the underground coal operator indicate the equivalent concentration of a sample result is above the applicable standard but below the ECV a record of the corrective actions

taken must be made in the same manner as the record required by existing § 75.363. For underground coal mines, MSHA estimates there would be: 2 records in mines with 1-19 employees; 20 records in mines with 20-500 employees; and 3 records in mines with 501+ employees.

Under existing § 75.363 a certified person would make the record and the record must be countersigned by a mine foreman or equivalent mine official. MSHA estimates that a certified person (earning a supervisor's wage rate) would take 6 minutes (0.1 hrs.) to make the record; and a mine official (also earning a supervisor's wage rate) would take 3 minutes (0.05 hrs.) to countersign the record.

MSHA estimates that the cost to make a record as required by existing § 75.363 in the first year that the rule is in effect would be approximately $350 for underground coal operators. Costs for each mine size are shown below:

Underground operators:

- $25 in mines with 1-19 employees [2 records x ((0.1 hrs. x $84.70 hourly wage rate) + (0.05 hrs. x $84.79 hourly wage rate))];
- $254 in mines with 20-500 employees [20 records x ((0.1 hrs. x $84.70 hourly wage rate) + (0.05 hrs. x $84.79 hourly wage rate))]; and
- $38 in mines with 501+ employees [3 records x ((0.1 hrs. x $84.70 hourly wage rate) + (0.05 hrs. x $84.79 hourly wage rate))].

Operator Adjustments to Plan – Proposed §§ 70.207(c)(2), 70.209(b)(2), 71.207(h)(2), and 90.208(b)(2)

For underground coal operators (under proposed §§ 70.207(c)(2), 70.209(b)(2), and 90.208(b)(2)) and surface coal operators (under proposed § 71.207(h)(2)), if a sample result is above the new applicable standard, the underground coal operator must make necessary adjustments to the dust control parameters in the mine ventilation plan and the surface coal operator must revise the dust control parameters.

MSHA estimates that in underground coal mines operators would make adjustments on: 2 occasions in mines with 1-19 employees; 20 occasions in mines with 20-500 employees; and 3 occasions in mines with 501+ employees. MSHA estimates that surface coal operators would revise plans on: 2 occasions in mines with 1-19 employees; 2 occasions in mines with 20-500 employees; and 1 occasion in a mine with 501+ employees. On average, MSHA estimates that it would take a supervisor (earning $84.70 per hour in an underground mine and $69.98 per hour in a surface mine) 15 minute (0.25 hrs.) to make adjustments.

MSHA estimates that the cost to revise plans in the first year that the rule is in effect would be approximately $500 for underground coal operators and $100 for surface coal operators. Costs for each mine size are shown below:

Underground operators:

- $42 in mines with 1-19 employees [2 plans x ((0.25 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26 hourly wage rate) + $1.30)];

- $424 in mines with 20-500 employees [20 plans x ((0.25 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26 hourly wage rate) + $1.30)]; and
- $64 in mines with 501+ employees [3 plans x ((0.25 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26 hourly wage rate) + $1.30)].

Surface operators:

- $35 in mines with 1-19 employees [2 plans x ((0.25 hrs. x $69.98 hourly wage rate) + (0.25 hrs. x $25.45 hourly wage rate) + $1.30)];
- $35 in mines with 20-500 employees [2 plans x ((0.25 hrs. x $69.98 hourly wage rate) + (0.25 hrs. x $25.45 hourly wage rate) + $1.30)]; and
- $17 in mines with 501+ employees [1 plan x ((0.25 hrs. x $69.98 hourly wage rate) + (0.25 hrs. x $25.45 hourly wage rate) + $1.30)].

Notify Representative of the Miners – Existing §§ 75.370(a)(3)(i), 75.370(f)(1), and 90.301(d) and Proposed §§ 71.300(a)(1), and 71.301(d)(1)

Existing §§ 75.370(a)(3)(i) and 75.370(f)(1) for underground coal operators and proposed §§ 71.300(a)(1) and 71.301(d)(1) for surface coal operators would require operators to notify the representative of miners of a plan revision. Existing § 90.301(d) requires a copy of the dust control plan be provided to the Part 90 miner. MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to notify and provide a copy of the plan to the representative of the miners or Part 90 miner. MSHA assumes that all miners' representatives would request a copy of the plan. MSHA estimates that copy costs are $0.30 (2 pgs. x $0.15). There are no postage costs because MSHA assumes that a copy of the plan would be given to the representative of the miners at the mine site.

MSHA estimates that the number of notifications would be equal to the number of corrective actions submitted, which was determined above. For underground coal operators there would be: 48 notifications in mines with 1-19 employees; 403 notifications in mines with 20-500 employees; and 53 notifications in mines with 501+ employees. For surface coal mines, there would be: 38 notifications in mines with 1-19 employees; 32 notifications in mines with 20-500 employees; and 6 notifications in mines with 501+ employees.

In the first year that the rule is in effect, MSHA estimates that the cost to notify the miner representative and provide a copy if requested would be approximately $3,400 for underground coal operators and $500 for surface coal operators. Costs for each mine size are shown below:

Underground operators:

- $326 in mines with 1-19 employees [48 notifications x (0.25 hrs. x $26 hourly wage rate + $0.30)];
- $2,740 in mines with 20-500 employees [403 notifications x (0.25 hrs. x $26 hourly wage rate + $0.30)]; and
- $360 in mines with 501+ employees [53 notifications x (0.25 hrs. x $26 hourly wage rate + $0.30)].

Surface operators:

- $253 in mines with 1-19 employees [38 notifications x (0.25 hrs. x $25.45 hourly wage rate + $0.30)];
- $213 in mines with 20-500 employees [32 notifications x (0.25 hrs. x $25.45 hourly wage rate + $0.30)]; and
- $40 in mines with 501+ employees [6 notifications x (0.25 hrs. x $25.45 hourly wage rate + $0.30)].

Post Copy of Plan Revision – Existing §§ 75.370(a)(3)(iii), and 75.370(f)(3) and Proposed §§ 71.300(a)(3), and 71.301(d)(3)

Underground coal operators under existing §§ 75.370(a)(3)(iii) and 75.370(f)(3) and surface coal operators under proposed §§ 71.300(a)(3), and 71.301(d)(3) would be required to post a copy of the proposed or revised plan on the mine bulletin board. MSHA estimates that in underground coal mines there would be: 48 posting in mines with 1-19 employees; 403 postings in mines with 20-500 employees; and 53 postings in mines with 501+ employees. In surface coal mines, MSHA estimates there would be: 38 postings in mines with 1-19 employees; 32 postings in mines with 20-500 employees; and 6 postings in mines with 501+ employees.

MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to copy, and post. Copy costs are $0.30 (2 pgs. x $0.15). There are no postage costs. MSHA estimates that cost to copy and post in the first year the final rule is effective would be approximately $3,400 for underground coal operators and $500 for surface coal operators. Costs for each mine size are shown below:

Underground operators:

- $326 in mines with 1-19 employees [48 postings x (0.25 hrs. x $26 hourly wage rate + $0.30)];
- $2,740 in mines with 20-500 employees [403 postings x (0.25 hrs. x $26 hourly wage rate + $0.30)]; and
- $360 in mines with 501+ employees [53 postings x (0.25 hrs. x $26 hourly wage rate + $0.30)].

Surface operators:

- $253 in mines with 1-19 employees [38 postings x (0.25 hrs. x $25.45 hourly wage rate + $0.30)];
- $213 in mines with 20-500 employees [32 postings x (0.25 hrs. x $25.45 hourly wage rate + $0.30)]; and
- $40 in mines with 501+ employees [6 postings x (0.25 hrs. x $25.45 hourly wage rate + $0.30)].

Costs in Second Year - Resulting from Citations Received in the Second Year

As shown in Tables V-13 and 14 above in the second year that the final rule becomes effective MSHA estimates that underground coal operators would receive

666 additional citations (629 additional MMU citations plus 37 additional DA citations). MSHA estimates there would be: 63 citations in mines with 1-19 employees; 533 citations in mines with 20-500 employees; and 70 citations in mines with 501+ employees. Surface coal operations would receive 59 additional DWP citations: 30 citations in mines with 1-19 employees; 25 citations in mines with 20-500 employees; and 4 citations in mines with 501+ employees. Like the first year, under the proposed rule operators would receive a citation when they meet or exceed the excessive concentration value (ECV).

As was previously discussed, MSHA estimates that for every 20 additional citations there would be an instance where a sample result exceeds the applicable standard but is below the ECV. MSHA estimates that the sample result would be above the applicable standard but below the ECV in underground coal mines on: 3 occasions in mines with 1-19 employees; 27 occasions in mines with 20-500 employees; and 4 occasions in mines with 501+ employees. MSHA estimates that the sample result would be above the applicable standard but below the ECV in surface coal mines on 2 occasions in mines with 1-19 employees; 1 occasion in a mine with 20-500 employees; and 1 occasion in a mine with 501+ employees.

Since the majority of the additional citations for underground mines in the second year are expected to result from DO samples taken with the CPDM, MSHA based the abatement costs for underground coal operators on the use of the CPDM. Surface coal operators in the second year of the final rule are still expected to use the gravimetric sampler for DWP sampling so MSHA based the abatement costs for surface coal operators on the use of the gravimetric sampler.

Submit Corrective Actions and Revise Mine Ventilation or Dust Control Plan - Proposed §§ 70.208(f)(3), 71.207(k)(2), 90.209(e)(3), 90.300(a)

Proposed § 70.208(f)(3) would require underground coal operators to submit corrective actions to the District Manger for approval when a valid end-of-shift equivalent concentration measurement meets or exceeds the applicable ECV, or a weekly accumulated exposure exceeds the weekly permissible accumulated exposure. Proposed § 90.209(e)(3) would require underground coal operators to submit corrective actions if the corrective action involve implementation of dust control measures. Under proposed § 90.300(a) operators must submit or revise dust control plans for the Part 90 miner identified in a citation. Proposed § 71.207(k)(2) would require surface coal operators to submit corrective actions upon receiving a citation for a violation of the applicable standard.

For underground coal operators, MSHA estimates the number of corrective action submissions in the second year that the final rule is effective would be: 63 submissions in mines with 1-19 employees; 533 submissions in mines with 20-500 employees; and 70 submissions in mines with 501+ employees. For surface coal operators, MSHA estimates the number of corrective action submissions in the second year that the final rule is effective would be: 30 submissions in mines with 1-19 employees; 25 submissions in mines with 20-500 employees; and 4 submissions in mines with 501+ employees.

MSHA estimates that a supervisor (earning $84.70 per hour in an underground coal mine and $69.98 per hour in a surface coal mine) would take 15 minutes (0.25 hours) to write up the correction actions for submission; and a clerical employee (earning $26 per hour in an underground coal mine and $25.45 in a surface coal mine) would take 6 minutes (0.1 hours) to submit the correction actions. In addition, MSHA estimates that copy and postage costs are $1.30 per submission [(2 pages x $0.15 per page) + $1 postage].

MSHA estimates that the cost to submit corrective actions in the second year that the final rule is effective would be approximately $16,700 for underground coal operators and $1,200 for surface coal operators. Costs for each mine size are shown below:

Underground operators:

- $1,580 in mines with 1-19 employees [63 submissions x ((0.25 hrs. x $84.70 hourly wage rate) + (0.1 hrs. x $26 hourly wage rate) + $1.30)];
- $13,365 in mines with 20-500 employees [533 submissions x ((0.25 hrs. x $84.70 hourly wage rate) + (0.1 hrs. x $26 hourly wage rate) + $1.30)]; and
- $1,755 in mines with 501+ employees [70 submissions x ((0.25 hrs. x $84.70 hourly wage rate) + (0.1 hrs. x $26 hourly wage rate) + $1.30)].

Surface operators:

- $640 in mines with 1-19 employees [30 submissions x ((0.25 hrs. x $69.98 hourly wage rate) + (0.1 hrs. x $25.45 hourly wage rate) + $1.30)];
- $534 in mines with 20-500 employees [25 submissions x ((0.25 hrs. x $69.98 hourly wage rate) + (0.1 hrs. x $25.45 hourly wage rate) + $1.30)]; and
- $85 in mines with 501+ employees [4 submissions x ((0.25 hrs. x $69.98 hourly wage rate) + (0.1 hrs. x $25.45 hourly wage rate) + $1.30)].

Review CPDM Plan - Proposed §§ 70.208(f)(4), 70.208(g)(4), 70.209(g)(4), 71.207(k)(4), 71.207(n)(2), 90.209(e)(4) and 90.209(f)(4)

Proposed §§ 70.208(f)(4) and 90.209(e)(4) would require underground coal operators to review the adequacy of the approved CPDM Performance Plan and submit any necessary revisions to the District Manager when a valid end-of-shift equivalent concentration measurement meets or exceeds the applicable ECV or a weekly accumulated exposure exceeds the weekly permissible accumulated exposure. Surface coal operators under proposed § 71.207(k)(4) would be required to review the adequacy of the approved CPDM Performance Plan and submit any revisions upon issuance of a citation for violation of the applicable standard. In addition, for underground coal operators (under proposed §§ 70.208(g)(4), 70.209(g)(4), and 90.209(f)(4)) and surface coal operators (under proposed § 71.207(n)(2)) the CPDM plans would have to be reviewed when a valid end-of shift equivalent concentration measurement exceeds the applicable standard but is below the applicable ECV.

As noted above, MSHA does not project any additional citations for Part 90 miners and expects that surface operators would choose to use the gravimetric sampler.

Therefore, no costs were estimated for reviewing the CPDM plan due to the sampling results of either the Part 90 miners or the DWPs exceeding the applicable standard.

Also, as noted above, the number of samples expected to exceed the applicable standard would be equal to the projected number of times the ECV would be exceeded plus 5 percent to account for the additional times the sample would exceed the standard but be below the ECV.

For underground coal operators, MSHA estimates that the number of CPDM plans to review would be: 66 reviews for mines with 1-19 employees (63 citations x 1.05); 560 reviews for mines with 20-500 employees (533 citations x 1.05); and 74 reviews for mines with 501+ employees (70 citations x 1.05). On average, MSHA estimates that an underground coal supervisor would take 15 minutes (0.25 hrs.) to review a CPDM plan. MSHA estimates that the cost to submit corrective actions in the second year that the final rule is effective would be approximately $14,800 for underground coal operators. Costs for each mine size are shown below:

Underground operators:

- $1,398 in mines with 1-19 employees (66 reviews x 0.25 hrs. x $84.70 hourly wage rate);
- $11,858 in mines with 20-500 employees (560 reviews x 0.25 hrs. x $84.70 hourly wage rate); and
- $1,567 in mines with 501+ employees (74 reviews x 0.25 hrs. x $84.70 hourly wage rate).

Implement Corrective Actions - Proposed §§ 70.208(g)(2), 70.209(g)(2), 71.207(k)(3) and 90.209(e)(2)

Proposed §§ 70.208(g)(2) and 70.209(g)(2) would require underground coal operators to implement corrective actions when a valid end-of-shift equivalent concentration measurement exceeds the applicable standard but is below the applicable ECV. Underground coal operators would be required to implement corrective actions under proposed § 90.209(e)(2) when a valid end-of-shift equivalent concentration measurement meets or exceeds the applicable ECV or a weekly accumulated exposure exceeds the weekly permissible accumulated exposure. Surface coal operators under proposed § 71.207(k)(3) would be required to implement corrective actions when a citation is issued for a violation of the applicable standard.

The types of engineering controls implemented in the second year that the final rule is effective are similar to those implemented in the first year and which were discussed above. MSHA estimates that, on average, the cost (including labor) for corrective actions would be approximately $1,000 in an underground coal mine and $500 in a surface coal mine. Corrective actions would need to be implemented when sample results are above the applicable standard (whether or not they meet or exceed the ECV). MSHA estimates that corrective actions would be taken in underground coal mines on: 66 occasions (63 + 3) in mines with 1-19 employees; 560 occasions (533 + 27) in mines with 20-500 employees; and 74 occasions (70 + 4) in mines with 501+ employees. MSHA estimates that corrective actions would be taken in surface coal mines on:

32 occasions (30 + 2) in mines with 1-19 employees; 26 occasions (25 + 1) in mines with 20-500 employees; and 5 occasions (4 + 1) in mines with 501+ employees.

MSHA estimates that the cost to implement corrective actions in the second year that the final rule is effective would be approximately $700,000 for underground coal operators and $31,500 for surface coal operators. Costs for each mine size are shown below:

Underground operators:

- $66,000 in mines with 1-19 employees (66 occasions x $1,000);
- $560,000 in mines with 20-500 employees (560 occasions x $1,000); and
- $74,000 in mines with 501+ employees (74 occasions x $1,000).

Surface operators:

- $16,000 in mines with 1-19 employees (32 occasions x $500);
- $13,000 in mines with 20-500 employees (26 occasions x $500); and
- $2,500 in mines with 501+ employees (5 occasions x $500).

Conducting Sampling - Proposed §§ 70.209(b)(2), 70.209(e)(3), 71.207(k)(3), and 71.207(m)

Underground coal operators (under proposed §70.209(e)(3)) and surface coal operators (under proposed § 71.207(k)(3)) would be required to take five abatement samples upon issuance of a citation for a violation of the applicable standard. In addition, underground coal operators (under proposed §70.209(b)(2)) and surface coal operators (under proposed § 71.207(m)) would be required to take five samples if any sample result from the most recent bimonthly sampling period is above the new applicable standard.

As noted earlier, under the proposed rule most of the underground coal operator sampling with a CPDM would be conducted for the designated occupation (DO); for purposes of this analysis MSHA assumes that any additional citations would result from DO sampling with the CPDM. Since DO sampling with a CPDM under the proposed rule is conducted on every MMU, on every shift, there is no additional sampling for underground coal operators calculated here. With respect to surface coal operators, MSHA estimates that five samples would be taken on: 32 occasions (30 + 2) in mines with 1-19 employees; 26 occasions (25 + 1) in mines with 20-500 employees; and 5 occasions (4 + 1) in mines with 501+ employees.

The calculation used to estimate the cost per sample (including filters) for sampling conducted by underground coal operators in the first year of the final rule can be used for surface coal operators in the second year, except that surface coal hourly wage rates apply. MSHA estimates that the cost to take a sample is $75.32 ($28.66 per hr. x 0.8333 hrs. + $69.98 per hr. x 0.1666 hrs. + $19.89 per filter + $19.89 per control filter) for surface mines. Five samples are taken each time sampling is conducted with the gravimetric sampler.

MSHA estimates that the cost to conduct sampling in the second year that the final rule is in effect would be approximately $23,700 for surface coal operators. Costs for each mine size are shown below:

Surface operators:

- $12,051 in mines with 1-19 employees (32 occasions x 5 samples x $75.32 cost to sample);
- $9,792 in mines with 20-500 employees (26 occasions x 5 samples x $75.32 cost to sample); and
- $1,883 in mines with 501+ employees (5 occasions x 5 samples x $75.32 cost to sample).

Completing Dust Data Card and Sending Sample and Card to MSHA – Proposed § 71.208(c)

Surface coal operators under proposed § 71.208(c) would be required to complete the dust data card and submit the card to MSHA along with the sample. The person completing the dust data card is a certified dust technician with an estimated hourly wage of $28.66 in a surface coal mine. On average, MSHA estimates that a certified dust technician would take 6 minutes (0.1 hours) to complete the dust data card, sign it and send it along with the sample to MSHA. After filling out the dust data card, a certified person signs the card and writes the certification number on it. On average, MSHA estimates that a certified person (normally the mine safety inspector or an equivalent person) would take 1.5 minutes (0.025 hours) to review and sign the dust data card. A supervisor's hourly wage is estimated to be $69.98 in a surface mine. MSHA estimates postage costs at $1 per sample mailed.

The number of dust data cards equates to the number of samples taken. Therefore, for surface coal mines, MSHA estimates that the number of dust data cards to complete, sign, and send would be: 160 dust cards (32 occasions x 5 samples) in mines with 1-19 employees; 130 dust cards (26 occasions x 5 samples) in mines with 20-500 employees; and 25 dust cards (5 occasions x 5 samples) in mines with 501+ employees.

MSHA estimates that the cost to complete, sign, and send dust data cards, along with samples, to MSHA in the second year that the final rule is in effect would be approximately $1,800 for surface coal operators. Costs for each mine size are shown below:

Surface operators:

- $898 in mines with 1-19 employees [160 dust cards x ((0.1 hrs. x $28.66 hourly wage rate) + (0.025 hrs. x $69.98 hourly wage rate) + $1)];
- $730 in mines with 20-500 employees [130 dust cards x ((0.1 hrs. x $28.66 hourly wage rate) + (0.025 hrs. x $69.98 hourly wage rate) + $1)]; and
- $140 in mines with 501+ employees [25 dust cards x ((0.1 hrs. x $28.66 hourly wage rate) + (0.025 hrs. x $69.98 hourly wage rate) + $1)].

Posting Sample Results – Proposed § 71.209(b)

Surface coal operators under proposed § 71.209(b) would be required to post sample results. On average, MSHA estimates that a clerical employee earning $25.45 per hour would take 0.1 hours (6 minutes) to copy and post the sample results. Photocopying

costs are estimated to be $0.15 per page. The number of postings equals the number of times operators are required to sample due to exposures above the applicable standard. In surface coal mines, MSHA estimates that the number of postings would be: 32 postings (30 + 2) in mines with 1-19 employees; 26 postings (25 + 1) in mines with 20-500 employees; and 5 postings (4 + 1) in mines with 501+ employees. MSHA estimates that the cost to post sample results in the second year that the rule is in effect would be approximately $200 for surface coal operators. Costs for each mine size are shown below:

Surface operators:

- $86 in mines with 1-19 employees [32 postings x ((0.1 hrs. x $25.45 hourly wage rate) + (1 pg. x $0.15))];
- $70 in mines with 20-500 employees [26 postings x ((0.1 hrs. x $25.45 hourly wage rate) + (1 pg. x $0.15))]; and
- $13 in mines with 501+ employees [5 postings x ((0.1 hrs. x $25.45 hourly wage rate) + (1 pg. x $0.15))].

Make Existing § 75.363 Record - Proposed §§ 70.208(f)(5), 70.208(g)(3), 70.209(g)(3), 90.209(e)(5), and 90.209(f)(3)

For underground coal operators (under proposed §§ 70.208(g)(3), 70.209(g)(3), and 90.209(f)(3)) when a valid end-of-shift equivalent concentration measurement exceeds the applicable standard but is below the applicable ECV, the operator would be required to record the corrective actions taken in the same manner as the record required by existing § 75.363. In addition, for underground coal operators under proposed §§ 70.208(f)(5) and 90.209(e)(5) the same type of record would be required to be made when a valid end-of-shift equivalent concentration measurement meets or exceeds the applicable ECV, or a weekly accumulated exposure exceeds the weekly permissible accumulated exposure.

For underground coal mines, MSHA estimates the number of records would be: 66 records in mines with 1-19 employees; 560 records in mines with 20-500 employees; and 74 records in mines with 501+ employees. Under existing § 75.363 a certified person would make the record and the record must be countersigned by a mine foreman or equivalent mine official. MSHA estimates that a certified person (earning a supervisor's wage rate) would take 6 minutes (0.1 hrs.) to make the record and a mine official (also earning a supervisor's wage rate) would take 3 minutes (0.05 hrs.) to countersign the record. MSHA estimates that the cost to make a record as required by existing § 75.363 in the second year that the rule is in effect would be approximately $5,200 for underground coal operators. Costs for each mine size are shown below:

Underground operators:

- $489 in mines with 1-19 employees [66 records x ((0.1 hrs. x $84.70 hourly wage rate) + (0.05 hrs. x $84.70 hourly wage rate))];
- $4,151 in mines with 20-500 employees [560 records x ((0.1 hrs. x $84.70 hourly wage rate) + (0.05 hrs. x $84.70 hourly wage rate))]; and

- $548 in mines with 501+ employees [74 records x ((0.1 hrs. x $84.70 hourly wage rate) + (0.05 hrs. x $84.70 hourly wage rate))].

Notify Representative of the Miners – Existing §§ 75.370(a)(3)(i), 75.370(f)(1) and 90.301(d) and Proposed §§ 71.300(a)(1) and 71.300(d)(1)

Existing §§ 75.370(a)(3)(i) and 75.370(f)(1) for underground coal operators requires and proposed §§ 71.300(a)(1) and 71.300(d)(1) for surface coal operators would require notification to the representative of miners of a plan revision. Existing § 90.301(d) requires a copy of the dust control plan be provided to the Part 90 miner. MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to notify and provide a copy of the plan to the representative of the miners or Part 90 miner. MSHA assumes that all miners' representatives would request a copy of the plan. MSHA estimates that copy costs are $0.30 (2 pgs. x $0.15). There are no postage costs because MSHA assumes that a copy of the plan would be given to the representative of the miners at the mine site.

MSHA estimates that the number of notifications would be equal to the number of occasions corrective actions were submitted, which was determined above. For underground coal operators, the notifications would be: 63 notifications in mines with 1-19 employees; 533 notifications in mines with 20-500 employees; and 70 notifications in mines with 501+ employees. For surface coal mines, MSHA estimates that the number of notifications would be: 30 notifications in mines with 1-19 employees; 25 notifications in mines with 20-500 employees; and 4 notifications in mines with 501+ employees.

MSHA estimates that the cost to notify the miner representative and provide a copy if requested in the second year that the rule is in effect would be approximately $4,500 for underground coal operators and $400 for surface coal operators. Costs for each mine size are shown below:

Underground operators:

- $428 in mines with 1-19 employees [63 notifications x (0.25 hrs. x $26 hourly wage rate + $0.30)];
- $3,624 in mines with 20-500 employees [533 notifications x (0.25 hrs. x $26 hourly wage rate + $0.30)]; and
- $476 in mines with 501+ employees [70 notifications x (0.25 hrs. x $26 hourly wage rate + $0.30)].

Surface operators:

- $200 in mines with 1-19 employees [30 notifications x (0.25 hrs. x $25.45 hourly wage rate + $0.30)];
- $167 in mines with 20-500 employees [25 notifications x (0.25 hrs. x $25.45 hourly wage rate + $0.30)]; and
- $27 in mines with 501+ employees [4 notifications x (0.25 hrs. x $25.45 hourly wage rate + $0.30)].

Post Copy of Plan Revision – Existing §§ 75.370(a)(3)(iii), and 75.370(f)(3) and Proposed §§ 71.300(a)(3), and 71.301(d)(3)

Underground coal operators under existing §§ 75.370(a)(3)(iii) and 75.370(f)(3) are required and surface coal operators under proposed §§ 71.300(a)(3), and 71.301(d)(3) would be required to post a copy of the proposed or revised plan on the mine bulletin board. MSHA estimates that the number of postings for underground mines would be: 63 posting in mines with 1-19 employees; 533 postings in mines with 20-500 employees; and 70 postings in mines with 501+ employees. For surface coal mines, MSHA estimates that the number of proposed or revised plans to post would be: 30 postings in mines with 1-19 employees; 25 postings in mines with 20-500 employees; and 4 postings in mines with 501+ employees.

MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to copy and post. Copy costs are $0.30 (2 pgs. x $0.15). There are no postage costs. MSHA estimates that the costs to copy and post in the second year the final rule is in effect would be approximately $4,500 for underground coal operators and $400 for surface coal operators. Costs for each mine size are shown below:

Underground operators:

- $428 in mines with 1-19 employees [63 postings x (0.25 hrs. x $26 hourly wage rate + $0.30)];
- $3,624 in mines with 20-500 employees [533 postings x (0.25 hrs. x $26 hourly wage rate + $0.30)]; and
- $476 in mines with 501+ employees [70 postings x (0.25 hrs. x $26 hourly wage rate + $0.30)].

Surface operators:

- $200 in mines with 1-19 employees [30 postings x (0.25 hrs. x $25.45 hourly wage rate + $0.30)];
- $167 in mines with 20-500 employees [25 postings x (0.25 hrs. x $25.45 hourly wage rate + $0.30)]; and
- $27 in mines with 501+ employees [4 postings x (0.25 hrs. x $25.45 hourly wage rate + $0.30)].

Costs in Third Year and Every Year Thereafter- Resulting from Citations Received in the Third Year and Every Year Thereafter

With respect to underground coal operators, MSHA estimated that the number of additional citations would increase in years one and two and then decrease beginning in the third year that the final rule is effective. Beginning in the fourth year, the number of citations would remain at a constant level each year. With respect to surface coal operators, MSHA estimated that the number of additional citations would increase in year one, decrease in the second and third year, and then remain at a constant level beginning in the fourth year and every year thereafter that the final rule is in effect. The Agency took into account each year's delay before costs would be incurred by multiplying each year's cost (except for the costs incurred in the first year) during a 10 year period by the appropriate discount factor. The discount factor is derived by using the formula

$1/(1+0.07)^n$, where n equals the number of years. The discounted amounts were summed and amortized over a 10 year period by multiplying by an annualization factor of 0.142 based on a 7 percent discount rate in order to arrive at a annualized cost.

Table V-15 shows that operators' net present value first year costs related to receiving additional citations would be approximately $2.1 million for underground coal operators and $208,000 for surface coal operators.

Table V-15: Net Present Value First Year Abatement Costs

Requirements	1-19	20-500	501+	Total
Underground Coal Operators				
Costs Related to Additional Citations	$206,800	$1,686,100	$226,100	$2,119,000
Surface Coal Operators				
Costs Related to Additional Citations	$106,700	$85,000	$16,200	$207,900

Net Present Value First Year Abatement Costs = sum of the net present value costs that occur over a 10 year period.

Table V-16 shows that operators' annualized costs related to receiving additional citations would be approximately $300,900 for underground coal operators and $29,500 for surface coal operators.

Table V-16: Annualized Abatement Costs

Requirements	1-19	20-500	501+	Total
Underground Coal Operators				
Costs Related to Additional Citations	$29,400	$239,400	$32,100	$300,900
Surface Coal Operators				
Costs Related to Additional Citations	$15,100	$12,100	$2,300	$29,500

Annualized Abatement Costs = Net Present Value First Year Abatement Costs + Annual Abatement Costs

Costs to Certify Persons to Sample and Maintain Certification

Proposed § 70.202, 71.202, and 90.202

Sampling by Certified Person

Proposed §§ 70.202(a), 71.202(a), and 90.202(a) are the same as the existing standards and would require that respirable dust sampling be performed by a certified

person. Since this is an existing requirement, there are no new costs associated with this provision. Costs for the additional persons that would be needed and the additional sampling that would be required under the proposed requirements are presented below.

Cost to Certify Persons to Perform Sampling

Proposed §§ 70.202(b), 71.202(b), and 90.202(b) would retain the existing requirement that candidates for certification pass an MSHA examination to demonstrate competency in respirable dust sampling procedures. To ensure consistent administration of the certification process, however, the proposal would add a new requirement that candidates complete an MSHA course of instruction prior to certification. MSHA would provide the course of instruction at no charge. However, MSHA assumes that persons becoming certified to sample would travel to either an MSHA district or field office to take the course.

The proposed rule would not require persons currently certified to perform sampling to take the course of instruction unless they failed the exam. Currently, there are a sufficient number of persons certified to perform the required sampling using the gravimetric sampler at all underground coal mines and approximately 20 percent of surface coal mines. Since MSHA's existing standards do not permit the use of the CPDM to sample for compliance purposes, there are no persons certified to sample using the CPDM at either underground or surface coal mines.

The number of persons that would be needed to meet the proposed requirements is determined below, first for underground coal mines and then for surface coal mines.

Estimated Number of Certified Persons at Underground Mines:

Since there are a sufficient number of persons currently certified to sample with a gravimetric sampler at underground coal mines, only the costs related to certifying persons to conduct CPDM sampling are new. MSHA estimates that one person per MMU per shift would need to be certified to sample with the CPDM. Since many certified persons (e.g., the section boss) would likely have to remain at the MMU during sampling, MSHA assumes an additional person per underground coal mine would also have to be certified to handle other designated occupation (ODO) sampling in outby areas. Finally, MSHA assumes that another person would have to be certified to sample in underground coal mines that have facilities on the surface (such as a preparation plant, a mill, shop or yard). MSHA estimates that the number of underground coal mines with surface facilities that would need a person certified would be: 3 mines with 1-19 employees; 21 mines with 20-500 employees; and 8 mines with 501+ employees. MSHA estimates that the number of persons that underground coal operators would need to have certified would be:

- 96 persons in mines with 1-19 employees [(69 MMUs x 1 shift x 1 person per shift) + (12 MMUs x 2 shifts x 1 person per shift) + (3 mines with surface facilities x 1 person per mine)];
- 1,797 persons in mines with 20-500 employees [(45 MMUs x 1 shift x 1 person per shift) + (589 MMUs x 2 shifts x 1 person per shift) + (74 MMUs x 3 shifts x

1 person per shift) + (331 mines x 1 person for sampling outby areas) + (21 mines with surface facilities x 1 person per mine)]; and

- 293 persons in mines with 501+ employees [(3 MMUs x 2 shifts x 1 person per shift) + (89 MMUs x 3 shifts x 1 person per shift) + (12 mines x 1 person for sampling outby areas) + (8 mines with surface facilities x 1 person per mine)].

Estimated Number of Certified Persons at Surface Mines:

Surface coal mines currently sample about 320 designated work positions (DWPs) at approximately 225 mines. This represents about 20 percent of all surface coal mines. Under the proposed rule, surface coal mine operators would have the option to use either a gravimetric sampler or a CPDM to conduct sampling. When the rule becomes effective, MSHA assumes that surface coal mine operators would choose to conduct sampling using the less expensive gravimetric sampler unless they have Part 90 miners who must use the CPDM.[5] Therefore, the 80 percent of surface coal mines (898 mines) that currently do not sample would need to have persons take the applicable course and examination that would be required by proposed § 71.202(b) to become certified. In addition, MSHA expects that the 20 percent of surface coal mines that currently are sampling would each need additional persons to be certified to perform sampling because of the increased sampling that would be required under the proposed requirements (e.g., proposed § 71.207(b) establishes more DWPs than currently exist).

MSHA estimates that the 898 surface coal mines that currently do not conduct sampling would need to obtain certification for: 2 persons at each mine with 1-19 employees; 3 persons at each mine with 20-500 employees; and 6 persons at each mine with 501+ employees. MSHA estimates that the 225 surface coal mines that currently conduct sampling have an average of 2 persons per mine that are currently certified to sample. Surface coal mine operators already performing sampling would need certifications to sample for 1 additional person in mines with 20-500 employees and 4 additional persons in mines with 501+ employees. No additional persons would need to be certified to sample for surface coal mine operators with 1-19 employees. MSHA estimates that the number of persons that surface coal mine operators would need to have certified to sample would be:

- 992 persons in mines with 1-19 employees (620 surface mines x 2 persons x 80 percent);
- 1,276 persons in mines with 20-500 employees [(491 surface mines x 3 persons x 80 percent) + (491 surface mines x 1 person x 20 percent)]; and
- 68 persons in mines with 501+ employees [(12 surface mines x 6 persons x 80 percent) + (12 surface mines x 4 persons x 20 percent)].

Estimated Costs

[5] Since surface miners are not currently eligible to become Part 90 miners, MSHA placed all of the costs related to the use of the CPDM at surface mines, including those related to certified persons, under proposed § 90.1, which would to expand the scope of the Part 90 option to surface mines.

MSHA estimates that it would take a person 9 hours to complete the CPDM course and examination on sampling (7 hours for the course, 1 hour for the examination and 1 hour to travel to and from the course site); and 3.5 hours for the course and examination on sampling with the gravimetric sampler (2 hours for the course, 0.5 hours for the exam, 1 hour to travel to and from the course site). MSHA estimates that a person certified for sampling earns $31.77 per hour in an underground coal mine and $28.66 per hour in a surface coal mine. MSHA estimated that the travel expenses would average $50 per round trip. MSHA estimates that first year costs to certify persons to sample would be approximately: $734,300 for underground coal mine operators and $351,100 for surface coal mine operators. Costs for underground and surface operators for each mine size are shown below:

Underground operators:

- $32,249 in mines with 1-19 employees [96 persons x (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)];
- $603,666 in mines with 20-500 employees [1,797 persons x (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)]; and
- $98,427 in mines with 501+ employees [293 persons x (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)].

Surface operators:

- $149,108 in mines with 1-19 employees [992 persons x (3.5 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expenses)];
- $191,796 in mines with 20-500 employees [1,276 persons x (3.5 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expenses)]; and
- $10,221 in mines with 501+ employees [68 persons x (3.5 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expenses)].

First year costs were amortized over 10 years by multiplying them by an annualization factor of 0.142 based on a 7 percent discount rate to arrive at annualized cost of approximately $104,300 for underground coal mine operators and $50,000 for surface coal mine operators.

Turnover Costs Related to Certifying Persons to Perform Sampling

There would be occasions when persons certified to sample will leave the job and have to be replaced or a new mine starting up would need certified persons. In some instances, these persons will already have certification to perform the required sampling. However, in other instances these persons would need to become certified to perform sampling.

MSHA estimates that the annual need for replacement certified persons would be 6 percent of the persons certified in underground coal mines and 3 percent of the persons certified in surface coal mines. MSHA assumes that persons employed at underground coal mines would have to become certified to sample with both the gravimetric sampler and CPDM, while persons employed at surface coal mines would only have to become certified to sample with the gravimetric sampler.

MSHA estimates that annual cost to certify replacement persons to sample would be approximately $54,800 for underground coal mine operators and $10,500 for surface coal mine operators. Costs for underground and surface operators for each mine size are shown below:

Underground operators:

The time to certify persons in underground coal mines would be 11.5 hours (8 hours for the CPDM course and exam, 2.5 hours for the gravimetric course and exam, and 1 hour for travel to and from the course site).

- $2,492 in mines with 1-19 employees [(96 persons x 6 percent) x ((11.5 hrs. for course, examination and travel x $31.77 hourly wage rate) + $50 travel expenses)];
- $44,858 in mines with 20-500 employees [(1,797 persons x 6 percent) x ((11.5 hrs. for course, examination and travel x $31.77 hourly wage rate) + $50 travel expenses)]; and
- $7,476 in mines with 501+ employees [(293 persons x 6 percent) x ((11.5 hrs. for course, examination and travel x $31.77 hourly wage rate) + $50 travel expenses)].

Surface operators:

At surface coal mines, the time to certify persons in surface coal mines would be 3.5 hours (2.5 hours for the course and exam, and 1 hour for travel to and from the course site).

- $4,509 in mines with 1-19 employees [(992 persons x 3 percent) x ((3.5 hrs. for course, examination and travel x $28.66 hourly wage rate) + $50 travel expenses)];
- $5,712 in mines with 20-500 employees [(1,276 persons x 3 percent) x ((3.5 hrs. for course, examination and travel x $28.66 hourly wage rate) + $50 travel expenses)]; and
- $301 in mines with 501+ employees [(68 persons x 3 percent) x ((3.5 hrs. for course, examination and travel x $28.66 hourly wage rate) + $50 travel expenses)].

Costs for Persons to Take Examination to Maintain their Certification to Perform Sampling

Proposed §§ 70.202(c), 71.202(c) and 90.202(c) are new and would require persons certified in dust sampling procedures to pass the MSHA examination every three years to demonstrate competency in sampling procedures. Persons that pass the examination maintain their certification. Persons that fail the examination must take the course and pass the examination to become recertified.

Estimated Number of Persons Taking the Examination

The number of persons in underground coal mines that would be required to take the MSHA examination to maintain certification to sample is the same as those estimated earlier to become certified to sample with the CPDM under proposed § 70.202(b):

96 persons in mines with 1-19 employees; 1,797 persons in mines with 20-500 employees; and 293 persons in mines with 501+ employees. However, with respect to surface coal mines, persons that were certified to sample with the gravimetric sampler due to proposed § 71.202(b), as well as persons already holding certifications to sample with the gravimetric sampler when the rule would take effect, would need to take the re-certification examination. The number of persons in surface coal mines that would need to take a MSHA examination to maintain their certification to sample would be: 1,240 persons in mines with 1-19 employees (620 mines x 2 persons); 1,473 persons in mines with 20-500 employees (491 mines x 3 persons); and 72 persons in mines with 501+ employees (12 mines x 6 persons).

It was not possible for MSHA to estimate with any degree of precision when persons would have to be re-certified. For example, for underground mines, MSHA assumed that all of the new certifications resulting from the proposal would occur in the first year following the effective date of the rule. This is a simplification. Some may become certified before the rule would take effect. Others may wait until the second year when the requirement for additional monitoring with the CPDM would take effect.

Due to the difficulty of determining exactly when persons would take the examination to re-certify, and that some persons may recertify earlier than required, MSHA made the simplifying assumption for costing purposes that one third of the persons that are certified to perform sampling would take the re-certification examination each year. Thus, MSHA estimates that the number of persons taking the examination ach year to maintain their certifications would be approximately:

Underground Operators:

- 32 persons in mines with 1-19 employees (96 persons / 3);
- 599 persons in mines with 20-500 employees (1,797 persons / 3); and
- 98 persons in mines with 501+ employees (293 persons / 3).

Surface Operators:

- 413 persons in mines with 1-19 employees (1,240 persons / 3);
- 491 persons in mines with 20-500 employees (1,473 persons / 3); and
- 24 persons in mines with 501+ employees (72 persons / 3).

Costs for the Examinations

As noted above, with respect to certification for sampling, MSHA estimates that it would take 1 hour for the CPDM examination, 0.5 hours for the gravimetric examination, and 1 hour to travel to and from the site where the examination is given. MSHA assumes that all persons from underground coal mines would take both examinations and all persons from surface coal mines would take just the gravimetric exam. For underground coal mines, this assumption is likely to result in a slight overestimate of the examination costs for re-certification because a small number of persons may be certified on only one device and take only one exam. For example, after the requirement to sample the designated occupations (DOs) and ODOs with the CPDM becomes effective, underground coal mines would need fewer persons certified in the gravimetric sampler. As a result, not every certified person working underground would need to pass the examination for the gravimetric sampler. However, this slight overestimation with regard

to underground coal mines would be offset by the additional hours needed for travel if different persons have to take each exam. All persons from surface coal mines would take the gravimetric exam. MSHA estimates that annual cost for certified persons to take the examination to maintain their certification to sample would be approximately $92,800 for underground coal mine operators and $94,350 for surface coal mine operators. Costs for underground and surface operators for each mine size are shown below:

Underground operators:

- $4,142 in mines with 1-19 employees [32 persons x (2.5 hrs. for gravimetric and CPDM examinations and travel x $31.77 hourly wage rate + $50 travel expenses)];
- $77,526 in mines with 20-500 employees [599 persons x (2.5 hrs. for gravimetric and CPDM examination and travel x $31.77 hourly wage rate + $50 travel expenses)]; and
- $12,684 in mines with 501+ employees [98 persons x (2.5 hrs. for gravimetric and CPDM examination and travel x $31.77 hourly wage rate) + $50 travel expenses)].

Surface Operators:

- $38,405 in mines with 1-19 employees [413 persons x (1.5 hrs. for examination and travel x $28.66 hourly wage rate + $50 travel expenses)];
- $45,658 in mines with 20-500 employees [491 persons x (1.5 hrs. for examination and travel x $28.66 hourly wage rate + $50 travel expenses)]; and
- $2,232 in mines with 501+ employees [24 persons x (1.5 hrs. for examination and travel x $28.66 hourly wage rate + $50 travel expenses)].

Costs for Persons who Fail Examinations to Re-Certify to Perform Sampling

Some of the persons taking the examination to maintain their certification to sample would fail the examination and need to take the course and examination again. In addition, proposed §§ 70.202(d), 71.202(d), and 90.202(d) would provide that MSHA may revoke a person's certification for failing to properly carry out required sampling procedures, as appropriate. MSHA assumes that 10 percent of the certified persons who work at underground coal mines and 5 percent who work at surface coal mines would have to take the course and examination to become recertified.

Course and examination times are the same as determined above. MSHA estimates that the annual cost for persons who failed the examination and need to retake the course and examination would be approximately $24,500 for underground coal mine operators and $7,100 for surface coal mine operators. Costs for underground and surface operators for each mine size are shown below:

Underground operators:

For underground coal mines, MSHA based the estimated times and costs on the CPDM examination, which would be harder to pass than the examination for the gravimetric sampler.

- $1,008 in mines with 1-19 employees [32 persons x 10 percent x (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)];
- $20,156 in mines with 20-500 employees [599 persons x 10 percent (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)]; and
- $3,359 in mines with 501+ employees [99 persons x 10 percent x (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)].

Surface operators:

For surface coal mines, MSHA based the estimated times and costs on the examination for the gravimetric sampler.

- $3,157 in mines with 1-19 employees [413 persons x 5 percent x(3.5 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expense)];
- $3,758 in mines with 20-500 employees [491 persons x 5 percent x((3.5 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expense)]; and
- $150 in mines with 501+ employees [24 persons x 5 percent x (3.5 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expense)].

Certified Person; Maintenance and Calibration

Proposed § 70.203, 71.203, and 90.203

Maintenance and Calibration Performed by a Certified Person

Proposed §§ 70.203(a), 71.203(a), and 90.203(a) would require that persons who maintain and calibrate respirable dust sampling equipment be certified. Since this is an existing requirement, there are no new costs associated with this provision. Costs for additional persons to become certified and costs for the additional maintenance that would be needed under the proposed requirements are presented below.

Cost to Certify Persons to Maintain and Calibrate (M&C) Sampling Devices

For underground coal mine operators, proposed § 70.203(b) would require a person to complete an MSHA course of instruction and pass an MSHA examination in order to become certified to maintain and calibrate approved sampling devices. Like the certification to perform sampling, MSHA would provide this course at no charge; however, persons becoming certified would have to travel to either an MSHA district or field office to take the course. Estimates of the number of persons that operators would need to become certified to perform M&C are determined as follows.

Estimated Number of Certified Persons at Underground Mines

Since all underground coal mines currently use the gravimetric sampler and are maintaining and calibrating those devices, no additional persons would be needed at underground mines to maintain and calibrate the gravimetric sampler. However, all underground coal mines are assumed to need at least one person certified in the

maintenance and calibration of the CPDM. Underground mines with 501+ employees are assumed to need 2 persons.

- 81 persons in mines with 1-19 employees (81 mines x 1 person per mine);
- 331 persons in mines with 20-500 employees (331 mines x 1 person per mine); and
- 24 persons in mines with 501+ employees (12 mines x 2 persons per mine).

Estimated Number of Certified Persons at Surface Mines

As was noted above, surface coal mines are not expected to use the CPDM unless they have Part 90 miners. The 225 surface coal mines that currently sample with the gravimetric sampler are not expected to need additional persons to be certified to maintain and calibrate that device. However, MSHA assumes that each of the 898 surface coal mines (80 percent of surface mines) that currently do not sample would need 1 person to be certified to maintain and calibrate the gravimetric sampler.

- 496 persons in mines with 1-19 employees (620 mines x 80 percent x 1 person per mine);
- 393 persons in mines with 20-500 employees (491 mines x 80 percent x 1 person per mine); and
- 10 persons in mines with 501+ employees (12 mines x 80 percent x 1 person per mine).

Estimated Costs

MSHA estimates that it would take a person 9 hours for the CPDM course and examination on maintenance and calibration (7 hours for the course, 1 hour for the examination and 1 hour to travel to and from the course site). Also, MSHA estimates that it would take a person 6 hours for the course and examination on maintenance and calibration for the gravimetric sampler (4 hours for the course, 1 hour for the exam, 1 hour to travel to and from the course site). MSHA estimates that a certified person earns $31.77 per hour in an underground coal mine and $28.66 in a surface coal mine. MSHA estimates that first year costs to certify persons to maintain and calibrate sampling device would be approximately $146,500 for underground coal mine operators and $199,400 for surface coal mine operators. Costs for underground and surface operators for each mine size are shown below:

Underground Operators:

- $27,210 in mines with 1-19 employees [81 persons x (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)];
- $111,193 in mines with 20-500 employees [331 persons x (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)]; and
- $8,062 in mines with 501+ employees [24 persons x (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)].

Surface Operators:

- $110,092 in mines with 1-19 employees [496 persons x (6 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expenses)];
- $87,186 in mines with 20-500 employees [393 persons x (6 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expenses)]; and
- $2,131 in mines with 501+ employees [10 persons x (6 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expenses)].

First year costs were amortized over 10 years by multiplying by an annualization factor of 0.142 based on a 7 percent discount rate to arrive at annualized cost of approximately $20,800 for underground coal mine operators and $28,300 for surface coal mine operators.

Turnover Costs Related to Certifying Persons to Maintain and Calibrate the Sampling Devices

There would be occasions when persons certified to sample will leave the job and have to be replaced or a new mine starting up would need certified persons. MSHA assumes the same replacement rates for persons certified to maintain and calibrate the sampling devices as those for certifying persons to perform sampling noted above, 6 percent at underground coal mines and 3 percent at surface coal mines. MSHA estimates that annual costs to certify replacement persons to M&C sampling devices are approximately $15,000 for underground coal mine operators and $6,200 for surface coal mine operators. Costs for underground and surface operators for each mine size are shown below:

Underground operators:

MSHA assumed that the certified persons at underground mines would have to be certified on the maintenance and calibration of both the gravimetric and CPDM sampling devices. The time to certify replacement persons in underground coal mines would be 15 hours which consist of: 9 hours for the first day (8 hours for the CPDM course and exam + 1 hour of travel time to and from the course site); and 6 hours for the second day (5 hours for the gravimetric course and exam + 1 hour for travel to and from the course site). Travel costs are estimated to be $100 ($50 per day). MSHA estimates that the number of persons to train are: 5 persons in mines with 1-19 employees (81 persons x 6 percent; 20 persons in mines with 20-500 employees (331 persons x 6 percent); and 1 person in mines with 501+ employees (24 persons x 6 percent).

- $2,883 in mines with 1-19 employees [5 persons x (15 hrs. for course, examination and travel x $31.77 hourly wage rate + $100 travel expenses)];
- $11,531 in mines with 20-500 employees [20 persons x (15 hrs. for course, examination and travel x $31.77 hourly wage rate + $100 travel expenses)]; and
- $577 in mines with 501+ employees [1 person x (15 hrs. for course, examination and travel x $31.77 hourly wage rate + $100 travel expenses)].

Surface operators:

MSHA assumed that the certified persons at surface mines would have to be certified only on the maintenance and calibration of the gravimetric sampling device unless the

mine had Part 90 miners. The time to certify replacement persons in surface coal mines would be 6 hours (5 hours for the course and exam, and 1 hour for travel to and from the course site). MSHA estimates that the number of persons to train are: 15 persons in mines with 1-19 employees (496 persons x 3 percent); 12 persons in mines with 20-500 employees (393 persons x 3 percent); and 1 person in mines with 501+ employees (10 persons x 3 percent).

- $3,329 in mines with 1-19 employees [15 persons x (6 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expenses)];
- $2,664 in mines with 20-500 employees [12 persons x (6 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expenses)]; and
- $222 in mines with 501+ employees [1 person x (6 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expenses)].

Costs for Persons to Take the Examination to Maintain the Certification to Maintain and Calibrate Sampling Devices

Proposed §§ 70.203(c), 71.203(c) and 90.203(c) are new and would require persons certified in dust sampling procedures to pass the MSHA examination demonstrating competency in sampling procedures or maintenance and calibration procedures every three years. Persons who pass the examination maintain their certification. Persons who fail the examination must take the course and pass the examination to become re-certified.

Estimated Number of Certified Persons Taking the Examination

The number of certified persons in underground coal mines who would need to take the MSHA examination to maintain their certification to maintain and calibrate sampling devices is the same as that estimated above to become certified under proposed § 70.203(b): 81 persons in mines with 1-19 employees; 331 persons in mines with 20-500 employees; and 24 persons in mines with 501+ employees. For surface coal mines, MSHA assumed that all mines would need to have one person certified to maintain and calibrate sampling devices. The number of persons taking the examination is equal to the number of surface coal mines: 620 persons in mines with 1-19 employees; 491 persons in mines with 20-500 employees; and 12 persons in mines with 501+ employees.

As explained above in the discussion of re-certification of persons for sampling, due to the difficulty of determining exactly when persons would take the examination to re-certify, and the fact that some persons may recertify earlier than required, MSHA assumes that one-third of the persons who are certified to perform sampling would take the re-certification examination each year. MSHA estimates that the number of persons taking the examination each year to maintain their certification is approximately:

Underground operators:

- 27 persons in mines with 1-19 employees (81 persons / 3);
- 110 persons in mines with 20-500 employees (331 persons / 3); and
- 8 persons in mines with 501+ employees (24 persons / 3).

Surface operators:

- 207 persons in mines with 1-19 employees (620 persons / 3);
- 164 persons in mines with 20-500 employees (491 persons / 3); and,
- 4 persons in mines with 501+ employees (12 persons / 3).

Estimated Costs of the Examinations

As noted above, with respect to certification to perform maintenance and calibration on sampling devices, MSHA estimates that it would take 1 hour for the CPDM examination, 1 hour for the gravimetric examination, and 1 hour to travel to and from the site where the examination is given. MSHA assumes that all certified persons from underground coal mines would take both examinations and all persons from surface coal mines would only take the gravimetric examination. For underground coal mines, this assumption is likely to result in a slight overestimate of the examination costs for re-certification because a small number of persons may be certified on only one device and take only one examination. For example, after the proposed requirements to sample the DOs and ODOs with the CPDM go into effect, underground coal mines would need fewer persons certified in the gravimetric sampler.

As a result, not every certified person working underground would need to pass the examination for the gravimetric sampler. This slight overestimation with regard to underground coal mines would be offset by the additional hours needed for travel if different persons have to take each exam. All certified persons from surface coal mines would take the gravimetric exam. MSHA estimates that annual costs for certified persons to take the examination to keep their certification to maintain and calibrate sampling devices would be approximately $21,100 for underground coal mine operators and $40,200 for surface coal mine operators. Costs for underground and surface operators for each mine size are shown below:

Underground operators:

- $3,923 in mines with 1-19 employees [27 persons x (3 hrs. for gravimetric and CPDM examinations and travel x $31.77 hourly wage rate + $50 travel expenses)];
- $15,984 in mines with 20-500 employees [110 persons x (3 hrs. for gravimetric and CPDM examination and travel x $31.77 hourly wage rate + $50 travel expenses)]; and
- $1,162 in mines with 501+ employees [8 persons x (3 hrs. for gravimetric and CPDM examination and travel x $31.77 hourly wage rate + $50 travel expenses)].

Surface operators:

- $22,215 in mines with 1-19 employees [207 persons x (2 hrs. for examination and travel x $28.66 hourly wage rate + $50 travel expenses)];
- $17,600 in mines with 20-500 employees [164 persons x (2 hrs. for examination and travel x $28.66 hourly wage rate + $50 travel expenses)]; and
- $429 in mines with 501+ employees [4 persons x (2 hrs. for examination and travel x $28.66 hourly wage rate + $50 travel expenses)].

Cost for Persons who Fail the Examinations

Some persons taking the examination to keep their certification to maintain and calibrate sampling devices would fail the examination and need to take the course and examination again. In addition, proposed §§ 70.203(d), 70.203(d) and 90.203(d) would provide that MSHA may revoke a person's certification for failing to properly carry out required maintenance and calibration procedures, as appropriate. MSHA assumes that 10 percent of the certified persons who work at underground coal mines and 5 percent who work at surface coal mines would have to become re-certified by taking the course and the examination. The course and examination times are the same as determined above.

MSHA estimates that the annual cost for persons who failed the examination and need to re-take the course and examination would be approximately $5,000 for underground coal mine operators and $4,200 for surface coal mine operators. Costs for underground and surface operators for each mine size are shown below:

Underground operators:

- $1,008 in mines with 1-19 employees [27 persons x 10 percent x (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)];
- $3,695 in mines with 20-500 employees [110 persons x 10 percent (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)]; and
- $336 in mines with 501+ employees [8 persons x 10 percent x (9 hrs. for course, examination and travel x $31.77 hourly wage rate + $50 travel expenses)].

Surface operators:

- $2,220 in mines with 1-19 employees [207 persons x 5 percent x(6 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expense)];
- $1,776 in mines with 20-500 employees [164 persons x 5 percent x (6 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expense)]; and
- $222 in mines with 501+ employees [4 persons x 5 percent x (6 hrs. for course, examination and travel x $28.66 hourly wage rate + $50 travel expense)].

Table V-17 shows, by mine size, a summary of the first year costs to certify persons to perform sampling and to maintain and calibrate (M&C) sampling equipment for underground and surface coal mine operators. The dollar amounts in Table IV-17 were derived by summing the first year cost estimates (first year costs plus annual costs) for proposed § 70.202 and proposed § 70.203. MSHA estimates that the first year costs to certify persons to sample and to maintain and calibrate equipment would be approximately $1.1 million for underground coal operators and $705,100 for surface coal operators.

Table V-17: Costs Occurring in the First Year

To Certify Persons to Sample and M&C Sampling Equipment

Requirements	Std.	1-19	20-500	501+	Total
Underground Coal Operators					
Persons Getting Certified to Sample & M&C	§§70.202(b), 90.202(b) 70.203(b) & 90.203(b)	$59,500	$714,900	$106,500	$880,800
Persons Getting Certified to Sample & M&C (Due to Turnover)	§§70.202(b), 90.202(b) 70.203(b) & 90.203(b)	$5,400	$56,400	$8,100	$69,800
Persons Taking Exams to Keep Certification to Sample & M&C	§§70.202(c) & 90.202(c)	$8,100	$93,500	$13,800	$115,400
Persons taking Course and Exam Because They Failed the Re-Certification Exam	§§70.202(c) & 90.202(c)	$2,000	$23,900	$3,700	$29,600
Underground Total		$74,900	$888,600	$132,100	$1,095,600
Surface Coal Operators					
Persons Getting Certified to Sample & M&C	§§71.202(b) & 71.203(b)	$259,200	$279,000	$12,400	$550,500
Persons Getting Certified to Sample & M&C (Due to Turnover)	§§71.202(b) & 71.203(b)	$7,800	$8,400	$500	$16,700
Persons Taking Exams to Keep Certification to Sample & M&C	§§71.202(c) & 71.203(c)	$60,600	$63,300	$2,700	$126,500
Persons taking Course and Exam Because They Failed the Re-Certification Exam	§§71.202(c) & 71.203(c)	$5,400	$5,500	$400	$11,300
Surface Total		$333,000	$356,200	$15,900	$705,100
Total		$408,000	$1,244,800	$148,000	$1,800,700

[a] First Year Costs = First Year Costs + Annual Costs

Table V-18 shows, by mine size, a summary of the annualized costs (first year cost annualized plus annual costs) to certify persons to perform sampling and M&C sampling equipment for underground and surface coal mine operators. The dollar amounts in Table IV-18 were derived by summing the annualized cost estimates (annualized first year costs plus annual costs) for proposed § 70.202 and proposed § 70.203. MSHA estimates that the annualized costs to certify persons to sample and to maintain and calibrate equipment would be approximately $340,000 for underground coal operators and $232,700 for surface coal operators.

Table V-18: Annualized Costs

To Certify Persons to Sample and M&C Sampling Equipment

Requirements	Std.	1-19	20-500	501+	Total
Underground Coal Operators					
Persons Getting Certified to Sample & M&C	§§70.202(b), 90.202(b) 70.203(b) & 90.203(b)	$8,400	$101,500	$15,100	$125,100
Persons Getting Certified to Sample & M&C (Due to Turnover)	§§70.202(b), 90.202(b) 70.203(b) & 90.203(b)	$5,400	$56,400	$8,100	$69,800
Persons Taking Exams to Keep Certification to Sample & M&C	§§70.202(c) & 90.202(c)	$8,100	$93,500	$13,800	$115,400
Persons taking Course and Exam Because They Failed the Re-Certification Exam	§§70.202(c) & 90.202(c)	$2,000	$23,900	$3,700	$29,600
Underground Total		$23,900	$275,300	$40,700	$339,900
Surface Coal Operators					
Persons Getting Certified to Sample & M&C	§§71.202(b) & 71.203(b)	$36,800	$39,600	$1,800	$78,200
Persons Getting Certified to Sample & M&C (Due to Turnover)	§§71.202(b) & 71.203(b)	$7,800	$8,400	$500	$16,700
Persons Taking Exams to Keep Certification to Sample & M&C	§§71.202(c) & 71.203(c)	$60,600	$63,300	$2,700	$126,500
Persons taking Course and Exam Because They Failed the Re-Certification Exam	§§71.202(c) & 71.203(c)	$5,400	$5,500	$400	$11,300
Surface Total		$110,600	$116,800	$5,300	$232,700
Total		$134,500	$392,000	$46,000	$572,600

[a] Annualized Costs = Annualized First Year Costs + Annual Costs

Record of Production

Proposed § 70.201(i) would require the operator to record the amount of run-of-mine material produced by each MMU during each shift. Production data are used to determine the average production for the most recent 30 production shifts or for the most recent production shifts if fewer than 30 shifts of production data are available. The operator would also be required to retain production records for at least six months and make the records available for inspection by authorized representatives of the Secretary and the miners' representative.

Some mines already record the material produced per shift; however, most do not. Underground coal mines with 1-19 employees operate 93 shifts per day (69 MMUs operating 1 shift per day + 12 MMUs operating 2 shifts per day). MSHA estimates that material produced is not recorded for 90 percent of these shifts, or 84 shifts per day (93 shifts x 90 percent). Underground coal mines with 20-500 employees operate 1,445 shifts per day (45 MMUs operating 1 shift per day + 589 MMUs operating 2 shifts per day + 74 MMUs per day operating 3 shifts per day). MSHA estimates that material produced is not recorded for 75 percent of these shifts operating each day or 1,084 shifts (1,445 shifts x 75 percent). All mines with 501+ employees are assumed to already record the amount of material produced. MSHA estimates that the annual number of workdays is: 200 days in mines with 1-19 employees; and 300 days in mines with 20-500 employees. MSHA assumes that a supervisor, earning $84.70 an hour, would take 5 minutes (0.0833 hours) to record the material produced on each shift. MSHA estimates that underground coal mine operators' annual cost to record the material produced on each shift would be approximately $2.4 million. Costs for each mine size are shown below:

Underground operators:

- $118,533 in mines with 1-19 employees (84 shift per day x 200 days x 0.0833 hrs. x $84.70 hourly wage rate); and,
- $2,294,452 in mines with 20-500 employees (1,084 shifts per day x 300 days x 0.0833 hrs. x $84.70 hourly wage rate).

Table V-19 provides cost data for each mine size and shows that the annualized cost for underground coal mine operators to record the material produced would be approximately $2.4 million. The annualized costs for underground coal mine operators would also occur in the first year.

Table V-19: Annualized Costs to Record Material Produced

Requirement	1-19	20-500	501+	Total
Underground Coal Operators				
Record Material Produced	$118,500	$2,294,500	$0	$2,413,000

[a] Annualized Costs = Annual Costs (these costs also occur in the first year)

Record of Shift Length

Proposed §§ 70.201, 71.201, and 90.201 Sampling; General and Technical Requirements

Record of the Shift Length

Proposed §§ 70.201(g), 71.201(d) and 90.201(f) are new and would require the operator to make a record showing the length of each production shift for each MMU,

DWP and Part 90 miner, to retain the records for at least six months, and to make the records available for inspection by authorized representatives of the Secretary and the miners' representative.

For underground coal mine operators, proposed §§ 70.211(c) and 90.211(c) would require that operators validate, certify and post for each MMU or provide to each Part 90 miner the shift length and other information regarding CPDM sampling results. MSHA assumes that records of the shift length required by proposed §§ 70.201(g) and 90.201(f) would be made at the same time as the recording of the shift length and other information for CPDM sampling results required by proposed §§ 70.211(c) and 90.211(c). The time and cost for underground coal mine operators to record shift length required by proposed §§ 70.201(g) and 90.201(f) is accounted for below in calculating the compliance costs under proposed §§ 70.211(c) and 90.211(c).

The requirement under proposed § 71.201(d) to record shift length for DWPs would involve a new cost for underground coal mine operators who have surface operations. Surface coal mine operators, too, would incur a new cost for recording shift length for their DWPs.

MSHA estimates that it would take a miner, earning $35.30 an hour in an underground coal mine or $31.84 an hour in a surface mine, one minute (0.167 hours) to record shift length for a DWP. MSHA estimates that the number of DWP in surface areas of underground coal mines are: 13 DWPs in mines with 1-19 employees; 47 DWPs in mines with 20-500 employees and; 29 DWPs in mines with 501+ employees. MSHA estimates that the number of DWPs in surface coal mines would be: 1,107 DWPs in mines with 1-19 employees; 1,759 DWPs in mines with 20-500 employees and; 64 DWPs in mines with 501+ employees. MSHA estimates that the average number of shifts per day is 1 in mines with 1-19 employees, 2 in mines with 20-500 employees, and 2 in mines with 501+ employees. The estimated average number of workdays per year is 200 in underground mines with 1-19 employees and 250 in surface mines with 1-19 employees, 300 in both underground and surface mines with 20-500 employees, and 350 in both underground and surface mines with 501+ employees.

The estimated annual costs for making a record of the shift length would be $768,300. This figure consists of $36,100 for surface operations at underground coal and $732,200 for surface coal. Costs for underground and surface operators for each mine size are shown below:

Underground operators:

- $1,533 for mines with 1-19 employees (13 DWPs x 1 shift x 200 workdays x $35.30 x 0.0167);
- $16,624 for mines with 20-500 employees (47 DWPs x 2 shifts x 300 workdays x $35.30 x 0.0167); and,
- $17,951 for mines with 501+ employees (29 DWPs x 3 shifts x 350 workdays x $35.30 x 0.0167).

Surface operators:

- $147,156 for mines with 1-19 employees (1,107 DWPs x 1 shift x 250 workdays x $31.84 x 0.0167);

- $561,186 for mines with 20-500 employees (1,759 DWPs x 2 shifts x 300 workdays x $31.84 x 0.0167); and,
- $23,821 for mines with 501+ employees (64 DWPs x 2 shifts x 350 workdays x $31.84 x 0.0167).

Costs Related to Using Gravimetric Sampler

Proposed §§ 70.207, 70.209, 71.207 and 90.208 would revise the existing bimonthly sampling requirements when using the gravimetric sampler. Currently, operators conduct the required sampling in one of three ways: some sample using their own equipment, some sample using rented equipment, and some hire contractors to sample. The amount of sampling that would be required under the proposed rule is significantly greater than is currently required (e.g., § 70.207 would require underground operators to sample designated areas (DAs) on 5 consecutive production shifts and § 71.207 would significantly expand the number of DWPs at surface mines). MSHA has determined that the Agency's historical experience does not provide a good indication of how operators would choose to sample to meet the proposed requirements. Instead, MSHA assumed that due to the increased sampling requirements all mine operators would choose to purchase the sampling units and conduct sampling. If some operators choose to use an alternative means that proves to be less expensive, then the estimated costs presented below would be overstated.

Estimated Cost to Purchase the Sampling Devices

MSHA assumes that underground mine operators currently have sufficient numbers of gravimetric samplers to conduct the sampling that would be required. The estimated difference in the costs of filters, maintenance, and posting are presented below.

As noted above, surface coal mine operators currently sample about 320 DWPs at approximately 225 mines. This represents about 20 percent of all surface coal mines. Proposed § 71.207(b) would expand the number of DWPs and would require that all surface mines perform sampling. Under the proposed rule, surface coal mine operators would have the option to use either a gravimetric sampler or a CPDM to conduct sampling. When the rule becomes effective, MSHA assumes that surface coal mine operators would choose to conduct sampling only using the less expensive gravimetric sampler unless they have Part 90 miners who must use the CPDM. Therefore, 898 surface coal mines that currently do not sample would need to purchase gravimetric samplers.

MSHA estimates the following number of gravimetric samplers would be needed: 1 at each mine with 1-19 employees; 2 at each mine with 20-500 employees; and 3 at each mine with 501+ employees. MSHA assumes that the 225 surface coal mines currently sampling have 1 gravimetric sampler per mine. Surface coal mine operators already performing sampling would need 1 additional unit in mines with 20-500

employees and 2 additional units in mines with 501+ employees. MSHA estimates that surface coal mine operators would need 1,413 additional gravimetric samplers:

- 496 samplers in mines with 1-19 employees (620 surface mines x 80 percent);
- 884 samplers in mines with 20-500 employees (491 surface mines x 2 samplers x 80 percent) + (491 surface mines x 1 sampler x 20 percent); and,
- 34 samplers in mines with 501+ employees (12 surface mines x 3 samplers x 80 percent) + (12 surface mines x 2 samplers x 20 percent).

MSHA estimates that each gravimetric sampler would cost $700 to purchase and have a useful life of 5 years. Thus, the first year costs for surface coal mines to purchase the gravimetric samplers would be $989,800; $347,200 for the 620 mines with 1-19 employees (496 samplers x $700 per sampler); $618,800 for the 491 mines with 20-500 employees (884 samplers x $700 per sampler); and $23,800 for the 12 mines with 501+ employees (34 samplers x $700 per sampler).

First year costs were multiplied by an annualization factor of 0.244 based on a 7 percent discount rate to reflect the 5-year service life. The annualized first year costs would be approximately $241,511 for surface coal mine operators.

Estimated Costs for Listing the DWPs

Proposed § 71.207(c) would require mine operators to provide the district manager with a list identifying the specific work positions where DWP samples would be collected. MSHA estimates that it would take a supervisor 5 minutes (0.0833 hours) to prepare the list. The supervisor's wage rate is $84.70 per hour at underground mines and $69.98 per hour at surface mines. A clerical employee would take 5 minutes (0.0833 hours) to type the list and mail it to MSHA. The clerical wage is $26.00 per hour at underground mines and $25.45 per hour at surface mines. Postage and handling is $1 per list.

First Year Costs

In the first year after the rule would take effect, the number of lists that would be required is equal to the number of surface areas at underground mines plus the number of surface mines and facilities.

Surface Areas at Underground Mines

MSHA estimates that it would take underground coal mine operators 5.3 hours in the first year to submit the lists of the DWPs - 0.5 hours at mines with 1-19 employees (3 surface areas x 0.167 hours per area), 3.5 hours at mines with 20-500 (21 surface areas x 0.167 hours per area), and 1.3 hours at mines with 501+ employees (8 surface areas x 0.167 hours per area). This would result in first year costs of $326; $31 at mines with 1-19 employees [(0.25 hours x $26.00 per hour) + (0.25 hours x $84.70 per hour) + (3 areas x $1 per area)], $215 at mines with 20-500 employees [(1.75 hours x $26.00 per hour) + (1.75 hours x $84.70 per hour) + (21 areas x $1 per area)], and $80 at mines with 501+ employees [(1.3 hours x $26.00 per hour) + (1.3 hours x $84.70 per hour) + (8 areas x $1 per area)]. These first year costs were amortized over 10 years by multiplying

them by a factor of 0.142 based on a 7 percent discount rate to arrive at an annualized cost of $46.

Surface Mines and Facilities

MSHA estimates that it would take surface coal mine operators 187.5 hours in the first year to submit the lists of the DWPs; 103.5 hours at mines with 1-19 employees (620 mines and facilities x 0.167 hours), 82.0 hours at mines with 20-500 (491 mines and facilities x 0.167 hours), and 2.0 hours at mines with 501+ employees (12 mines and facilities x 0.167 hours). This would result in first year costs of $10,070; $5,559 at mines with 1-19 employees [(51.75 hours x $25.45 per hour) + (51.75 hours x $69.98 per hour) + (620 mines and facilities x $1)], $4,404 at mines with 20-500 employees [(41.0 hours x $25.45 per hour) + (41.0 hours x $69.98 per hour) + (491 mines and facilities x $1)], and $107 at mines with 501+ employees [(1.0 hours x $25.45 per hour) + (1.0 hours x $69.98 per hour) + (12 mines and facilities x $1)]. These first year costs were amortized over 10 years by multiplying them by a factor of 0.142 based on a 7 percent discount rate to arrive at annualized cost of $1,430.

Annual Costs

MSHA assumes that each year about 10 percent of underground mines with surface areas plus the number of surface mines and facilities would have to submit a new list of DWPs. This 10 percent includes new mines and facilities submitting a list for the first time and existing mines and facilities revising the list to account for changes in their operations.

Surface Areas at Underground Mines

MSHA estimates that it would take underground coal mine operators 0.6 hours annually to submit the lists of the DWPs; 0.1 hours at mines with 1-19 employees (3 surface areas x 0.1 x 0.167 hours per area), 0.4 hours at mines with 20-500 (21 surface areas x 0.1 x 0.167 hours per area), and 0.1 hours at mines with 501+ employees (8 surface areas x 0.1 x 0.167 hours per area). This would result in annual costs of $36; $6 at mines with 1-19 employees [(0.05 hours x $26.00 per hour) + (0.05 hours x $84.70 per hour) + (3 areas x 0.1 x $1 per area)], $24 at mines with 20-500 employees [(0.2 hours x $26.00 per hour) + (0.2 hours x $84.70 per hour) + (21 areas x 0.1 x $1 per area)], and $6 at mines with 501+ employees [(0.1 hours x $26.00 per hour) + (0.1 hours x $84.70 per hour) + (8 areas x 0.1 x $1 per area)].

Surface Mines and Facilities

MSHA estimates that it would take surface coal mine operators 18.8 hours annually to submit the lists of the DWPs; 10.4 hours at mines with 1-19 employees (620 mines and facilities x 0.1 x 0.167 hours), 8.2 hours at mines with 20-500 (491 mines and facilities x 0.1 x 0.167 hours), and 2.0 hours at mines with 501+ employees (12 mines and facilities x 0.1 x 0.167 hours). This would result in annual costs of $1,009; $558 at mines with 1-19 employees [(5.2 hours x $25.45 per hour) + (5.2 hours x $69.98 per hour) + (620 mines and facilities x 0.1 x $1)], $440 at mines with 20-500 employees

[(4.1 hours x $25.45 per hour) + (4.1 hours x $69.98 per hour) + (491 mines and facilities x $1)], and $11 at mines with 501+ employees [(0.1 hours x $25.45 per hour) + (0.1 hours x $69.98 per hour) + (12 mines and facilities s x 0.1 x $1)].

Estimated Costs for Sampling

On average, MSHA estimates that it would take approximately 1 hour to prepare the sampling device and perform the required checks during sampling. This time period includes 50 minutes (0.8333 hours) of a certified dust technician's time to prepare, disassemble, and clean the sampling unit after completion of sampling. In addition, it would take a mine supervisor 10 minutes (0.1666 hours) to make the required operational checks of the sampling device during the shift. A certified dust technician's hourly wage is estimated to be $31.77 per hour in an underground coal mine and $28.66 in a surface coal mine. A supervisor's hourly wage is estimated to be $84.70 in an underground mine and $69.98 in a surface mine. The cost for each filter used is $19.89. Two filters are used for each sample; the filter used to take the sample and the control filter. The estimated cost to take a sample is $80.36 ($31.77 per hr. x 0.8333 hrs. + $84.70 per hr. x 0.1666 hrs. + $19.89 per filter x 2 filters) for underground mines and $75.32 ($28.66 per hr. x 0.8333 hrs. + $69.98 per hr. x 0.1666 hrs. + $19.89 per filter x 2 filters) for surface mines.

Underground Coal Mines

Underground coal mine operators currently sample DOs on 5 consecutive shifts or days six times per year (i.e., bi-monthly sampling). There would be no change for operator DO sampling during the first year under the proposed requirements. However, in the first year, in additional to the DOs, underground mine operators would also have to sample the DAs quarterly on 5 consecutive shifts (rather than the current bimonthly sampling for one shift) using either the gravimetric sampler or the CPDM. MSHA assumes operators would use the gravimetric sampler. In the first year under the proposed requirements, DWPs at surface areas of underground coal mines would have to be sampled 4 times per year. Although this represents a decrease in the sampling frequency from the bimonthly sampling required by the existing standard, the number of DWPs would increase under the proposed standard. In the first year, the proposed requirements would reduce the sampling frequency for Part 90 miners from 6 times per year to 4 times per year however, the number of samples taken during each sampling period would be increased from 1 per Part 90 miner to 5.

Twelve months after the effective date of the standard, operators would be required to perform DO sampling using the CPDM, leading to a reduction in sampling with the gravimetric samplers. Eighteen months after the effective date of the standard, operators would be required to perform ODO sampling using the CPDM, leading to a further decline in gravimetric sampling.

The costs of DO and ODO sampling using the CPDM are presented separately below. However, in this section, MSHA estimates the savings to underground operators from not having to perform DO sampling using the gravimetric sampler. Since the sampling requirements would be changing over the first two years, MSHA presents

separate cost estimates for years one, two and thereafter.

Change in the Number of Samples

Year 1

- The proposed requirements would make no changes to DO sampling in the first year.
- As noted above, proposed § 70.209(a) would require each DA to be sampled 4 times per year rather than the 6 times per year currently required. However, it would also require 5 shifts to be sampled at each DA rather than the one currently sampled. Together these two changes would result in 14 additional samples being taken at each DA each year (i.e., 5 samples 4 times per year under the proposed rule minus 1 sample taken 6 times per year under the existing rule). There are currently 105 DAs at underground mines with 1-19 employees, 814 DAs at underground mines with 20-500 employees, and 87 DAs at underground mines with 501+ employees. The proposed change would result in 14,084 additional samples taken: 1,470 samples at mines with 1-19 employees (105 DAs x 14 samples); 11,396 samples at mines with 20-500 employees (814 DAs x 14 samples); and 1,218 samples at mines with 501+ employees (87 DAs x 14 samples).
- Proposed § 71.207(a) would require each DWP to be sampled 4 times per year rather than the 6 times per year currently required. However, proposed § 71.207(b) would increase the number of DWPs from the current 11 to 89. Taken together the proposed rule would increase the number of DWP samples by 290.
    - DWP sampling at surface areas of underground mines with 1-19 employees would increase by 52. (Projected 13 DWPs sampled 4 times per year).
    - DWP sampling at surface areas of underground mines with 20-500 employees would increase by 152. (Projected 47 DWPs sampled 4 times per year – current 6 DWPs sampled 6 times per year).
    - DWP sampling at surface areas of underground mines with 501+ employees would increase by 86. (Projected 29 DWPs sampled 4 times per year – current 5 DWPs sampled 6 times per year).

- In the first year after the effective date, proposed § 90.208(a) would reduce the sampling frequency for Part 90 miners from 6 times per year to 4 times per year and would also increase the number of samples taken during each period from 1 to 5. 14 additional samples would be taken for each Part 90 miner in the first year (4 x 5 – 6). The proposed change would result in 924 additional samples: 0 at mines with 1-19 employees (there are no Part 90 miners at small mines); 658 samples at mines with 20-500 employees (47 Part 90 miners x 14 samples); and 266 samples at mines with 501+ employees (19 Part 90 miners x 14 samples).

Year 2

- Beginning in the second year after the effective date, proposed § 70.201(a) would require all DO sampling to be conducted with the CPDM. Therefore, the number of DO samples taken with the gravimetric sampler would be reduced by 30 samples per year for each MMU (i.e., 5 samples x 6 bi-monthly sampling periods). So the proposed change would result in 26,430 fewer samples taken: 2,430 fewer samples at mines with 1-19 employees (81 MMUs x 30 samples); 21,240 fewer samples at mines with 20-500 employees (708 MMUs x 30 samples); and 2,760 fewer samples at mines with 501+ employees (92 MMUs x 30 samples).
- Proposed § 70.209(a) would require 5 samples to be taken at each DA 4 times per year. However, proposed § 70.208(b) would convert the roofbolter DAs to ODOs. Proposed § 70.201(c) would require the ODOs to be sampled with the CPDM (and not the gravimetric sampler) 18 months after the effective date of the standard. Therefore, the amount of gravimetric sampling of DAs would decrease in the second year compared to the first. There are currently 41 roofbolter DAs at mines with 1-19 employees, 388 roofbolter DAs at mines with 20-500 employees and 23 roofbolter DAs at mines with 501+ employees. The roofbolter DAs would only be sampled 10 times in the second year. This change would reduce the number of additional DA samples taken with the gravimetric sampler to 9,564 in the second year 1,060 samples at mines with 1-19 (1,470 samples – (41 roofbolter DAs x 10 samples per DA)); 7,516 samples at mines with 20-500 employees (11,396 samples – (388 roofbolter DAs x 10 samples per DA)); and 988 samples at mines with 501+ employees (1,218 samples – (23 roofbolter DAs x 10 samples per DA)).
- Beginning in the second year after the effective date, proposed § 90.201(a) would require all Part 90 miners to be sampled with the CPDM. This change would result in a decrease of 6 gravimetric samples for each Part 90 miner compared to the existing requirements, resulting in 396 fewer samples taken; 0 at mines with 1-19 employees (there are no Part 90 miners at small mines); 282 samples at mines with 20-500 employees (47 Part 90 miners x 6 samples); and 114 samples at mines with 501+ employees (19 Part 90 miners x 6 samples).

Year 3There would be no sampling of the roofbolter DAs using the gravimetric sampler beginning in third year after the effective date. This change would reduce the number of DA samples taken with the gravimetric sampler to 5,044 in the third year: 650 samples at mines with 1-19 employees (1,470 samples – (41 roofbolter DAs x 20 samples per DA)); 3,636 samples at mines with 20-500 employees (11,396 samples – (388 roofbolter DAs x 20 samples per DA)); and 758 samples at mines with 501+ employees (1,218 samples – (23 roofbolter DAs x 20 samples per DA)).

Estimated Sampling Costs

- Year 1Proposed § 70.209(a) would result in increased costs of $1,131,790 in the first year for DA sampling: $118,129 at mines with 1-19 employees (1,470 samples x $80.36 per sample); $915,783 at mines with 20-500 employees (11,396 samples x $80.36 per sample); and $97,878 at mines with 501+ employees (1,218 samples x $80.36 per sample).
- Proposed § 71.207(a) would result in increased costs of $23,304 beginning in the first year for DWP sampling: $4,179 at mines with 1-19 employees (52 samples x $80.36 per sample); $12,215 at mines with 20-500 employees (152 samples x $80.36 per sample); and $6,911 at mines with 501+ employees (86 samples x $80.36 per sample).
- Proposed § 90.208(a) would result in increased costs of $74,253 in the first year for Part 90 miner sampling: $52,877 at mines with 20-500 employees (658 samples x $80.36 per sample); and $21,376 at mines with 501+ employees (266 samples x $80.36 per sample).

Year 2

- Proposed § 70.201(a) would result in cost savings of $2,123,915 beginning in the second year for DO sampling: $195,275 at mines with 1-19 employees (2,430 samples x $80.36 per sample); $1,706,846 at mines with 20-500 employees (21,240 samples x $80.36 per sample); and $221,794 at mines with 501+ employees (2,760 samples x $80.36 per sample).
- In the second year, the combination of proposed §§ 70.209(a), 70.208(b) and 70.201(c) would result in increased costs of $768,563 for DA sampling compared to current practice: $85,182 at mines with 1-19 employees (1,060 samples x $80.36 per sample); $603,986 at mines with 20-500 employees (7,516 samples x $80.36 per sample); and $79,396 at mines with 501+ employees (988 samples x $80.36 per sample).
- The costs resulting from proposed § 71.207(a) would remain unchanged in the second year at $23,304 for DWP sampling.
- Proposed § 90.201(a) would result in cost savings of $31,823 for Part 90 miner sampling beginning in the second year: $22,662 at mines with 20-500 employees (282 samples x $80.36 per sample); and $9,161 at mines with 501+ employees (114 samples x $80.36 per sample).

Year 3

- The cost savings resulting from proposed § 70.201(a) would remain unchanged for DO sampling in the third year at $2,123,915.
- Beginning in the third year the costs of DA sampling would be $405,336 per year: $52,234 at mines with 1-19 employees (650 samples x $80.36 per sample); $292,189 at mines with 20-500 employees (3,636 samples x $80.36 per sample); and $60,913 at mines with 501+ employees (758 samples x $80.36 per sample).
- The costs resulting from proposed § 71.207(a) would remain unchanged in the third year at $23,304 for DWP sampling.

- The cost savings resulting from proposed § 90.201(a) would remain unchanged in the third year at $31,823 for Part 90 miner sampling.

Surface Coal Mines

- Proposed § 71.207(a) would require each DWP to be sampled 4 times per year rather than the 6 times per year currently required. However, proposed § 71.207(b) would increase the number of DWPs from the current 307 to 2,930. This would increase the number of samples taken by 9,878.DWP sampling at surface areas of underground mines with 1-19 employees would increase by 3,564. (Projected 1,107 DWPs sampling 4 times per year – current 144 DWPs sampling 6 times per year).
- DWP sampling at surface areas of underground mines with 20-500 employees would increase by 6,076. (Projected 1,759 DWPs sampling 4 times per year – current 160 DWPs sampling 6 times per year).
- DWP sampling at surface areas of underground mines with 501+ employees would increase by 238. (Projected 64 DWPs sampling 4 times per year – current 3 DWPs sampling 6 times per year).

Proposed § 71.207(a) would result in increased costs of $744,011 beginning in the first year: $268,440 at mines with 1-19 employees (3,564 samples x $75.32 per sample); $457,644 at mines with 20-500 employees (6,076 samples x $75.32 per sample); and $17,926 at mines with 501+ employees (238 samples x $75.32 per sample).

Estimated Costs for Reporting and Recordkeeping Cost of Transmitting the Samples

Proposed §§ 70.210(c), 71.208(c) and 90.210(c) would require each sample to be transmitted to MSHA along with a completed dust data card. The dust data card is provided by the manufacturer with each filter cassette. On each dust data card, the person collecting the sample writes information about the production conditions under which the sample was collected. Normally this is a certified dust technician with an estimated hourly wage of $31.77 in an underground coal mine and $28.66 in a surface coal mine. On average, MSHA estimates that a certified dust technician would take 6 minutes (0.1 hours) to prepare and send one sample, along with the dust data card, to MSHA. MSHA estimates postage costs at $1 per sample mailed.

After the dust data card has been filled out, a certified person signs the card and writes the certification number on it. On average, MSHA estimates that a certified person (normally the mine safety inspector or an equivalent person) would take 1.5 minutes (0.025 hours) to complete and sign the dust data card. A supervisor's hourly wage is estimated to be $84.70 in an underground mine and $69.98 in a surface mine.

Underground Coal Mines

Year 1

MSHA estimates that the time needed for underground coal mine operators to complete and sign the data cards and prepare the sample to be mailed would increase by 1,912 hours in year one: 190 hours at mines with 1-19 employees (1,522 samples x 0.125 hours per sample); 1,526 hours at mines with 20-500 employees (12,206 samples x 0.125 hours per sample); and 196 hours at mines with 501+ employees (1,570 samples x 0.125 hours per sample). This would result in added costs of $96,293: $9,580 at mines with 1-19 employees [1,522 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)]; $76,831 at mines with 20-500 employees [12,206 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)]; and $9,882 at mines with 501+ employees [1,570 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)].

Year 2

Due to the proposed shift from the gravimetric sampler to the CPDM (for DOs, Part 90 miners and ODOs) in the second year after the effective date, MSHA estimates that the time needed for underground coal mine operators to complete and sign the data cards and prepare the sample to be mailed would decline by 2,122 hours in year two: 165 hours at mines with 1-19 employees (1,318 samples x 0.125 hours per sample); 1,732 hours at mines with 20-500 employees (13,854 samples x 0.125 hours per sample); and 225 hours at mines with 501+ employees (1,800 samples x 0.125 hours per sample). This would result in reduced costs of $106,830: $8,296 at mines with 1-19 employees [1,318 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)]; $87,204 at mines with 20-500 employees [13,854 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)]; and $11,330 at mines with 501+ employees [1,800 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)].

Year 3

Due to the shift from the gravimetric sampler to the CPDM (for DOs, Part 90 miners and ODOs during the second year after the effective date), MSHA estimates that the time needed for underground coal mine operators to complete and sign the data cards and prepare the sample to be mailed would decline by 2,687 hours in year three and thereafter: 216 hours at mines with 1-19 employees (1,728 samples x 0.125 hours per sample); 2,217 hours at mines with 20-500 employees (17,734 samples x 0.125 hours per sample); and 254 hours at mines with 501+ employees (2,030 samples x 0.125 hours per sample). This would result in reduced costs of $135,282: $10,877 at mines with 1-19 employees [1,728 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)]; $111,627 at mines with 20-500 employees [17,734 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)]; and $12,778 at mines with 501+ employees [2,030 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)].

Surface Coal Mines

MSHA estimates that the time needed for surface coal mine operators to complete and sign the data cards and prepare the sample to be mailed would increase by 1,236

hours: 446 hours at mines with 1-19 employees (3,564 samples x 0.125 hours per sample); 760 hours at mines with 20-500 employees (6,076 samples x 0.125 hours per sample); and 30 hours at mines with 501+ employees (238 samples x 0.125 hours per sample). This would result in added costs of $55,470: $20,014 at mines with 1-19 employees [3,564 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)]; $34,120 at mines with 20-500 employees [6,076 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)]; and $1,336 at mines with 501+ employees [238 samples x ((0.1 hours x $31.77 per hour) + (0.025 hours x $84.70 per hour) + $1 per sample)].

Cost of Posting the Sample Results

After processing the gravimetric samples, the Agency sends the sample results to the operator. Upon receiving the results, proposed §§ 70.211(b) and 71.209(b) would require mine operators to post the sampling results on the mine bulletin board. Proposed § 90.211(b) would require mine operators to provide Part 90 miners with a copy of the sample results. For purposes of this cost analysis, MSHA assumes that it would take the same amount of time to provide a copy of the sample results to the Part 90 miner as it does to post the sample results on the mine bulletin board.

MSHA's current practice is to transmit the sampling results to the operator in a group, so the number of postings equate to the number of occasions when samples have to be taken. Since mine operators would be required to sample the DOs, DAs and Part 90 miners 5 times during each sampling period, the number of occasions would be equal to the number of samples divided by 5. Since the DWPs are only sampled once, the number of occasions would be equal to the number of samples.

On average, MSHA estimates that a clerical employee would take 0.1 hours (6 minutes) to copy and post the sample results. Photocopying costs are estimated to be $0.15 per page. Thus, MSHA estimates that the cost for a clerical employee to copy and post the sample results would be: $2.75 for underground coal mine operators [(0.1 hrs. x $26.00 hourly wage) + (1 pg. x $0.15)] and $2.70 for surface coal mine operators [(0.1 hrs. x $25.45 hourly wage) + (1 pg. x $0.15)].

Underground Coal Mines

Year 1

In the first year, there would be no change to the number of times the DO results would have to be posted. Posting the DA results and providing the Part 90 miner results would decrease by 2 occasions due to the decrease in the sampling frequency. For DWPs the frequency of posting would decrease by 2 occasions but the number of DWPs would increase. So the net change in the posting of the DWP results would be four times the number of additional DWPs minus twice the number of current DWPs. MSHA estimates that the time needed to post the gravimetric sample results would decrease by 182 hours in year one: 16 hours at mines with 1-19 employees (158 postings x 0.1 hours per posting); 155 hours at mines with 20-500 employees (1,546 postings x 0.1 hours per posting); and 11 hours at mines with 501+ employees (106 postings x 0.1 hours per posting). This would result in cost savings of $4,979: $435 at mines with 1-19

employees [158 postings x ((0.1 hours x $26.00 per hour) + $0.15 per postings]; $4,252 at mines with 20-500 employees [1,546 postings x ((0.1 hours x $26.00 per hour) + $0.15 per posting)]; and $292 at mines with 501+ employees [106 postings x ((0.1 hours x $26.00 per hour) + $0.15 per posting)].

Years 2 and After

Due to the shift from the gravimetric sampler to the CPDM (for DOs and Part 90 miners) in the second year, beginning in the second year there would be a decrease in the number of gravimetric sampling results to be posted equal to 6 times the number of DOs and the number of results to be provided to Part 90 miners equal to 6 times the number of Part 90 miners. The decrease in the number of DA sampling result postings would remain at twice the number of DAs and the change in the number of postings of the DWP sampling results would remain at four times the number of additional DWPs minus twice the number of current DWPs. MSHA estimates that the time needed post the gravimetric sample results would decrease by 746 hours in the second year: 75 hours at mines with 1-19 employees (748 postings x 0.1 hours per posting); 598 hours at mines with 20-500 employees (5,982 postings x 0.1 hours per posting); and 73 hours at mines with 501+ employees (734 postings x 0.1 hours per posting). This would result in decreased costs of $20,527: $2,057 at mines with 1-19 employees [748 postings x ((0.1 hours x $26.00 per hour) + $0.15 per postings]; $16,451 at mines with 20-500 employees [5,982 postings x ((0.1 hours x $26.00 per hour) + $0.15 per posting)]; and $2,019 at mines with 501+ employees [734 postings x ((0.1 hours x $26.00 per hour) + $0.15 per posting)].

Surface Coal Mines

MSHA estimates that the time needed for surface coal mine operators to complete and sign the dust data cards and prepare the sample to be mailed would increase by 988 hours: 356 hours at mines with 1-19 employees (3,564 samples x 0.1 hours per sample); 608 hours at mines with 20-500 employees (6,076 samples x 0.1 hours per sample); and 24 hours at mines with 501+ employees (238 samples x 0.1 hours per sample). This would result in added costs of $26,621: $9,605 at mines with 1-19 employees [3,564 samples x ((0.1 hours x $25.45 per hour) + $0.15 per sample)]; $16,375 at mines with 20-500 employees [6,076 samples x ((0.1 hours x $25.45 per hour) + $0.15 per sample)]; and $641 at mines with 501+ employees [238 samples x ((0.1 hours x $25.45 per hour) + $0.15 per sample)].

Status change reports

If there is a change in operational status that affects the respirable dust sampling requirements, the operator shall report the change in operational status of the mine, MMU or DA (under proposed § 70.212(a) and (b) for underground coal operators) and the mine or DWP (under proposed § 71.210(a) and (b) for surface coal operators) to the MSHA District Manager or to any other MSHA office designated by the District Manager. Status changes shall be reported in writing or electronically within 3 working days after the status change has occurred. Operators are already required to provide status change reports to MSHA District Managers under existing § 70.220 for underground coal mines and existing § 71.220 for surface coal mines. The number of status change reports

generated as a result of the proposed rule is expected to be small; the costs for these proposed standards are minimal and not included in this analysis.

Summary

Table V-20 shows that the net present value first year costs related to performing sampling with a gravimetric sampler would be a net cost savings of approximately $10.6 million for underground coal mine operators, and increased costs of approximately $1.8 million for surface coal mine operators.

Table V-20: First Year Costs for Gravimetric Sampling

Requirements	1-19	20-500	501+	Total
Underground Coal Operators				
Purchase Units	$0	$0	$0	$0
List DWPs	$30	$210	$80	$320
Sampling	-$751,600	-$8,012,400	-$919,400	-$9,683,400
Transmit Results	-$58,900	-$627,600	-$72,000	-$758,500
Post Results	-$13,800	-$111,400	-$13,400	-$138,600
Total	-$824,270	-$8,751,190	-$1,004,720	-$10,580,180
Surface Coal Operators				
Purchase Units	$347,200	$618,800	$23,800	$989,800
List DWPs	$5,560	$4,400	$110	$10,070
Sampling	$268,400	$457,600	$17,900	$743,900
Transmit Results	$20,000	$34,100	$1,300	$55,400
Post Results	$9,600	$16,400	$600	$26,600
Total	$650,760	$1,131,300	$43,710	$1,825,770

First Year Cost for Underground Operators represent Present Values
First Year Cost for Surface Operators = First Year Costs + Annual Costs

Table V-21 shows that the annualized costs related to performing sampling with a gravimetric sampler would be net cost savings of approximately $1.5 million for underground coal mine operators and increased costs of approximately $1.1 million for surface coal mine operators.

Table V-21: Annualized Costs for Gravimetric Sampling

Requirements	1-19	20-500	501+	Total
Underground Coal Operators				
Purchase Units	$0	$0	$0	$0
List DWPs	$10	$50	$20	$80
Sampling	-$106,700	-$1,137,800	-$130,600	-$1,375,100
Transmit Results	-$8,400	-$89,100	-$10,200	-$107,700
Post Results	-$2,000	-$15,800	-$1,900	-$19,700
Total	-$117,090	-$1,242,650	-$142,680	-$1,502,420
Surface Coal Operators				
Purchase Units	$84,700	$151,000	$5,800	$241,500

List DWPs	$1,350	$1,070	$30	$2,450
Sampling	$268,400	$457,600	$17,900	$743,900
Transmit Results	$20,000	$34,100	$1,300	$55,400
Post Results	$9,600	$16,400	$600	$26,600
Total	$384,050	$660,170	$25,630	$1,069,850

Annualized Cost for Underground Operators represent Annualized Present Values
Annualized Cost for Surface Operators = Annualized First Year Costs + Annual Costs.

CPDM Plans at Underground Mines

Proposed §§ 70.206 and 90.206

Cost to Write and Submit CPDM Plans to MSHA for Approval

Proposed §§ 70.206(a), 71.206(a) and 90.206(a) and (b) are new and would require operators who use CPDMs to develop and submit for approval a CPDM Performance Plan (Plan) prior to using them. The proposal specifies the information that would be required to be contained in the Plan and would establish Plan approval procedures.

Since surface mine operators are not expected to use CPDMs to sample unless they have Part 90 miners who are required to use the CPDM, proposed § 71.206 is discussed later in this analysis when developing CPDM plans for Part 90 miners at surface coal mines.

Each underground coal mine operator would need a CPDM plan. MSHA expects that underground coal mine operators would develop an initial plan that addresses DO, Part 90 miner, and ODO sampling even though the proposed requirements for DO and Part 90 miner sampling with a CPDM would begin 6 months before the proposed requirement to use the CPDM to conduct ODO sampling. This would be more efficient than having to make significant plan revisions less than 6 months later to include ODO sampling.

Also, MSHA expects that underground coal mine operators would include information about Part 90 miners in the CPDM plan, if applicable, rather than develop a completely different plan for Part 90 miners. However, under proposed § 90.206(d), any Part 90 miner information included in a CPDM plan may not be posted, but must be provided to the affected Part 90 miner. MSHA expects that operators will meet these requirements.

Each underground coal mine would need a CPDM plan resulting in: 81 plans for mines with 1-19 employees; 331 plans for mines with 20-500 employees; and 12 plans for mines with 501+ employees. On average, MSHA estimates that it would take a supervisor 4 hours to write a proposed CPDM plan and a clerical employee 15 minutes (0.25 hours) to copy and submit it. MSHA estimates that, on average, the copy and postage costs are $1.60 for mines with 1-19 employees [(4 pgs. x $0.15) + $1 postage] and $2.20 for mines with 20 or more employees [(8 pgs. x $0.15) + $1 postage]. MSHA estimates that first year costs for underground coal mine operators to write CPDM plans

and submit them to MSHA would be approximately $147,300. Costs for each mines size are shown below:

Underground Operators:

- $28,099 in mines with 1-19 employees [81 plans x ((4 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26.00 hourly wage rate) + $1.60)];
- $115,023 in mines with 20-500 employees [331 plans x ((4 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26.00 hourly wage rate) + $2.20)]; and
- $4,170 in mines with 501+ employees [12 plans x ((4 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26.00 hourly wage rate) + $2.20)].

First year costs were amortized over 10 years by multiplying them by an annualization factor of 0.142 based on a 7 percent discount rate to arrive at annualized costs of approximately $21,000 for underground coal mine operators.

Costs to Revise Proposed Plans

MSHA estimates that 35 percent of mine operators that submit proposed CPDM plans to the Agency for approval would need to revise the plans before MSHA approval could be obtained. MSHA estimates that the number of plans to be revised would be: 28 plans for mines with 1-19 employees (81 plans x 0.35); 116 plans for mines with 20-500 employees (331 plans x 0.35); and 4 plans for mines with 501+ employees (12 plans x 0.35). On average, MSHA estimates that it would take a supervisor 30 minutes (0.5 hours) to revise a proposed plan and 15 minutes (0.25 hours) for a clerical employee to copy and resubmit the plan. Copy and postage costs are the same as determined above. MSHA estimates that first year costs for underground coal mine operators to develop and submit revised proposed CPDM plans would be approximately $7,600. Costs for each mine size are shown below:

Underground Operators:

- $1,413 in mines with 1-19 employees [28 plans x ((0.5 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26.00 hourly wage rate) + $1.60)];
- $5,922 in mines with 20-500 employees [116 plans x ((0.5 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26.00 hourly wage rate) + $2.20)]; and
- $200 in mines with 501+ employees [4 plans x ((4 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26.00 hourly wage rate) + $2.20)].

First year costs were amortized over 10 years by multiplying them by an annualization factor of 0.142 based on a 7 percent discount rate to arrive at annualized cost of approximately $1,000 for underground coal mine operators.

Cost to Notify and Provide to the Miners' Representative a Copy of the Proposed CPDM Plans and Revisions Submitted to MSHA for Approval

Proposed § 70.206(a)(1) would require underground mine operators to notify the miners' representative at least 5 days prior to submitting a CPDM Performance Plan, or any proposed revision to the Plan, to the District Manager for approval. The proposal

would also require operators to provide a copy of the Plan to the miners' representative, if requested.

MSHA made the conservative assumption that the plan would be requested 100 percent of the time at underground coal mines. MSHA estimates that the number of proposed CPDM plans and proposed plan revisions that operators would provide to the representative of the miners would be: 109 plans at mines with 1-19 employees (81 plans + 28 revised plans); 447 plans (331 plans + 116 revised plans) at mines with 20-500 employees; and 16 plans (12 plans + 4 revised plans) at mines with 501+ employees.

MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to notify and provide a copy of the plan to the miners' representative. MSHA estimates that copy costs are $0.60 (4 pgs. x $0.15) for mines with 1-19 employees and $1.20 (8 pgs. x $0.15) for mines with 20 or more employees). There are no postage costs because MSHA assumes that a copy of the plan would be given to the representative of the miners at the mine site. MSHA estimates that first year costs to underground coal mine operators to notify and provide to the miners' representative proposed and revised CPDM plans submitted to MSHA for approval would be approximately $4,300. Costs for each mine size are shown below:

Underground Operators:

- $774 for mines with 1-19 employees [109 plans x ((0.25 hrs. x $26.00 hourly wage rate) + $0.60)];
- $3,442 for mines with 20-500 employees [447 plans x ((0.25 hrs. x $26.00 hourly wage rate) + $1.20)]; and
- $123 for mines with 501+ employees [16 plans x ((0.25 hrs. x $26.00 hourly wage rate) + $1.20)].

First year costs were amortized over 10 years by multiplying by an annualization factor of 0.142 based on a 7 percent discount rate to arrive at annualized costs of approximately $600 for underground coal mine operators.

Make Available a Copy of the Proposed CPDM Plan or Revisions Submitted to MSHA for Approval

Proposed § 70.206(a)(2) would require underground coal mine operators to have a copy of any proposed CPDM plan or revision, submitted for approval, available for inspection by the representative of miners. MSHA expects that underground coal mines would not incur any costs to comply with this proposed standard because coal mine operators normally have copies of their plans available for inspection.

Costs to Post Proposed CPDM Plans or Revisions Submitted to MSHA for Approval

Proposed § 70.206(a)(3) would require a copy of the proposed Plan or revisions submitted for approval to be posted on the mine bulletin board at the time of submittal. The proposed plan or revision would be required to remain posted on the bulletin board until approved, withdrawn or denied. As was stated earlier, MSHA expects that one

CPDM plan would be developed by each underground mine operator. The copy of any plan that is posted would have the language that pertains to the Part 90 miner edited out.

The number of plans and revisions to be posted is the same as the number previously estimated that would have to be provided to the miners' representative: 109 plans at mines with 1-19 employees; 447 plans at mines with 20-500 employees; and 16 plans at mines with 501+ employees. MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to edit, copy, and post the proposed plans and revisions. Copy costs are the same as above - $0.60 (4 pgs. x $0.15) for mines with 1-19 employees and $1.20 (8 pgs. x $0.15) for mines with 20 or more employees. There are no postage costs. MSHA estimates that first year cost to underground coal mine operators to copy and post proposed and revised CPDM plans submitted to MSHA for approval would be approximately $4,300. Costs for each mine size are shown below:

Underground Operators:

- $774 for mines with 1-19 employees [109 plans x (0.25 hrs. x $26.00 hourly wage rate + $0.60)];
- $3,442 for mines with 20-500 employees [447 plans to post x (0.25 hrs. x $26.00 hourly wage rate + $1.20)]; and
- $123 for mines with 501+ employees [16 plans to post x (0.25 hrs. x $26.00 hourly wage rate + $1.20)].

First year costs were amortized over 10 years by multiplying by an annualization factor of 0.142 based on a 7 percent discount rate to arrive at annualized cost of approximately $600 for underground coal mine operators.

Comments Submitted by Representative of Miners

Proposed §§ 70.206(a)(4) would address procedures for miners' representatives to provide comments on the Plan to the District Manager. It would permit the miners' representative, following receipt of a proposed Plan or proposed revision, to submit timely, written comments to the District Manager for consideration during the review process. The proposal would also require the District Manager to provide a copy of the miners' representative's comments to the operator upon the operator's request. This provision does not impose any costs on coal mine operators. MSHA estimated no costs for the miners' representatives because the submission of comments is voluntary.

Contents of CPDM Plan

Proposed §§ 70.206(b) and 90.206(c) would specify the information that would be required in CPDM Performance Plans. There would be no additional costs associated with these proposed requirements because they were already included in the estimated costs to develop and submit CPDM plans to MSHA for approval.

Posting and Providing Approved Plans

Proposed §§ 70.206(c) would require a copy of the approved plan to be posted and to be provided to the miners' representative upon request. MSHA has not estimated

any additional costs for this proposed requirement because the costs of posting and providing copies to the miners' representatives of all of the proposed plans and revisions were included in MSHA's estimates presented earlier. Proposed § 90.206(d) would require that if the mine has Part 90 miners, then they need to be given a copy of the approved plan. As of January 2010 there were: no Part 90 miners in mines with 1-19 employees; 47 Part 90 miners in mines with 20-500 employees; and 19 Part 90 miners in mines with 501+ employees.

MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to edit, copy, and post the proposed plans and revisions. Copy costs are the same as determined above. There are no postage costs. MSHA estimates that first year costs to underground coal mine operators to copy and post proposed and revised CPDM plans submitted to MSHA for approval would be approximately $500. Costs for each mine size are shown below:

Underground Operators:

- $0 for mines with 1-19 employees;
- $362 for mines with 20-500 employees [47 plans x (0.25 hrs. x $26.00 hourly wage rate + $1.20)]; and
- $146 for mines with 501+ employees [19 plans x (0.25 hrs. x $26.00 hourly wage rate + $1.20)].

First year costs were amortized over 10 years by multiplying by an annualization factor of 0.142 based on a 7 percent discount rate to arrive at annualized cost of approximately $70 for underground coal mine operators.

Costs of Revising Approved CPDM Plans

Cost to Revise and Submit Revisions to Approved CPDM Plans

MSHA expects that revisions to approved CPDM plans by underground coal mine operators would occur under proposed §§ 70.206(d), 70.208(f)(4), 70.208(g)(4), 70.209(g)(4), 90.206(b), 90.206(e), 90.209(e)(4) and 90.209(f)(4). MSHA also expects that a small number of revisions could address new mines that use and would need to revise model plans.

MSHA estimates that 25 percent of underground coal mine operators would propose revisions to approved CPDM plans each year: 20 mines with 1-19 employees (81 x 0. 25); 83 mines with 20-500 employees (331 x 0.25); and 3 mines with 501+ employees (12 x 0.25). On average, MSHA estimates that a supervisor would take 15 minutes (0.25 hours) to revise an approved plan and a clerical employee would take 15 minutes (0.25 hours) to copy and submit the revision. Copy and postage costs per revision would be $1.30 [(2 pgs. x $0.15) + $1 postage]. MSHA estimates that the number of plan revision per mine would be: 2 revisions in mines with 1-19 employees; 4 revisions in mines with 20-500 employees; and 6 revisions in mines with 501+ employees. Since CPDMs would not be required to be used until 12 months after the final rule became effective, revisions to approved plans are assumed to begin after that time. Therefore, the annual costs beginning in year 2 were discounted by applying a discount factor of 0.925 based on 7 percent.

MSHA estimates that the discounted annual costs for underground coal mine operators to revise their approved CPDM plans would be approximately $10,450. Costs for each mine size are shown below:

Underground Operators:

- $1,072 for mines with 1-19 employees [20 mines x 2 revisions/yr. x ((0.25 hrs. x $84.70) + (0.25 hrs. x $26.00 hourly wage rate) + $1.30)] x 0.925;
- $8,899 for mines with 20-500 employees [83 mines x 4 revisions/yr. x ((0.25 hrs. x $84.70) + (0.25 hrs. x $26.00 hourly wage rate) + $1.30)] x 0.925; and
- $483 for mines with 501+ employees [3 mines x 6 revisions/yr. x ((0.25 hrs. x $84.70) + (0.25 hrs. x $26.00 hourly wage rate) + $1.30)] x 0.925.

Cost to Notify and Provide the Miners' Representative a Copy of the Approved CPDM Plan and Revisions to Approved CPDM Plans

Proposed § 70.206(c)(1) would require the approved CPDM Plan and revisions to the Plan be provided to the representative of miners upon request. MSHA made the conservative assumption that approved plan revisions would be requested 100 percent of the time at underground coal mines. On average, MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to copy and provide the revisions of the approved CPDM plan to the miners' representative. On average, MSHA estimates that copy costs for approved plan revisions would be $0.30 (2 pgs. x $0.15). There are no postage costs because MSHA assumes that a copy of the plan would be given to the representative of the miners at the mine site. The discount factor of 0.925 based on a 7 percent discount rate is applied to the annual costs for the same reason as noted above. MSHA estimates that the annual costs for underground coal mine operators to provide approved CPDM plan revisions to the representative of the miners would be approximately $2,450. Costs for each mine size are shown below:

Underground Operators:

- $252 for mines with 1-19 employees [20 mines x 2 revisions/yr. x ((0.25 hrs. x $26.00 hourly wage rate) + $0.30)] x 0.925;
- $2,089 for mines with 20-500 employees [83 mines x 4 revisions/yr. x ((0.25 hrs. x $26.00 hourly wage rate) + $0.30)] x 0.925; and
- $113 for mines with 501+ employees [3 mines x 6 revisions/yr. x ((0.25 hrs. x $26.00 hourly wage rate) + $0.30)] x 0.925.

Make Copies Available of the Approved Plan and Revisions

Proposed § 70.206(c)(2) would require coal mine operators to have a copy of the approved plan and any revisions available for inspection by the representative of miners. MSHA expects that underground coal mines would not incur any costs to comply with this proposal because mine operators normally have copies of their approved plans available for inspection.

Cost to Post Approved CPDM Plans and Revisions

Proposed §§ 70.206(c)(3) would require the approved Plan and revisions be posted on the mine bulletin board within 1 working day following notification of approval, and to remain posted for the period that the Plan is in effect. Proposed § 90.206(d) would require that Part 90 miners be given a copy of the plan. As was stated earlier, MSHA expects that one CPDM plan would be developed by each underground mine operator. The Part 90 miner would be provided the entire plan and the plan that is posted would have the language that pertains to the Part 90 miner edited out. The number of revised CPDM plans submitted for approval was determined above.

MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to copy and post or copy and provide revisions to the Part 90 miner. Copy costs are the same as determined above. There are no postage costs. Since these costs would begin in the second year, a discount factor of 0.925 based on a 7 percent discount rate, was applied to the annual costs for the same reason noted above. MSHA estimates that annual costs for underground coal mine operators to copy and post approved CPDM plan revisions would be approximately $2,450. Costs for each mine size are shown below:

Underground Operators:

- $252 for mines with 1-19 employees [20 mines x 2 revisions/yr. x ((0.25 hrs. x $26.00 hourly wage rate) + $0.30)] x 0.925;
- $2,089 for mines with 20-500 employees [83 mines x 4 revisions/yr. x ((0.25 hrs. x $26.00 hourly wage rate) + $0.30)] x 0.925; and
- $113 for mines with 501+ employees [3 mines x 6 revisions/yr. x ((0.25 hrs. x $26.00 hourly wage rate) + $0.30)] x 0.925.

Table V-22 summarizes, by mine size, first year costs of approximately $179,400 related to approving and revising CPDM plans.

Table V-22: Summary of Underground Coal Mine Operators Costs Occurring in the First Year for Approving and Revising CPDM Plans

Requirements	Std.	1-19	20-500	501+	Total
Develop & Submit CPDM Plans for Approval	§§70.206(a), 90.206(a) & (b)	$28,100	$115,000	$4,200	$147,300
Revise CPDM Plans Submitted for Approval	§§70.206(a), 90.206(a) & (b)	$1,400	$5,900	$200	$7,500
Notify & Provide Copy to Miners Rep. of CPDM Plans & Revisions Submitted for Approval	§70.206(a)(1)	$800	$3,400	$100	$4,300
Post CPDM Plans & Revisions Submitted for Approval	§70.206(a)(3)	$800	$3,400	$100	$4,300

Provide Copy to Part 90 Miners of Approved CPDM Plans	§90.206(d)	$0	$400	$100	$500
Revise & Submit Approved CPDM Plan Revisions	§§70.206(d), 70.208(f)(4), 70.208(g)(4), 70.209(g)(4), 90.206(b), 90.206(e), 90.209(e)(4), 90.209(f)(4)	$1,100	$8,900	$500	$10,500
Notify & Provide Copy to Miners Rep. of Revisions to Approved CPDM Plans	§70.206(c)(1)	$300	$2,100	$100	$2,500
Post or Provide Copy to Part 90 Miner of Approved CPDM Plans/Revisions	§§70.206(c)(3), 90.206(d)	$300	$2,100	$100	$2,500
Total		$32,800	$141,200	$5,400	$179,400

First Year Costs = First Year Costs + Annual Costs.

Table V-23 summarizes, by mine size, annualized costs of approximately $39,000 related to approving and revising CPDM plans.

Table V-23: Summary of Annualized Cost to Underground Coal Mine Operators For Approving and Revising CPDM Plans

Requirements	Std.	1-19	20-500	501+	Total
Develop & Submit CPDM Plans for Approval	§§70.206(a), 90.206(a) & (b)	$4,000	$16,300	$600	$20,900
Revise CPDM Plans Submitted for Approval	§§70.206(a), 90.206(a) & (b)	$200	$800	$100	$1,100
Notify & Provide Copy to Miners Rep. of CPDM Plans & Revisions Submitted for Approval	§70.206(a)(1)	$100	$500	$100	$600
Post CPDM Plans & Revisions Submitted for Approval	§70.206(a)(3)	$100	$500	$100	$600
Provide Copy to Part 90 Miners of Approved CPDM Plans	§90.206(d)	$0	$50	$50	$100
Revise & Submit Approved CPDM Plan Revisions	§§70.206(d), 70.208(f)(4), 70.208(g)(4), 70.209(g)(4), 90.206(b), 90.206(e), 90.209(e)(4), 90.209(f)(4)	$1,100	$8,900	$500	$10,500
Notify & Provide Copy to Miners Rep. of Revisions to Approved CPDM Plans	§70.206(c)(1)	$300	$2,100	$100	$2,500
Post or Provide Copy to Part 90 Miner of Approved CPDM Plans/Revisions	§§70.206(c)(3), 90.206(d)	$300	$2,100	$100	$2,500

Total		$6,100	$31,250	$1,650	$38,800

Annualized Cost = Annualized First Year Costs + Annual Costs.

Using CPDMs at Underground Mines

Cost of CPDM Training for Miners Expected to Use a CPDM

Proposed §§ 70.201(j) and 90.201(h) are new and require that training be provided to all miners expected to wear a CPDM. The training shall be completed prior to a miner being required to wear a CPDM and repeated every 12 months thereafter. The training would include: 1) explaining the basic features and capabilities of the CPDM; 2) how to setup the CPDM for compliance sampling; 3) a discussion of the various types of information displayed by the CPDM and how to access that information; 4) how to start and stop a short-term sample run during compliance sampling; and 5) the importance of continuously monitoring dust concentrations and properly wearing the CPDM.

The number of miners at underground coal mines expected to be trained on the use of the CPDM is based upon the number of MMUs, the number of shifts per day, the number of MMUs using supplementary controls, and the number of Part 90 miners. This training is assumed to occur in the first year after the rule become effective. MSHA assumes that:

- Every MMU operating 1 shift per day would have 1 DO and 1 ODO each using a CPDM;
- Every MMU operating 2 shifts per day would have 1 DO and 2 ODOs per shift each using a CPDM;
- 20 percent of total shifts operating per day would have 1 additional person (ODO) to be monitored with a CPDM;
- Each Part 90 miner would use a CPDM;
- The number of additional persons needing to wear a CPDM for MMUs using supplementary controls in accordance with proposed § 70.208(h) would be: 24 persons at MMUs in mines with 1-19 employees; 150 persons at MMUs in mines with 20-500 persons; and no persons at MMUs in mines with 501+ employees; and
- On every shift, 1 additional person would be trained on how to use a CPDM to account for unexpected absences.

MMUs operate on: 93 shifts in mines with 1-19 employees (69 MMUs x 1 shift per day + 12 MMUs x 2 shifts per day); 1,445 shifts in mines with 20-500 employees (45 MMUs x 1 shift per day + 589 shifts x 2 shifts per day + 74 MMUs x 3 shifts per day); and 273 shifts in mines with 501+ employees (3 MMUs x 2 shifts per day + 89 MMUs x 3 shifts per day). Based on the above, the number of persons in underground coal mines that MSHA estimates would need to be trained on using a CPDM is:

346 persons in mines with 1-19 employees
[69 MMUs x 1 shift x (1 DO + 1 ODO] +
[12 MMUs x 2 shifts x (1 DO + 2 ODOs] +

[(93 shifts on which MMUs operate / 5) x 1 ODO] +
[24 persons with CPDMs at MMUs using supplementary controls] +
[93 shifts on which MMUs operate x 1 additional person];

6,221 persons in mines with 20-500 employees
[45 MMUs x 1 shift x (1 DO + 1 ODO] +
[589 MMUs x 2 shifts x (1 DO + 2 ODOs] +
[74 MMUs x 3 shifts x (1 DO + 2 ODOs] +
[(1,445 shifts on which MMUs operate / 5) x 1 ODO] +
[47 Part 90 miners x 1] +
[150 persons with CPDMs at MMUs using supplementary controls] +
[1,445 shifts on which MMUs operate x 1 extra person]; and,

1,166 persons in mines with 501+ employees
[3 MMUs x 2 shifts x (1 DO + 2 ODOs] +
[89 MMUs x 3 shifts x (1 DO + 2 ODOs] +
[(273 shifts on which MMUs operate / 5) x 1 ODO] +
[19 Part 90 miners x 1] +
[[273 shifts on which MMUs operate x 1 extra person].

MSHA estimates that it would take 30 minutes (0.5 hours) to train a miner on how to use the CPDM. MSHA estimates that the annual costs of miners' time to receive annual CPDM training would be approximately $136,500. Costs for each mine size are shown below:

Underground operators:

- $6,107 for mines with 1-19 employees (346 miners x 0.5 hrs. x $35.30 hourly wage rate);
- $109,801 for mines with 20-500 employees (6,221 miners x 0.5 hrs. x $35.30 hourly wage rate); and
- $20,580 for mines with 501+ employees (1,166 miners x 0.5 hrs. x $35.30 hourly wage rate).

Also, MSHA estimates that the person certified in sampling with a CPDM, earning $31.77 per hour in an underground coal mine, would spend 30 minutes (0.5 hours) providing one CPDM training session for each shift that an MMU operates. Since the number of training sessions equals the number of shifts MMUs operate, there will be: 93 training sessions for mines with 1-19 employees; 1,445 training sessions for mines with 20-500 employees; and 273 training sessions for mines with 501+ employees. MSHA estimates that the annual costs for a certified technician, earning an hourly wage rate of $31.77, to provide the annual CPDM training to miners would be approximately $28,800. Costs for each mine size are shown below:

Underground operators:

- $1,477 for mines with 1-19 employees (93 training sessions x 0.5 hrs. x $31.77 hourly wage rate);
- $22,954 for mines with 20-500 employees (1,445 training sessions x 0.5 hrs. x $31.77 hourly wage rate); and

- $4,337 for mines with 501+ employees (273 training sessions x 0.5 hrs. x $31.77 hourly wage rate).

Costs of Records for CPDM Training

Proposed §§ 70.201(k) and 90.201(i) are new and require coal mine operators keep a record of miners who receive CPDM training. The estimated number of miners at underground mines who would receive CPDM training was presented in the previous section; 346 miners in mines with 1-19 employees; 6,277 miners in mines with 20-500 employees; and 1,190 miners in mines with 501+ employees.

MSHA estimates that it would take a clerical employee 0.00833 hours (30 seconds) to make a record of each miner who received CPDM training. MSHA estimates that the annual costs to make records for miners receiving CPDM training would be approximately $1,700. Costs for each mine size are shown below:

Underground operators:

- $75 for mines with 1-19 employees (346 miners x 0.00833 hrs. x $26 hourly wage rate);
- $1,347 for mines with 20-500 employees (6,221 miners x 0.00833 hrs. x $26 hourly wage rate); and
- $252 for mines with 501+ employees (1,166 miners x 0.00833 hrs. x $26 hourly wage rate).

Costs Incurred When Using a CPDM to Sample

Proposed §§ 70.201(a) and 90.201(a) would require that DOs in each MMU and Part 90 miners be sampled with CPDMs beginning 12 months after the effective date of the final rule. Proposed § 70.201(c) would require that ODOs associated with an MMU be sampled with CPDMs beginning 18 months after the effective date of the final rule. Proposed § 70.208(h) would require the use of the CPDM to sample while supplementary controls are used.

Costs to Purchase Related Equipment When Using a CPDM to Sample

Proposed §§ 70.210(f) and 90.210(f) are new and would apply when operators use CPDMs to sample. The proposal would require that, within 12 hours after the end of the last sampling shift of the work week, a designated mine official must validate, certify, and transmit electronically to MSHA all daily sample and error data file information collected during the previous calendar week (Sunday through Saturday) and stored in the CPDM. The proposal would also require the operator to maintain all CPDM data files transmitted to MSHA for at least 12 months.

Proposed §§ 70.211(c) and 90.211(c) are new and would apply to operators who use a CPDM. Proposed § 70.211(c) would require the designated mine official to validate, certify, and post certain sampling information on the mine bulletin board. Proposed § 90.211(c) would require certain sampling information be provided to Part 90 miners.

MSHA had determined that a computer would be needed to download the sampling data from the CPDM and transmit it to MSHA. A printer would also be needed to print the data so that copies can be posted and provided to the miners' representative and Part 90 miners.

Proposed §§ 70.204(d) and 90.204(d) are new and would require that when CPDMS are used, a person certified in sampling or in maintenance and calibration follow the examination, testing, and set-up procedures contained in the approved CPDM Performance Plan. MSHA has determined that a flow meter would be needed to perform the required calibration of the CPDM.

MSHA estimates that 75 percent of mines would need to purchase a computer and printer to process information generated by the CPDM. The number of underground coal mine operators that would need computers and printers would be: 61 mines with 1-19 employees (81 mines x 75 percent); 248 mines with 20-500 employees (331 mines x 75 percent); and 9 mines with 501+ employees (12 mines x 75 percent). In addition, to perform the required monthly calibration on a CPDM, a flow meter would be needed to conduct a flow audit. MSHA estimates that the number of mines that would need to purchase a flow meter is: 81 mines with 1-19 employees (all mines in this size group) and 83 mines with 20-500 employees (331 mines x 25 percent). MSHA expects that all mines with 501+ employees currently have flow meters. MSHA estimates that a computer and printer cost $1,000 (includes ink and paper) and a flow meter costs $1,700. MSHA estimates a 5 year life for the computer, printer and flow meter. MSHA estimates that underground coal mine operators ' first year cost to purchase computers, printers and flow meters when using CPDMs would be approximately $597,000. Costs for each mine size are shown below:

Underground Operators:

- $198,700 for mines with 1-19 employees [(61 mines x 1 computer and printer x $1,000) + (81 mines x 1 flow meter x $1,700)];
- $389,100 for mines with 20-500 employees [(248 mines x 1 computer and printer x $1,000) + (83 mines x 1 flow meter x $1,700)]; and
- $9,000 for mines with 501+ employees (9 mines x 1 computer and printer x $1,000).

First year costs were multiplied by an annualization factor of 0.244 based on a 7 percent discount rate to reflect a 5 year service life for the computer, printer and flow meter. The annualized first year costs would be approximately $145,600 for underground coal mine operators.

Costs to Purchase CPDMs (including Warranty)

Proposed § 70.201(a) and 70.208(a)(1) are new and would require mine operators to use CPDMs to sample the DO in each MMU during each production shift beginning 12 months after the effective date of the final rule. Proposed §§ 90.201(a) and 90.209(a)(1) are new and would require operators to use CPDMs to sample the work environment of each Part 90 miner during each shift beginning 12 months after the effective date of the standard. Proposed §§ 70.201(c) and 70.208(a)(2) are new and

would require mine operators using CPDMs to sample ODOs in each MMU during each production shift for 14 consecutive calendar days during each quarterly period beginning 18 months after the effective date of the final rule. Proposed § 70.208(h) would provide that for the 24-month period following the effective date of the final rule, if an operator is unable to maintain compliance with the applicable standard for an MMU and the operator determines that all feasible engineering or environmental controls are being used on the MMU, the operator may request approval for the use of supplementary controls in conjunction with monitoring miners' exposures with CPDMs to reduce affected miners' dust exposure. MSHA estimated the costs based upon the number of CPDMs that would be required to comply with each provision.

CPDMs Needed for DO and Part 90 Miner Sampling

There is one DO during each shift at each MMU. A CPDM operates for 12 hours before it needs to be recharged. Recharging would take at least 6 hours. One CPDM would be needed to sample a DO at an MMU that operates one shift per day. Two CPDMs would needed to sample each DO at an MMU operating two shifts per day since the CPDM used for the first shift would be recharging during the second shift. Also, two CPDMs would be needed to sample each DO at an MMU that operates three shifts per day because the same CPDM could be used on the first and third shifts.

Each Part 90 miner would need a CPDM. In January 2010, there were 66 Part 90 miners: none employed at mines with 1-19 employees, 47 employed at mines with 20-500 employees and 19 employed at mines with 501+ employees.

Since the proposed rule would require DO and Part 90 miner sampling with a CPDM to begin 12 months after the effective date of the final rule, MSHA expects that operators would purchase CPDMs to perform DO and Part 90 sampling within that 12 month period. MSHA estimates that underground coal mine operators would purchase 1,714 CPDMs to perform DO and Part 90 miner sampling required by the proposed rule. CPDM purchases for each mine size are shown below:

- 93 CPDMs for mines with 1-19 employees [(69 MMUs with one shift per day x 1 CPDM) + (12 MMUs with two shifts per day x 2 CPDMs)];
- 1,418 CPDMs for mines with 20-500 employees [(45 MMUs with one shift per day x 1 CPDM) + (589 MMUs with two shifts per day x 2 CPDMs) + 74 MMUs with three shifts per day x 2 CPDMs)] + [47 Part 90 miners x 1 CPDM]; and
- 203 CPDMs for mines with 501+ employees [(3 MMUs with two shifts per day x 2 CPDMs) + 89 MMUs with three shifts per day x 2 CPDMs)] + [19 Part 90 miners x 1 CPDM].

CPDMs Needed for ODO Sampling

Since proposed § 70.208(a)(2) would require that each ODO be sampled for only 14 days per quarter, one CPDM can be used to sample several ODOs. MSHA estimates that 1 CPDM would be needed in mines with 1-19 employees and 2 CPDMs would be needed in mines with 20-500 and 501+ employees.

- 81 CPDMs for mines with 1-19 with employees (81 mines x 1 CPDMs);
- 662 CPDMs for mines with 20-500 employees (331 mines x 2 CPDMs); and
- 24 CPDMs for mines with 501+ employees (12 mines x 2 CPDMs).

CPDMs Needed for Sampling During the Use of Supplementary Controls

Under proposed § 70.208(h), supplementary controls could be used on MMUs for a 6 month period during the first 24 months after the effective date of the final rule if an operator is unable to maintain compliance with the applicable dust standard for the MMU. Based upon the feasibility analysis presented previously, MSHA has determined that all mines can comply with the proposed respirable dust standards given the two-year phase-in of the lower dust exposure limits.

However, since proposed full-shift sampling (proposed § 70.201(e)) and single-sample (proposed § 72.800) provisions would be effective on the effective date of the rule, it may not be feasible for all mines to comply with proposed dust standards during the first 24-month period. It is likely that the provisions that take immediate effect would have the greatest impact on the MMU currently operating under a reduced standard due to the presence of quartz. Therefore, MSHA based the costs of complying with proposed § 70.208(h) on MMUs currently operating under a reduced standard of 0.5 mg/m^3 where at least 50 percent of the operators' sample results were above the applicable standard in 2009; based on data and experience, the Agency expects these MMUs would most likely need supplementary controls to meet the proposed standards.

In estimating the cost of the engineering controls, MSHA determined that 29 MMUs (4 MMUs in mines with 1-19 employees and 25 MMUs in mines with 20-500 employees) are currently operating under a reduced standard of 0.5 mg/m^3 and had at least 50 percent of the operators sample results above the applicable standard in 2009. MSHA expects that these 29 MMUs would institute controls in addition to those being instituted at the other MMUs.

MSHA expects that operators with MMUs using supplementary controls would need to monitor additional occupations with CPDMs and would need to purchase CPDMs in addition to those purchases estimated above to monitor DOs, ODOs, and Part 90 miners. MSHA assumes that where supplementary controls would be used on the MMU 3 CPDMs in addition to the CPDM needed to sample the DO would be required on each shift. MSHA assumes that operators using supplementary controls operate an average of 2 shifts per day. MSHA estimates that the number of additional CPDMs used by underground coal mine operators when supplementary controls would be used would be:

- 24 CPDMs for MMUs in mines with 1-19 employees (4 MMUs x 3 CPDMs x 2 shifts); and,
- 150 CPDMs for MMUs in mines with 20-500 employees (25 MMUs x 3 CPDMs x 2 shifts).

Costs of the CPDMs (including warranty)

MSHA estimates the average cost of a CPDM to be $10,000. MSHA assumes that a 5 year warranty would be purchased at a cost of $2,875 with each CPDM sold and that the service life of a CPDM is 5 years. First year costs were multiplied by an annualization factor of 0.244 based on a 7 percent discount rate to amortize the costs of the CPDM over its 5 year service life. Costs for CPDMs purchased for ODO sampling were multiplied by a discount factor of 0.903 based on 7 percent to reflect the fact that these CPDMs would be purchased 18 months after the final rule goes into effect. Costs for CPDMs for the DO and Part 90 miner sampling, and for sampling where

supplemental controls would be used were not discounted since MSHA expects the costs to occur in the first year.

Table V-24 shows that the estimated first year costs to purchase CPDMs would be approximately $33.2 million. Annualized first year costs would be approximately $8.1 million.

Table V-24: Underground Coal Mine Operators' Costs to Purchase CPDMs (including warranty)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Type of Sampling	No. of CPDMs	Cost per CPDM	Discount Factor	First year Costs [a]	Annualization Factor	Annualized Costs [b]
For MMUs in Mines with 1-19 Employees						
DO & Part 90	93	$12,875		$1,197,375	0.244	$292,160
ODO	81	$12,875	0.903	$941,716	0.244	$229,779
Supplementary Controls	24	$12,875		$309,000	0.244	$75,396
Sub-Total	198			$2,448,091		$597,335
For MMUs in Mines with 20-500 Employees						
DO & Part 90	1,418	$12,875		$18,256,750	0.244	$4,454,647
ODO	662	$12,875	0.903	$7,696,495	0.244	$1,877,945
Supplementary Controls	150	$12,875		$1,931,250	0.244	$471,225
Sub-Total	2,230			$27,884,495		$6,803,817
For MMUs in Mines with 501+ Employees						
DO & Part 90	203	$12,875		$2,613,625	0.244	$637,725
ODO	24	$12,875	0.903	$279,027	0.244	$68,083
Supplementary Controls	0	$12,875		$0	0.244	$0
Sub-Total	227			$2,892,652		$705,808
Total	2,655			$33,225,238		$8,106,960

[a] Col. e = col. b x col. c x col. d, where applicable.

[b] Col. g = col. e x col. f.

Additional CPDMs

MSHA expects that additional CPDMs would be needed at times when deployed CPDMs are not operating correctly (e.g., units are not fully charged or require cleaning). There are approximately 120 CPDMs already purchased by underground coal mine operators, and additional orders for CPDMs are expected to continue in the future. MSHA expects that, before the final rule goes into effect, there would be at least 200 CPDMs owned by underground coal mine operators. Since these units are in excess of the number that would be needed to comply with the proposed requirements, the costs of which were presented above, they represent a stockpile of spare units. When the

supplemental controls are no longer being used, the CPDMs used during the period while supplemental controls were being used represent a second stock pile of spares units.

Since large mine operators are currently purchasing most of the CPDMs, MSHA expects that most of the spare CPDMs would end up being owned by the larger mine operators. MSHA did not estimate the cost of spare units for smaller operators because MSHA assumed that the small mines with 1 to 19 employees would be able to handle a problem with one of their CPDMs without purchasing a spare. In estimating the costs for small mines, MSHA assumed that each operator would purchase one CPDM per MMU per shift for DO sampling and an additional unit for the other ODO sampling. Since § 70.208(a)(2) only requires the sampling of the ODOs for 14 consecutive shifts each quarter, MSHA expects that if one CPDM is not working then the operator would send that unit to be repaired, delay the ODO sampling until the end of the quarter and use the other CPDM for DO sampling. MSHA expects that the broken CPDM can be repaired and returned in time for quarterly ODO sampling.

Cost for CPDM Filters

Filters Needed

A new CPDM filter is needed for each CPDM used on every shift sampled. The number of CPDMs used on each shift depends on the type of sampling conducted.

DO and Part 90 miner sampling

The DO sampling with a CPDM would occur on every production shift. There is 1 DO sampled with a CPDM on each shift. The number of shifts per day multiplied by the number of CPDMs used on each shift equates to the number of CPDM filters used per day. For underground mines, MSHA estimates that the number of shifts per day operated by MMUs would be: 93 shifts in mines with 1-19 employees (69 MMUs operating 1 shift per day + 12 MMUs operating 2 shifts per day); 1,445 shifts in mines with 20-500 employees (45 MMUs x 1 shift per day + 589 shifts x 2 shifts per day + 74 MMUs x 3 shifts per day); and 273 shifts in mines with 501+ employees (3 MMUs x 2 shifts per day + 89 MMUs x 3 shifts per day).

In addition, every Part 90 miner is sampled each shift they work. There are 47 Part 90 miners currently employed at mines with 20-500 employees and 19 at mines with 501+ employees. The number of CPDM filters used per day by underground coal mine operators ' to perform DO and Part 90 miner sampling would be:

- 93 filters per day for mines with 1-19 employees [1 filter x ((69 MMUs x 1 shift per day) + (12 MMUs x 2 shifts per day))];
- 1,492 filters per day for mines with 20-500 employees [1 filter x ((45 MMUs x 1 shift per day) + (589 MMUs x 2 shifts per day) + (74 MMUs x 3 shifts per day) + (47 Part 90 miners x 1 shift per day))]; and,
- 292 filters per day for mines with 501+ employees [1 filter x ((3 MMUs x 2 shifts per day) + (89 MMUs x 3 shifts per day) + (19 Part 90 miners x 1 shift per day))].

ODO sampling

Each ODO would be sampled on each production shift in each MMU for 14 consecutive days each quarter. For mines with 1-19 employees, MSHA estimates that there would be 1 ODO on each shift at each MMU. For mines with 20 or more employees, MSHA estimates that there would be 1 ODO at each MMU that operates 1 shift per day and 2 ODOs per shift at each MMU that operates 2 or 3 shifts per day. In addition, MSHA projects that an additional ODO would be sampled on every fifth shift (20 percent of total shifts). Every ODO sampled would need a new CPDM filter on each shift where ODO sampling occurs. MSHA estimates that the number of CPDM filters used per day of ODO sampling by underground coal mine operators would be:

- 112 filters per day in mines with 1-19 employees [1 filter x ((69 MMUs x 1 shift x 1 ODO) + (12 MMUs x 2 shifts x 1 ODO)))] + [1 filter x (93 total shifts per day on which MMUs operate / 5) x 1 ODO)];
- 3,134 filters per day in mines with 20-500 employees [1 filter x ((45 MMUs x 1 shift 1 ODO) + (589 MMUs x 2 shifts x 2 ODOs) + (74 MMUs x 3 shifts x 2 ODOs))] + [1 filter x ((1,445 total shifts on which MMUs operate / 5) x 1 ODO)]; and
- 601 filters per day in mines with 501+ employees [1 filter x ((3 MMUs x 2 shifts x 2 ODOs) + (89 MMUs x 3 shifts x 2 ODOs))] + [1 filter x ((273 shifts on which MMUs operate / 5) x 1 ODO)].

Sampling While Supplementary Controls are in Use

A new filter would be needed for each CPDM on every shift where the CPDM is used in conjunction with supplementary controls. For mines using supplementary controls on MMUs, MSHA expects that the number of shifts operating per day would be 2 shifts per day for non-longwall MMUs. As noted above, 3 additional CPDMs per MMU per shift would be needed for MMUs using supplementary controls. MSHA estimates that the number of CPDM filters per day needed by operators using supplementary controls would be:

- 24 filters per day for MMUs in mines with 1-19 employees [1 filter x (4 MMUs x 2 shifts per day x 3 additional CPDMs)]; and,
- 150 filters per day for MMUs in mines with 20-500 employees [1 filter x (25 non-longwall MMUs x 2 shifts per day x 3 CPDMs)].

CPDM Filter Costs

MSHA estimates that a CPDM filter costs $5.50. The DO, Part 90 miner sampling and sampling in MMUs using supplementary controls would occur on each day the mine operates. MSHA estimates that the number of workdays per year in underground coal mines is: 200 workdays in mines with 1-19 employees; 300 workdays in mines with 20-500 employees; and 350 workdays in mines with 501+ employees. Each ODO would be sampled for 14 consecutive days during each calendar quarter (or 56 days per year per ODO sampled).

Since DO and Part 90 Miner sampling with the CPDM would not be required until 12 months after the final rule is in effect and would continue annually, the filter costs are multiplied by a discount factor of 0.925 based on 7 percent. Since ODO sampling with a CPDM is not required until 18 months after the final rule is in effect and

would continue annually, the filter costs are multiplied by a discount factor of 0.859 based on 7 percent. MSHA expects that mines that use supplementary controls would do so for an average of one year and that these costs would typically occur in the first year for the reasons discussed above. The filter costs for operators that have MMUs using supplementary controls were treated as a capital cost and amortized over 5 years by using an annualization factor of 0.244 based on a 7 percent discount rate.

Table V-25 shows that the estimated annual costs for CPDM filters would be approximately $3.9 million. First year costs would be approximately $274,000. Annualized first year costs would be approximately $67,000.

Table V-25: Underground Coal Mine Operators Costs for CPDM Filters

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Type of Sampling	No. of CPDMs Filters Needed per Day	No. of Days per Yr. Filters Used	Cost per Filter	Discount Factor	Annual Costs [a]	First year Costs [a]	Annualization Factor	Annualized Costs [b]
For MMUs in Mines with 1-19 Employees								
DO & Part 90	93	200	$5.50	0.925	$94,628			
ODO	112	56	$5.50	0.859	$29,632			
Supplementary Controls	24	200	$5.50			$26,400	0.244	$6,442
Sub-Total	229				$124,260	$26,400		$6,442
For MMUs in Mines with 20-500 Employees								
DO & Part 90	1,492	300	$5.50	0.925	$2,277,165			
ODO	3,134	56	$5.50	0.859	$829,169			
Supplementary Controls	150	300	$5.50			$247,500	0.244	$60,390
Sub-Total	4,776				$3,106,334	$247,500		$60,390
For MMUs in Mines with 501+ Employees								
DO & Part 90	292	350	$5.50	0.925	$519,943			
ODO	601	56	$5.50	0.859	$159,008			
Supplementary Controls	0	350	$5.50			$0	0.244	$0
Sub-Total	893				$678,951	$0		$0
Total	5,898				$3,909,545	$273,900		$66,832

[a] Col. f and Col. g = col. b x col. c x col. d x col. e.

b Col. i = col. g x col. h.

Costs for CPDM Annual Maintenance

Proposed §§ 70.204(d) and 90.204(d) are new and would require that when CPDMS are used, a person certified in sampling or in maintenance and calibration follow the examination, testing, and set-up procedures contained in the approved CPDM

Performance Plan. According to the manufacturer's recommendations, the following monthly maintenance is required: clean cyclone and inlet tubing; perform a sample line leak check; and perform a flow audit procedure.

For underground mines, MSHA estimates that monthly maintenance by a certified person earning $31.77 per hour would take 35 minutes to clean the cyclone and inlet tubing; 5 minutes for a sample line leak check; and 5 minutes for a flow audit (0.75 hours). The annual cost to perform monthly maintenance on a CPDM would be approximately $286 (12 mos. x 0.75 hrs. x $31.77 hourly wage rate). A calibration audit must be performed on the CPDM once a year at a cost of approximately $32 (1 hr. for audit x $31.77 hourly wage rate).

MSHA expects that items on the CPDM unit that are not covered by the warranty may need to be replaced periodically. The manufacturer lists the following parts of the CPDM that are not covered by the warranty: auxiliary board; modified display; front and rear case assembly; PTO cable assembly; digital board; amplifier board; and cyclone assembly. During the warranty period, there is a one time free replacement of the pump assembly and battery pack. If these parts fail the second time, then the operator would be responsible for the costs of the replacement parts. Manufacturer costs for the items noted above range from $200 for a front case assembly to $1,300 for the LED cap lamp assembly. MSHA does not expect that each CPDM would need all of these items replaced annually. However, as these devices are deployed in the mining environment they would be damaged and replacement parts would be needed. MSHA projects $1,000 for annual replacement parts. MSHA estimates total annual maintenance costs for a CPDM would be approximately $1,318 ($286 + $32 + $1,000).

With respect to ODO sampling with a CPDM, MSHA expects that the $1,318 of annual maintenance costs would apply to mines with 20 or more employees, and half of that amount ($659) would apply to mines with 1-19 employees. MSHA expects half of the annual maintenance cost for the smallest mine size category because these mines would use the CPDM for ODO sampling less than one month per quarter (e.g., to sample one ODO for 14 consecutive days on one or two shifts). This limited use of the CPDM would mean that repair and maintenance costs should be lower.

With respect to sampling with a CPDM at MMUs using supplementary controls, MSHA expects that the $1,318 annual maintenance costs noted above would apply because CPDMs used in conjunction with supplementary controls would be used every production shift each day.

Since some of the CPDM maintenance costs do not begin until some time in the second year, they have been amortized over 5 years using the same methodology used to estimate the costs of CPDM filters. Table V-26 shows that annual maintenance costs for CPDMs would be approximately $2.5 million. First year costs would be approximately $229,000 and annualized first year costs would be $56,000.

Table V-26: Underground Coal mine operators CPDM Annual Maintenance Costs

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

Type of Sampling	No. of CPDMs	Annual Maint. Cost per CPDM	Discount Factor	Annual Costs [a]	First Year Costs [a]	Annualization Factor	Annualized Costs [b]
For MMUs in Mines with 1-19 Employees							
DO & Part 90	93	$1,318	0.925	$113,381			
ODO	81	$659	0.859	$45,853			
Supplementary Controls	24	$1,318			$31,632	0.244	$7,718
Sub-Total	198			$159,234	$31,632		$7,718
For MMUs in Mines with 20-500 Employees							
DO & Part 90	1,418	$1,318	0.925	$1,728,755			
ODO	662	$659	0.859	$374,746			
Supplementary Controls	150	$1,318			$197,700	0.244	$48,239
Sub-Total	2,230			$2,103,501	$197,700		$48,239
For MMUs in Mines with 501+ Employees							
DO & Part 90	203	$1,318	0.925	$247,487			
ODO	24	$659	0.859	$13,586			
Supplementary Controls	0	$1,318			$0	0.244	$0
Sub-Total	227			$261,073	$0		$0
Total	2,655			$2,523,808	$229,332		$55,957

[a] Col. e and Col. f = col. b x col. c x col. d.

[b] Col. h = col. f x col. g.

Maintenance Costs on CPDM Performed Before Shift Begins

Based on manufacturer's recommendations, after the CPDM has been used on a shift and before it can be used again, the TEOM filter must be replaced; and the grit pot, mass transducer area and sample lines must be cleaned. In addition, the CPDM has to be programmed before each shift on which it is used. MSHA estimates that it would take a certified person, earning $31.77 per hour, 15 minutes (0.25 hrs.) to perform the above tasks. The maintenance would be performed before every shift where a CPDM is used.

Since a new filter must be used each time a CPDM is used, the estimate of the number of filters used per day can be used as the estimate of the number of times per day that this maintenance would be performed on CPDMs.

Since some of the costs do not begin until some time in the second year, they have been annualized using the same methodology used to estimate the costs of CPDM filters. Table V-27 shows that the annual before shift maintenance costs for CPDMs would be approximately $5.6 million. First year costs for before shift maintenance being performed on CPDMs would be approximately $396,000 and annualized first year costs would be approximately $97,000.

Table V-27: Underground Coal Mine Operators' Costs for Before Shift CPDM Maintenance

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Type of Sampling	No. of CPDMs Maint. Done Before Shift per day	No. of Days per Yr. Maint. Done	Time to Conduct Maint. in hrs.	Miner Hourly Wage Rate	Discount Factor	Annual Costs [a]	First year Costs [a]	Annualization Factor	Annualized Costs [b]
For MMUs in Mines with 1-19 Employees									
DO & Part 90	93	200	0.25	$31.77	0.925	$136,651			
ODO	112	56	0.25	$31.77	0.859	$42,791			
Supplementary Controls	24	200	0.25	$31.77			$38,124	0.244	$9,302
Sub-Total	229					$179,442	$38,124		$9,302
For MMUs in Mines with 20-500 Employees									
DO & Part 90	1,492	300	0.25	$31.77	0.925	$3,288,433			
ODO	3,134	56	0.25	$31.77	0.859	$1,197,395			
Supplementary Controls	150	300	0.25	$31.77			$357,413	0.244	$87,209
Sub-Total	4,776					$4,485,828	$357,413		$87,209
For MMUs in Mines with 501+ Employees									
DO & Part 90	292	350	0.25	$31.77	0.925	$750,845			
ODO	601	56	0.25	$31.77	0.859	$229,622			
Supplementary Controls	0	350	0.25	$31.77			$0	0.244	$0
Sub-Total	893					$980,467	$0		$0
Total	5,898					$5,645,737	$395,537		$96,511

[a] Col. g and h = col. b x col. c x col. d x col. e x col. f.

[b] Col. j = col. h x col. i.

Proposed § 70.208 Sampling of mechanized mining units; requirements when using a CPDM

Costs to Request Use of Supplementary Controls

Proposed § 70.208(h) permits an operator to request MSHA approval to use supplementary controls during the 24 month period after the effective date of the final rule for a period not to exceed 6 months if the operator is unable to maintain compliance with the applicable standard for an MMU and has determined that all feasible engineering or environmental controls are being used on the MMU.

In the request to use supplementary controls, the operator must include a report that: 1) evaluates the specific situation in the MMU; 2) outlines all controls that would be used during this time period to prevent miners from being exposed to concentrations exceeding the applicable standard; 3) addresses the actions that would be taken to lower miners' exposures through the use of engineering and environmental controls; and

4) establishes the time line for implementation of the engineering and environmental controls.

MSHA estimates that a supervisor would take 8 hours to write the request to use supplementary controls for each MMU and a clerical employee 15 minutes (0.25 hrs.) to copy and submit the request. On average, MSHA estimates that each request would be 10 pages. MSHA estimates that copy and postage costs would be $2.50 [(10 pages x $0.15) + $1 postage]. The number of MMUs in which supplementary controls are expected to be used was determined above. MSHA expects most of the requests would occur during the first year that the rule would take effect and mine operators would make an average of 2 requests per MMU (i.e., request to use the supplementary controls for two six-month periods). MSHA estimates that first year costs to underground coal mine operators to write initial requests to use supplementary controls would be approximately $40,000. Costs for each mine size are shown below:

Underground Operators:

- $6,000 for mines with 1-19 employees [4 MMUs x 2 requests x ((8 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26 hourly wage rate) + $2.50)]; and
- $34,000 for mines with 20-500 employees [25 MMUs x 2 request x ((8 hrs. x $84.70 hourly wage rate) + (0.25 hrs. x $26 hourly wage rate) + $2.50)].

The first year costs were amortized over 10 years by multiplying them by an annualization factor of 0.142 based on a 7 percent discount rate to arrive at annualized cost of approximately $6,000.

Proposed §§ 70.210 and 90.210 Respirable Dust Samples; Transmission by Operator Costs to Validate, Certify, and Transmit Electronically CPDM Data to MSHA

Proposed §§ 70.210(f) and 90.210(f) are new and would apply when operators use CPDMs to sample. The proposal would require that, within 12 hours after the end of the last sampling shift of the work week, a designated mine official must validate, certify, and transmit electronically to MSHA all daily sample and error data file information collected during the previous calendar week (Sunday through Saturday) and stored in the CPDM. The proposal would also require the operator to maintain all CPDM data files transmitted to MSHA for at least 12 months.

For underground coal mines, the cost of the computer needed to download the sampling data from the CPDM and transmit it to MSHA was estimated previously. MSHA estimates that validating, certifying, and uploading the CPDM data to a computer and then transmitting it electronically to MSHA would take a designated mine official, earning a supervisor's wage, 6 minutes (0.1 hours). The number of CPDMs estimated above and can be used to derive costs for this proposed requirement.

Since some of the costs do not begin until some time in the second year, they have been annualized using the same methodology for deriving CPDM filter costs. Table V-28 shows that annual costs to validate, certify, and transmit electronically CPDM data would be approximately $950,500. First year costs would be approximately $74,000 and annualized first year costs would be approximately $18,000.

Table V-28: Underground Coal Mine Operators' Costs to Validate, Certify, and Transmit Electronically CPDM Data to MSHA

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Type of Sampling	No. of CPDMs	Wks. per Yr.	Time per CPDM in hrs.	Superv. Hourly Wage Rate	Discount Factor	Annual Costs [a]	First year Costs [a]	Annualization Factor	Annualized Costs [b]
For MMUs in Mines with 1-19 Employees									
DO & Part 90	93	50	0.1	$84.70	0.925	$36,432			
ODO	81	50	0.1	$84.70	0.859	$29,467			
Supplementary Controls	24	50	0.1	$84.70			$10,164	0.244	$2,480
Sub-Total	198					$65,899	$10,164		$2,480
For MMUs in Mines with 20-500 Employees									
DO & Part 90	1,418	50	0.1	$84.70	0.925	$555,484			
ODO	662	50	0.1	$84.70	0.859	$240,827			
Supplementary Controls	150	50	0.1	$84.70			$63,525	0.244	$15,500
Sub-Total	2,230					$796,311	$63,525		$15,500
For MMUs in Mines with 501+ Employees									
DO & Part 90	203	50	0.1	$84.70	0.925	$79,523			
ODO	24	50	0.1	$84.70	0.859	$8,731			
Supplementary Controls	0	50	0.1	$84.70			$0	0.244	$0
Sub-Total	227					$88,254	$0		$0
Total	2,655					$950,464	$73,689		$17,980

[a] Col. g and h = col. b x col. c x col. d x col. e x col. f.

[b] Col. j = col. h x col. i.

Proposed §§ 70.211 and 90.211 Respirable Dust Samples Report to Operator: Posting Costs to Validate, Certify and Post CPDM Sampling Information and Provide Information to Part 90 Miners

Proposed §§ 70.211(c) and 90.211(c) are new and would apply to operators who use a CPDM. Proposed § 70.211(c) would require the designated mine official to validate, certify, and post certain sampling information on a daily and weekly basis. Proposed § 90.211(c) would require certain sampling information be provided to Part 90 miners.

The sampling results must include: the mine identification number; the locations within the mine from which the samples were taken; the concentration of respirable dust for each valid sample; the total amount of exposure accumulated by the sampled occupation during the shift; the occupation code, where applicable; the reason for voiding any sample; the shift length; and any other information required by the District Manager. With the exception of the information concerning the shift length and the total amount of

exposure accumulated by the sampled occupation during the shift, this information is included in the available data that can be printed from the CPDM. MSHA expects that the information not included on the printout would be written down on the printout and a copy of the printout would be posted to satisfy the requirements of this provision.

Proposed § 70.201(g) is new and would require the operator to make a record showing the length of each production shift for each MMU, retain the records for at least six months and make them available for inspection by authorized representatives of the Secretary and the miners' representative and submitted to the district manager when requested. Proposed § 90.201(f) is new and would require the operator to make a record showing the length of each shift for each Part 90 miner, retain the records for at least six months, and make them available for inspection by authorized representatives of the Secretary or submitted to the District Manager when requested in writing.

MSHA assumes that after recording the shift length on the printout, the operator would then record the shift length in a book to comply with proposed §§ 70.201(g) and 90.201(f). The costs for the computer and printer needed to download the sampling data from the CPDM and print out the dust cards were estimated previously.

Every time a CPDM is used to sample, a new CPDM filter is needed and a printout is generated after the sample is taken. The number of printouts to be completed and posted equals the number of CPDM filters used. MSHA estimates that a supervisor, earning $84.70 an hour, would take 3 minutes (0.05 hours) to complete the functions described above. MSHA also estimates it would cost $0.15 to make a copy of each printout. The number of workdays was determined previously and is used to derive these compliance costs.

Since some of the costs do not begin until some time in the second year, they have been annualized using the same methodology for deriving filter costs. Table V-29 shows that annual costs to validate, certify, and post sampling information and provide the sampling information to the Part 90 miners would be approximately $3.1 million. First year costs would be approximately $218,000 and annualized first year costs would be approximately $53,000.

Table V-29: Underground Coal Mine Operators' Costs to Validate, Certify, and Post or Provide Sampling Information

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Type of Sampling	No. of Dust Cards per Day	Work Days per Yr.	Time per Card in hrs.	Superv. Hourly Wage Rate	Copy Cost per Card	Discount Factor	Annual Costs [a]	First year Costs [a]	Annualization Factor	Annualized Costs [b]
For MMUs in Mines with 1-19 Employees										
DO & Pt 90	93	200	0.05	$84.70	$0.15	0.925	$75,444			
ODO	112	56	0.05	$84.70	$0.15	0.859	$23,625			
Supplem. Controls	24	200	0.05	$84.70	$0.15			$21,048	0.244	$5,136
Sub-Total	229						$99,069	$21,048		$5,136
For MMUs in Mines with 20-500 Employees										

DO & Pt 90	1,492	300	0.05	$84.70	$0.15	0.925	$1,815,522			
ODO	3,134	56	0.05	$84.70	$0.15	0.859	$661,074			
Supplem. Controls	150	300	0.05	$84.70	$0.15			$197,325	0.244	$48,147
Sub-Total	4,776						$2,476,596	$197,325		$48,147
For MMUs in Mines with 501+ Employees										
DO & Pt 90	292	350	0.05	$84.70	$0.15	0.925	$414,536			
ODO	601	56	0.05	$84.70	$0.15	0.859	$126,773			
Supplem. Controls	0	350	0.05	$84.70	$0.15			$0	0.244	$0
Sub-Total	893						$541,309	$0		$0
Total	5,898						$3,116,974	$218,373		$53,283

[a] Col. h and i = col. b x col. c x ((col. d x col. e + col. f) x col. g.

[b] Col. k = col. i x col. j.

Proposed §§ 70.212, 71.210, and 90.212 Change in Status Report

Proposed §§ 70.212(c), 71.210(c), and 90.212(b) are new and would require the mine operator to report to MSHA status changes that affect the operational readiness of any CPDM unit. Since the CPDM is a new technology, MSHA has no basis upon which to estimate the number of times this would occur. However, this requirement should represent a minimal burden since the reporting can be done electronically and since MSHA expects the mines using the CPDM would all have computers (in order to download and transmit the CPDM sampling data). MSHA has assessed one burden hour for this provision at a cost of $84.70, the supervisory wage rate for underground mines, where the preponderance of the CPDMs would be used.

Table V-30 shows the first year costs of approximately $51.5 million related to using a CPDM to perform sampling.

Table V-30: Summary of Underground Coal Mine Operator's First Year Costs for Using CPDMs at Underground Mines

Requirements	Std.	1-19	20-500	501+	Total
CPDM Training & Records	§§70.201(j), (k), & 90.201(h), (i)	$7,700	$134,100	$25,200	$166,900
Develop & Submit CPDM Plans for Approval & Revisions	§§70.206(a) & (c) & 90.209(a) & (c)	$32,800	$141,200	$5,400	$179,400
CPDM Related Equipment		$198,700	$389,100	$9,000	$596,800
Purchase CPDMs (includes Warranty Costs)	§§70.208(a)(1), (a)(2), (h) & 90.209(a)	$2,448,100	$27,884,500	$2,892,700	$33,225,200
CPDM Filters		$150,700	$3,353,800	$679,000	$4,183,400

CPDM Annual Maintenance		$190,900	$2,301,200	$261,100	$2,753,100
CPDM Before Shift Maintenance		$217,600	$4,843,200	$980,500	$6,041,300
Supplem. Control Requests	§ 70.208(h)	$5,500	$34,300	$0	$39,800
Validate/Certify/Transmit CPDM Data	§§ 70.210(f) & 90.201(f)	$76,100	$859,800	$88,300	$1,024,200
Validate/Certify/Post Dust Cards & Provide to Part 90 Miner	§§ 70.211(c) & 90.201(c)	$120,100	$2,673,900	$541,300	$3,335,300
Total		$3,448,200	$42,615,100	$5,482,500	$51,545,400

First Year Costs = First Year Costs + Annual Costs.

Table V-31 shows, by mine size, the annualized costs of approximately $24.8 million related to using a CPDM to perform sampling.

Table V-31: Summary of Underground Coal Mine Operator's Annualized Costs for Using CPDMs at Underground Mines

Requirements	Std.	1-19	20-500	501+	Total
CPDM Training & Records	§§70.201(j), (k), & 90.201(h), (i)	$7,700	$134,100	$25,200	$166,900
Develop & Submit CPDM Plans for Approval & Revisions	§§70.206(a) & (c) & 90.209(a) & (c)	$6,100	$31,300	$1,700	$38,800
CPDM Related Equipment					
Purchase CPDMs (includes Warranty Costs)	§§70.208(a)(1), (a)(2), (h) & 90.209(a)	$597,300	$6,803,800	$705,800	$8,107,000
CPDM Filters		$130,700	$3,166,700	$679,000	$3,976,400
CPDM Annual Maintenance		$167,000	$2,151,700	$261,100	$2,579,800
CPDM Before Shift Maintenance		$188,700	$4,573,000	$980,500	$5,742,200
Supplem. Control Requests	§ 70.208(h)	$800	$4,900	$0	$5,700
Validate/Certify/Transmit CPDM Data	§§ 70.210(f) & 90.201(f)	$68,400	$811,800	$88,300	$968,400
Validate/Certify/Post Dust Cards & Provide to Part 90 Miner	§§ 70.211(c) & 90.201(c)	$104,200	$2,524,700	$541,300	$3,170,300
Total		$1,270,900	$20,202,000	$3,282,900	24,755,500

Annualized costs = Annualized First Year Costs + Annual Costs.

On-Shift Examinations

Proposed § 75.362

Proposed § 75.362(a)(2) is revised to require that the person conducting the examination to ensure compliance with the respirable dust control parameters specified in the mine ventilation plan also record the results of the examination and corrective actions taken at the end of each shift for each MMU. This proposed requirement would only impact underground coal mines.

MSHA estimates that a supervisor, earning $84.70 per hour, would take 3 minutes (0.05 hours) to make a record of the examination for the average mine in all mine sizes. MSHA estimates that the number of shifts per day are: 93 shifts per day in mines with 1-19 employees (69 MMUs with 1 shift per day + 12 MMUs with 2 shifts per day); 1,445 shifts per day in mines with 20-500 employees (45 MMUs with 1 shift per day + 589 MMUs with 2 shifts per day + 74 MMUs with 3 shifts per day); and 273 shifts per day in mines with 501+ employees (3 MMUs with 2 shifts per day + 89 MMUs with 3 shifts per day). Records of the examinations would need to be made of these shifts each working day. MSHA estimates that, on average, the number of workdays per year is: 200 days for mines with 1-19 employees (4 days per week x 50 weeks); 300 days for mines with 20 or more employees (6 days per week x 50 weeks); and 350 days for mines with 501+ employees (7 days per week x 50 weeks). MSHA estimates that the annual cost to record the results from on-shift examinations would be approximately $2.3 million. Costs for each mine size are shown below:

Underground operators:

- $78,771 in mines with 1-19 employees (93 shifts per day x 200 days x 0.05 hrs. x $84.70 hourly wage rate);
- $1,835,873 in mines with 20-500 employees (1,445 shifts per day x 300 days x 0.05 hrs. x $84.70 hourly wage rate); and
- $404,654 in mines with 501+ employees (273 shifts per day x 350 days x 0.05 hrs. x $84.70 hourly wage rate).

Proposed § 75.362(g)(2)(i) requires that the proposed § 75.362(a)(2) record be certified by initials, date and time on a board maintained at the section load-out or similar location showing that the examination was made prior to resuming production. This proposed standard does not add any new costs and is already being required under existing § 75.362(g)(1) and § 75.362(g)(2).

Proposed § 75.362(g)(2)(ii) requires that the proposed § 75.362(a)(2) record be verified by the certified person directing the on-shift examination, by initials and date for compliance with the respirable control parameters specified in the mine ventilation plan. Verification shall be made no later than the end of the shift for which the examination was made. Proposed § 75.362(g)(3) requires that the mine foreman or equivalent official countersign each examination record under proposed paragraph (a)(2) after they are verified by certified person in proposed paragraph (g)(2)(ii). MSHA estimates that it would take 1 minute (0.0167 hours) to verify the record by a certified person earning $84.70 per hour; and another 1 minute (0.0167 hours) to review and countersign the record by a mine foreman or equivalent mine official earning $84.70 per hour.

MSHA estimates that the number of records to be verified and countersigned per year is: 18,600 records in mines with 1-19 employees (93 shifts per day x 200 days per year); 433,500 records in mines with 20-500 employees (1,445 shifts per day x 300 days per year); and 95,550 records in mines with 501+ employees (273 shifts per day x 350 days per year). MSHA estimates that underground coal mine operators' annual cost to verify and countersign the proposed § 75.362(a)(2) record would be approximately $1.6 million. Costs for each mine size are shown below:

Underground Operators:

- $52,619 in mines with 1-19 employees [(18,600 records x 0.0167 hrs. x $84.70 hourly wage rate) + (18,600 records x 0.0167 hrs. x $84.70 hourly wage rate)];
- $1,226,363 in mines with 20-500 employees [(433,500 records x 0.0167 hrs. x $84.70 hourly wage rate) + (433,500 records x 0.0167 hrs. x $84.70 hourly wage rate)]; and
- $270,309 in mines with 501+ employees [(95,550 records x 0.0167 hrs. x $84.70 hourly wage rate) + (95,550 records x 0.0167 hrs. x $84.70 hourly wage rate)].

Table V-32 shows that the annualized costs for underground coal mines to record, review and countersign the records would be approximately $3.9 million.

Table V-32: Annualized Costs for Underground Coal Mine Operators to Record Existing § 75.362 On Shift Exams, Review and Countersign the Record

	Mine Size			
Requirements	1-19	20-500	501+	Total
Record Exam	$78,800	$1,835,900	$404,700	$2,319,300
Review & Countersign	$52,600	$1,226,400	$270,300	$1,549,300
Total	$131,400	$3,062,300	$675,000	$3,868,600

Annualized Costs = Annual Costs (these costs also occur in the First Year)

Proposed § 75.371 Mine Ventilation Plan: Contents

Proposed § 75.371(f) and (j) would revise the information that operators would be required to provide in mine ventilation plans. Proposed paragraph (f) would add a new requirement to include the minimum quantity of air that would be delivered to the working section for each MMU. Proposed paragraph (j) would be revised to add a new requirement that the type and size of dust collector screens used and a description of the procedures to be followed in properly maintaining dust collectors used on equipment be included in the ventilation plan. These requirements would only pertain to underground coal mines.

MSHA has not estimated a separate cost for this proposed provision because these changes to the mine ventilation plan could be made at the time when operators are changing their mine ventilation plans due to the installation of engineering controls to

ensure compliance with the rule or, as part of the changes that are made to mine ventilation plan when they are reviewed every six months under existing § 75.370(g).

Periodic Examinations Proposed § 72.100

Proposed § 72.100 (a) and (b) would require each coal mine operator to provide periodic examinations including chest x-ray, spirometry, symptom assessment, and occupational history at no cost to each miner at least once every 5 years. Under proposed § 72.100(c), for miners who begin work at a coal mine for the first time (i.e., the miner has not previously worked in any coal mine), operator would provide both the chest x-ray and spirometry examinations at no cost to the miner no later than 30 days after beginning employment. If the miner is still employed at the same mine or at a mine owned by the same operator, the operator would provide follow-up chest x-ray and spirometry examinations no later than 3 years after the initial examinations.

If the follow-up examinations indicate coal miner's pneumoconiosis or decreased lung function, and if the miner is still employed at the same mine or at a mine owned by the same operator, then such miners would be provided additional follow-up examinations no later than 2 years after the follow-up examinations. For costing purposes, MSHA included the costs of these examinations in the costs developed for the examinations of the currently employed miners.

MSHA estimates that a chest x-ray costs an average of $100 and that a spirometry examination costs an average of $35. Under 42 CFR 37.3, operators already must provide underground coal miners the opportunity for chest x-rays at the frequencies noted above. For underground coal mines, the only additional costs due to proposed §§ 72.100 (a), (b), and (c) would be for the spirometry examination.

Approximately 20 percent of miners at underground miners take the chest x-rays that are currently being offered. MSHA assumes that the same percentage of miners at underground mines would take the spirometry examination and that the same percentage of miners at surface mines would take both the chest x-ray and spirometry examinations. (This is a conservative estimate. Since this rate of pneumoconiosis is considerably lower for surface miners than for underground miners, it is likely that the percentage of surface miners who would choose to take the examinations would be lower.) Since these examinations must be offered once every 5 years, MSHA estimates that on average 4% of currently employed miners would take the examinations every year (i.e., 20% taking the exam/ 5 years).

MSHA used turnover rates of 6 percent in underground coal and 3 percent in surface coal to estimate the number of new miners who would have to take the initial examinations. MSHA assumed that 20% of this group of miners would take the follow-up examinations. Since follow-up examinations would be offered every 3 years, this represents an average of 0.4% of miners in underground mines and 0.2% of miners in surface mines taking follow-up examinations each year.

MSHA estimates that each year 10.4 percent of miners in underground coal mines (4% representing current miners, 6% representing newly-hired miners and 0.4% representing newly-hired miners taking follow-up examinations) would take both

examinations each year. MSHA estimates that each year 7.2 percent of miners in surface coal mines (4% representing current miners, 3% representing newly hired miners and 0.2% representing newly hired miners taking follow-up examinations) would take both examinations each year.

MSHA estimates that 4,888 employed miners (including contractor employees) in underground coal mines would take the spirometry examination each year: 230 in underground mines with 1-19 employees (2,214 current miners x 0.104); 3,581 in mines with 20-500 employees (34,430 current miners x 0.104); and 1,077 miners in mines with 501+ employees (10,360 current miners x 0.104). MSHA also estimates that 4,036 currently employed miners at surface coal mines would take the x-ray and spirometry examinations each year: 968 miners at mines with 1-19 employees (13,448 current miners x 0.072), 2,698 miners at mines with 20-500 employees (37,478 current miners x 0.072); and 370 miners at surface mines with 501+ employees (5,141 current miners x 0.072).

The estimated annual costs for x-ray and spirometry examinations under proposed §§ 72.100 (a), (b) and (c) would be $716,000, of which $171,000 is for underground coal and $545,000 is for surface coal. Costs for each mine size are shown below:

Underground operators:

- $8,050 for mines with 1-19 employees (230 miners x $35 for spirometry examination);
- $125,335 for mines with 20-500 employees (3,581 miners x $35 for spirometry examination); and
- $37,695 for mines with 501+ employees + 1,077 miners x $35 for spirometry examination).

Surface operators:

- $130,680 for mines with 1-19 employees (968 miners x ($100 for chest x-ray +$35 for spirometry examination));
- $364,230 for mines with 20-500 employees (2,698 miners x ($100 for chest x-ray +$35 for spirometry examination)); and
- $49,950 for mines with 501+ employees (370 miners x ($100 for chest x-ray +$35 for spirometry examination)).

Proposed § 72.100 (d) would require each coal mine operator to develop and submit to the Secretary of Health and Human Services a roster and plan for providing miners with the required x-rays and spirometry examinations. Proposed § 72.100(e) would required to post the approved plan on the mine bulletin board.

Under 42 CFR 37.4, each operator of an underground coal mine is already required to submit to NIOSH a roster and plan for providing miners with the required chest x-rays and to post it on the mine bulletin board. MSHA assumes that, in the first year of the proposed rule, underground coal mine operators would simply revise the existing roster and plans for chest x-rays to add spirometry testing. In an underground coal mine, MSHA estimates that it would take a supervisor, earning $84.70 an hour, ten minutes (0.167 hours) to revise the roster and plan and a clerical employee, earning

$26.00 an hour, five minutes (0.0833 hours) to copy and submit the revised roster and plan. It would also cost $0.30 to copy two pages.

Each surface coal mine operator would have to develop and submit to NIOSH a roster and plan for providing both x-ray and spirometry examinations. In a surface coal mine, MSHA estimates that it would take a supervisor earning $69.98 per hour, one hour to develop the roster and plan and a clerical employee, earning $25.45 an hour, 5 minutes (0.083 hours) to copy and submit the roster and plan. It would also cost $0.30 to copy 2 pages.

The estimated first year costs under proposed §§ 72.100 (d) and (e) would be $88,300, of which $7,000 is for underground coal and $81,300 is for surface coal. Costs for each mine size are shown below:

Underground operators:

- $1,345 for mines with 1-19 employees [81 revised plans x (($84.70 hourly wage x 0.167 hrs.) + ($26 hourly wage x 0.0833 hrs.) + $0.30 for copying)];
- $5,498 for mines with 20-500 employees [331 revised plans x (($84.70 hourly wage x 0.167 hrs.) + ($26 hourly wage x 0.0833 hrs.) + $0.30 for copying)]; and
- $199 for mines with 501+ employees [12 revised plans x (($84.70 hourly wage x 0.167 hrs.) + ($26 hourly wage x 0.0833 hrs.) for labor + $0.30 for copying)].

Surface operators:

- $44,888 for mines with 1-19 employees [620 plans x (($69.98 hourly wage x 1 hr.) + ($25.45 hourly wage x 0.0833 hrs.) + $0.30 for copying)];
- $35,548 for mines with 20-500 employees [491 plans x (($69.98 hourly wage x 1 hr.) + ($25.45 hourly wage x 0.0833 hr.) + $0.30 for copying)]; and
- $869 for mines with 501+ employees [12 plans x (($69.98 hourly wage x 1 hr.) + ($25.45 hourly wage x 0.0833 hrs.) + $0.30 for copying)].

First year costs were amortized over 10 years by multiplying them by an annualization factor of 0.142 based on 7 percent to arrive at an annualized cost of $12,500, of which $1,000 is for underground coal mines and $11,500 is for surface coal mines.

Since the x-ray and spirometry examinations must be provided at least once every 5 years, MSHA assumes that each year one fifth of the mines would have to revise a plan to specify the 6 month period and the NIOSH approval facility for the examinations. MSHA estimates that it would take a supervisor, earning $84.70 an hour in an underground coal mine or $69.98 an hour in a surface coal mine, ten minutes (0.167 hours) to revise the plan and a clerical employee, earning $26.00 an hour in an underground coal mine or $25.45 an hour in a surface coal mine, five minutes (0.0833 hours) to copy and submit the revised plan and that it would cost $0.30 to copy each plan. The estimated annual costs would be $4,600, of which $1,400 is for underground coal and $3,200 is for surface coal mines. Costs for each mine size are shown below:

Underground operators:

- $266 for mines with 1-19 employees [16 mines x (($84.70 hourly wage x 0.167 hrs.) + ($26 hourly wage x 0.0833 hrs.) + $.30 for copying)];

- $1,096 for mines with 20-500 employees [66 mines x (($84.70 hourly wage x 0.167 hrs.) + ($26 hourly wage x 0.0833 hrs.) + $.30 for copying)]; and
- $33 for mines with 501+ employees [2 mines x (($84.70 hourly wage x 0.167 hrs.) + ($26 hourly wage x 0.0833 hrs.) + $.30 for copying)].

Surface operators:

- $1,749 for mines with 1-19 employees [124 mines x (($69.98 hourly wage x 0.167 hrs.) + ($25.45 hourly wage x 0.0833 hrs.) + $.30 for copying)];
- $1,383 for mines with 20-500 employees [98 mines x (($69.98 hourly wage x 0.167 hrs.) + ($25.45 hourly wage x 0.0833 hrs.) + $.30 for copying)]; and
- $28 for mines with 501+ employees [2 mines x (($69.98 hourly wage x 0.167 hrs.) + ($25.45 hourly wage x 0.0833 hrs.) + $.30 for copying)].

Table V-33 shows, by mine size, that for proposed § 72.100 first year costs related to X-ray and spirometry examinations would be approximately $179,500 for underground coal mine operators and $629,500 for surface coal mine operators.

Table V-33: First Year Costs for Periodic Examinations

Requirement	1-19	20-500	501+	Total
Underground Coal Operators				
Periodic Examinations	$8,100	$125,300	$37,700	$171,100
Develop Plans	$1,300	$5,500	$200	$7,000
Revise Plans	$270	$1,100	$40	$1,400
Total	$9,670	$131,900	$37,940	$179,500
Surface Coal Operators				
Periodic Examinations	$130,700	$364,300	$50,000	$545,000
Develop Plans	$44,900	$35,500	$900	$81,300
Revise Plans	$1,750	$1,390	$30	$3,200
Total	$177,350	$401,190	$50,930	$629,500

First Year Costs = First Year Costs + Annual Costs

Table V-34 shows, by mine size, that for proposed § 72.100 annualized costs related to X-ray and spirometry examinations would be approximately $173,500 for underground coal mine operators and $559,700 for surface coal mine operators.

Table V-34: Annualized Costs for Periodic Examinations

Requirement	1-19	20-500	501+	Total
Underground Coal Operators				
Periodic Examinations	$8,100	$125,300	$37,700	$171,100

Develop Plans	$190	$780	$30	$1,000
Revise Plans	$270	$1,100	$40	$1,410
Total	$8,560	$127,180	$37,770	$173,510
Surface Coal Operators				
Periodic Examinations	$130,700	$364,300	$50,000	$545,000
Develop Plans	$6,400	$5,000	$100	$11,500
Revise Plans	$1,750	$1,390	$30	$3,170
Total	$138,850	$370,690	$50,130	$559,670

Annualized Costs = Annualized First Year Costs + Annual Costs

Respiratory Training

Proposed § 72.700 Equipment; Respirable Dust

Proposed § 72.700(a) would require operators to maintain an adequate supply of respiratory equipment. The proposal would expand the existing standard's scope of coverage to include miners at surface mines and Part 90 miners.

The requirement under existing § 70.300 requires underground mine operators to maintain a supply of respiratory equipment adequate to deal with occurrences of concentrations of respirable dust in the mine atmosphere in excess of the applicable standard. Therefore, there are no additional costs for underground mine operators.

MSHA expects that surface coal mine operators already have an adequate supply of respirators and would not need to purchase additional ones as a result of the proposed rule. Some operators of surface coal mines also operate underground coal mines where there is a history of respirator use. These operators routinely provide respirators at both their underground and surface coal mines. In addition, surface coal mine operators consider it a good work practice to provide respirators to miners when necessary. Having respirators on hand to provide to miners is viewed by operators as part of a comprehensive plan that increases the protection of miner against job-related health hazards while at the same time minimizing operator workers' compensation cost premiums from health insurance providers. Therefore, MSHA assumes that there are also no additional costs for surface mine operators to purchase respirators.

Proposed § 72.700 (b) would require coal mine operators to provide training on the care, fit, use and limitations of each type of respirator to miners who would have respirators made available to them under proposed § 72.700 (a) unless the miner received training on the types of available respirators within the previous 12 months. MSHA has determined that three groups of miners would be offered respiratory protection - miners in MMUs, miners in outby DAs and miners in DWPs on the surface.

MSHA estimates that training would take fifteen minutes (0.25 hours) and be given by a supervisor, earning $84.70 an hour in an underground coal mine or $69.98 an hour in a surface mine. The average miner wage is $35.30 in underground coal and $31.84 in surface coal mines.

For miners in MMUs and Part 90 miners, proposed §§ 70.207(g)(1), 70.208(f)(1), 90.208(e)(1), and 90.209(e)(1) would require that respiratory protection be made available whenever a single-shift equivalent concentration measurement meets or exceeds the applicable ECV, or a weekly accumulated exposure exceeds the weekly permissible accumulated exposure. Proposed §§ 70.207(i)(1), 70.208(g)(1), 90.208(g)(1), and 90.209(f)(1) would require that respiratory protection be made available whenever a single-shift equivalent concentration measurement exceeds the applicable standard and is below the applicable ECV. Based upon the estimates of the citations present above and the assumption that an additional 5 percent of samples would exceed the applicable standards and be below the applicable ECVs, most mines would have at least one sample exceeding the applicable standard each year.

In order to reduce the possibility of disrupting production because a trainer was not available to provide the required respiratory protection training, MSHA expects that underground mine operators would provide respiratory protection training each year during regularly scheduled training sessions rather than wait to train the miners until after a sample exceeded the applicable standard. MSHA assumes that the training would be conducted in groups so that all miners at the same MMU on the same shift receive training at the same time including the Part 90 miners and miners working in the outby DAs. In the calculations below, the number of training sessions equals the number of shifts estimated earlier. There are typically 6 miners working at each MMU per shift. MSHA multiplied the number of shifts by 6.1, rather than 6, to account for underground coal miners who are not working on MMUs but still would require the training. Therefore, MSHA estimates that the number of underground coal miners to train are: 567 trainees in mines with 1-19 employees (93 sessions x 6.1 trainees per session); 8,815 trainees in mines with 20-500 employees (1,445 sessions x 6.1 trainees per session) and; 1,665 trainees in mines with 501+ employees (273 sessions x 6.1 trainees).

Respiratory protection would be required to be made available in a DA under proposed § 70.209(e)(1) when a citation is issued, and under proposed § 70.209(g)(1) when the equivalent concentration measurement exceeds the applicable standard but is less than the applicable ECV, thereby triggering the requirements of proposed § 72.700(b). To simplify the calculations, MSHA added 0.1 to the number of miners at each MMU in order to account for miners in outby DAs and Part 90 miners who require training. (The number of miners at the outby DAs averages slightly more than one while the estimated number of violations projected at the outby DAs is less than one-tenth the number of MMUs. There are fewer than 50 Part 90 mines.)

Proposed § 71.207(k)(1) would require that respiratory protection be made available whenever a citation is issued for exceeding the applicable standard, thereby triggering the requirements of proposed § 72.700 (b). For surface mines, the number of miners needing training due to a violation of the standard would equal the estimated number of violations projected for the DWPs. MSHA increased this estimate by 5 percent to account for the times when the result of a sample exceeded the standard but did not exceed the ECV. The number of miners to be trained in surface coal mines would vary according to the estimated number of violations, which would be different in the first year, second year, and third year, before reaching a steady level in the fourth year. MSHA estimated the cost of respirator training in each year over a 10-year period.

The estimated annualized costs for respirator training under proposed § 72.700 (b) would be $137,000. This figure consists of an annual cost of $136,000 for underground coal and an annualized cost of $907 for surface coal. In surface coal, the total costs for respirator training under proposed § 72.700 (b) would be $2,000 in the first year, $1,600 in the second year, and $1,000 in the third year and $440 in the fourth year and each year thereafter.

Annual Costs for Underground Operators:

- $6,973 for mines with 1-19 employees [(567 trainees x $35.30 hourly wage rate x 0.25 hrs. for training) + (93 sessions x $84.70 hourly wage rate x 0.25 hrs. of instructor time)];
- $108,390 for mines with 20-500 employees [(8,815 trainees x $35.30 hourly wage rate x 0.25 hrs. for training) + (1,445 sessions x $84.70 hourly wage rate x 0.25 hrs. of instructor time)]; and
- $20,474 for mines with 501+ employees [(1,665 trainees x $35.30 hourly wage rate x 0.25 hrs. for training) + (273 sessions x $84.70 hourly wage rate x 0.25 hrs. of instructor time)].

Costs for Surface Operators

First Year:

- $1,018 for mines with 1-19 employees [40 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))];
- $866 for mines with 20-500 employees [34 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))]; and
- $153 for mines with 501+ employees [6 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))].

Second year:

- $815 for mines with 1-19 employees [32 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))];
- $662 for mines with 20-500 employees [26 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))]; and
- $102 for mines with 501+ employees [4 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))].

Third year:

- $484 for mines with 1-19 employees [19 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))];
- $407 for mines with 20-500 employees [16 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))]; and
- $76 for mines with 501+ employees [3 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))].

Each year thereafter:

- $229 for mines with 1-19 employees [9 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))];
- $178 for mines with 20-500 employees [7 trainees x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))]; and
- $26 for mines with 501+ employees [1 trainee x (($31.84 hourly wage rate x 0.25 hrs. for training) + ($69.98 hourly wage rate x 0.25 hrs. for instructors' time))].

MSHA discounted the stream of training costs over 10 years based on a 7% discount rate to arrive at an estimated net present value of $6,385. MSHA then amortized these costs over 10 years by multiplying by an annualization factor of 0.142 based on a 7 percent discount rate to arrive at an annualized cost of $907.

Proposed § 72.700 (c) would require coal mine operators to keep a record of respirator training for two years after completion of the respirator training. This record may be kept elsewhere if the record is immediately available at the mine site by electronic transmission.

MSHA estimates that it would take a clerical employee, earning $26.00 an hour in an underground coal mine or $25.45 an hour in a surface mine, thirty seconds (0.00833 hours) per trainee to make a record of respirator training. The estimated annualized costs for recordkeeping under proposed § 72.700(c) would be $2,462. This figure consists of an annual cost of $2,393 for underground coal and an annualized cost of $8 for surface coal. In surface coal, the total costs for recordkeeping under proposed § 72.700 (c) would be $28 in the first year, $48 in the second year, and $73 in the third year and in each year thereafter. Costs for each mine size are shown below:

Annual Costs for Underground Operators:

- $123 for mines with 1-19 employees (567 trainees x $26 hourly wage rate x 0.00833 hrs. for clerical labor);

- $1,909 for mines with 20-500 employees (8,815 trainees x $26 hourly wage rate x 0.00833 hrs. for clerical labor); and,
- $361 for mines with 501+ employees ((1,665 x $26 hourly wage rate x 0.00833 hrs. for clerical labor).

Costs for Surface Operators

First year:

- $9 for mines with 1-19 employees (40 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor);
- $7 for mines with 20-500 employees (34 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor); and,
- $1 for mines with 501+ employees (6 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor).

Second year:

- $7 for mines with 1-19 employees (32 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor);
- $6 for mines with 20-500 employees (26 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor); and,
- $1 for mines with 501+ employees (4 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor).

Third year:

- $4 for mines with 1-19 employees (19 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor);
- $3 for mines with 20-500 employees (16 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor); and,
- $1 for mines with 501+ employees (3 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor).

Each year thereafter:

- $2 for mines with 1-19 employees (9 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor);
- $2 for mines with 20-500 employees (7 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor); and,
- $1 for mines with 501+ employees (1 trainees x $25.45 hourly wage rate x 0.00833 hrs. for clerical labor).

MSHA discounted the stream of training costs over 10 years using a 7% annual rate to arrive at an estimated net present value of $ 55. MSHA then amortized these costs

over 10 years by multiplying by an annualization factor of 0.142 based on 7 percent to arrive at an annualized cost of $8.

Table V-35 shows, by mine size, that the first year costs for respiratory training and recordkeeping would be approximately $138,000 for underground coal mine operators and $6,000 for surface coal mine operators.

Table V-35: First Year Cost for Respiratory Training

Requirement	1-19	20-500	501+	Total
Underground Coal Operators				
Respiratory Training	$6,980	$108,390	$20,480	$135,850
Recordkeeping	$120	$1,910	$360	$2,390
Total	$7,100	$110,300	$20,840	$138,240
Surface Coal Operators				
Respiratory Training	$3,270	$2,670	$450	$6,390
Recordkeeping	$30	$20	$0	$50
Total	$3,300	$2,690	$450	$6,440

First Year Costs = First Year Costs + Annual Costs

Table V-36: shows, by mine size, that the annualized costs for respiratory training and recordkeeping would be approximately $138,000 for underground coal mine operators and $900 for surface coal mine operators.

Table V-36: Annualized Cost for Respiratory Training

Requirement	1-19	20-500	501+	Total
Underground Coal Operators				
Respiratory Training	$6,980	$108,390	$20,480	$135,850
Recordkeeping	$120	$1,910	$360	$2,390
Total	$7,100	$110,300	$20,840	$138,240
Surface Coal Operators				
Respiratory Training	$460	$380	$60	$900
Recordkeeping	$10	$10	$10	$30
Total	$470	$390	$70	$930

Annualized Costs = Annualized First Year Costs + Annual Costs

Expansion of Part 90 Option to Surface Mines

CPDM Costs for Surface Mines

Proposed Part 71 does not have a requirement for surface mine operators to use the CPDM. Therefore, monitoring coal miners working at surface mines with the CPDM would be voluntary. Since monitoring with the CPDM is more expensive than

monitoring with the gravimetric sampler, MSHA does not expect surface mine operators to use CPDMs to sample unless they have Part 90 miners who are required to use the CPDM.

Proposed § 90.1 Scope

Proposed § 90.1 would expand the scope of the Part 90 option to include miners employed at surface coal mines. The current scope is limited to miners employed at underground coal mines or at surface areas of underground coal mines.

Under the proposed rule, miners who exercise their Part 90 option must be transferred to an area of a mine where the average concentration of respirable dust in the mine atmosphere during each shift to which that miner is exposed is continuously maintained at or below 0.5 mg/m^3. Based upon the historical monitoring data collected from surface mines presented previously in the technological feasibility analysis, MSHA has determined that there are numerous areas at surface mines that meet this standard. Therefore, the costs associated with transferring the miners who exercise the Part 90 option should be de minimis.

However, proposed § 90.201 would require that operators sample the concentration of respirable coal mine dust in the working environment of each Part 90 miner. For 12 months after the effective date of the rule, the sampling can be done with the gravimetric sampler. Beginning in the second year, the sampling must be done with the CPDM.

Most of the costs of using the gravimetric sampler (training the certified persons, purchasing the samplers, etc.) have already been estimated above. The only additional costs for using the gravimetric sampler to monitor Part 90 miners would result from proposed § 90.208(a) which would require that 5 samples be taken each quarter.

The costs of using the CPDM to monitor Part 90 miners working on the surface were not previously estimated. These costs are estimated below.

Miners Who Would Exercise their Part 90 Option

Since MSHA has no experience with offering the Part 90 option to miners at surface coal mines, there are no historical data upon which to estimate the number of miners at surface coal mines who would exercise their Part 90 option.

According to historical data from NIOSH's miner x-ray programs (e.g., Miners' Choice and the Coal Workers' X-ray Surveillance Program), 1,264 of the 32,250 surface miners examined (about 3.9 percent) showed evidence of pneumoconiosis. MSHA does not expect all of these miners to exercise their Part 90 option. Currently there are only 66 Part 90 miners. The NIOSH data indicate that 19,148 of the 224,131 miners at underground mines examined (about 8.5 percent) showed evidence of pneumoconiosis. Based upon this percentage, approximately 3,427 miners (8.5% of 40,319 underground miners) are eligible for the Part 90 option. So, most miners who qualify do not exercise their option. However, to account for the likelihood that surface miners would exercise their Part 90 option at greater rates than underground miners are currently doing (e.g., underground miners exercised their Part 90 option at greater rates when the Part 90

option was first made available), MSHA assumes that 200 surface miners (three times the number of underground miners) would exercise their Part 90 option.

Costs of Expanding the Scope of Part 90 Program to Cover Surface Miners

In order to exercise their Part 90 option, miners must have evidence of the development of pneumoconiosis. Under proposed § 72.100, mine operators must provide miners with the option to be tested once every five years. Since surface operators are not currently required to provide this testing, MSHA assumes that no new miners would exercise their option for at least the first year, while the NIOSH medical surveillance plans are developed, the miners are tested, the results are reviewed, etc. Therefore, MSHA has not estimated any costs for Part 90 miners in the first year related to the use of the gravimetric sampler, which is phased out 12 months after the effective date of the final rule. MSHA also assumes that 200 surface miners would exercise their Part 90 option in the second year and that the costs related to the use of the CPDM would start at the beginning of the second year. Finally, MSHA assumed that no surface miner who begins work at a coal mine for the first time would suffer from pneumoconiosis, a necessary condition to exercise the Part 90 option. MSHA believes that the estimate of 200 surface miners exercising their Part 90 option probably overstates the costs because many surface operators may not offer to provide testing for their existing workforce until the fourth year after the effective date of the final rule.

Costs to Certify Persons to Perform Sampling and Maintenance and Calibration (M&C)

Proposed § 90.202(b) would retain the existing requirement that candidates for certification pass an MSHA examination to demonstrate competency in respirable dust sampling procedures. To ensure consistent administration of the certification process, however, the proposal would add a new requirement that candidates complete an MSHA course of instruction prior to certification. Proposed § 90.203(b) requires that persons complete an MSHA course of instruction and pass an MSHA examination to become certified to maintain and calibrate approved sampling devices. Like the certification to perform sampling, MSHA would provide both courses at no charge; however, persons becoming certified for both sampling and maintenance and calibration would travel to either an MSHA district or field office to take the courses.

MSHA assumed that surface mines would only certify persons to perform sampling using the gravimetric sampler if they had Part 90 miners. Based on the worst-case assumption that all 200 Part 90 miners were employed at different mines, MSHA estimates that 200 persons would have to be certified on the CPDM. MSHA assumes that these 200 persons would become certified to both sample with and maintain the CPDM.

MSHA estimates that it would take a person 9 hours for the CPDM course and examination on sampling (7 hours for the course, 1 hour for the examination and 1 hour to travel to and from the course site) and 9 hours for the CPDM course and examination on maintenance and calibration (7 hours for the course, 1 hour for the examination and 1 hour to travel to and from the course site). MSHA also expects that each person would

require $100 in travel expenses. Therefore, the estimated costs to certify each person would be $615.88 ($28.66 per hour x 18 hours + $100). MSHA applied a discounted factor of 0.934 based on 7 percent to the second-year costs to bring them forward one year. MSHA estimates the cost to certify 200 persons would be $115,046: $17,255 in mines with 1-19 employees (30 persons x $615.88 per certification x 0.934); $85,191 in mines with 20-500 employees (148 persons x $615.88 per certification x 0.934); and $12,600 in mines with 501+ employees (22 persons x $615.88 per certification x 0.934). The first year costs were then amortized over 10 years by applying an annualization factor of 0.142 based on 7 percent to arrive at annualized cost of approximately $16,336.

Turnover Costs Related to Certifying Persons

Based upon a turnover rate of 3 percent, MSHA estimates that an additional 6 persons (200 x 0.03) would have to be certified each year. This would result in an estimated annual cost of $3,695; $616 in mines with 1-19 employees (1 person x $615.88 per certification), $2,464 in mines with 20-500 employees (4 persons x $615.88 per certification), and $616 in mines with 501+ employees (1 person x $615.88 per certification).

Costs for Persons to Take Examinations to Maintain the Certifications

Proposed §§ 90.202(c) and 90.203(c) would require certified persons to pass the MSHA examinations demonstrating competency in sampling procedures or maintenance and calibration procedures every three years to maintain their certifications. Persons that fail the examination must retake the course and pass the examination to become recertified.

As was done previously, MSHA made the simplifying assumption that one-third of the certified persons would take the re-certification examination each year. MSHA estimates that 66 persons (200 x 0.33) would have to take the examination each year. MSHA adjusted this by 10% to account for some persons failing an examination and having to retake it. Therefore, MSHA estimates that 73 persons would take the examination each year (66 x 1.1).

MSHA estimates that it would take 1 hour for the CPDM examination on sampling, 1 hour for CPDM examination on maintenance and calibration, and 1 hour to travel to and from the site where the examination is given. MSHA assumes that travel costs would be $50. Therefore, the estimated cost of the examinations is $136 (3 hours x $28.66 per hour + $50). This would result in estimated annual costs of $9,928: $1,496 in mines with 1-19 employees (11 persons x $136 per certification); $7,344 in mines with 20-500 employees (54 persons x $136 per certification); and $1,088 in mines with 501+ employees (8 persons x $136 per certification).

Revoking a Person's Certification

Proposed § 90.202(d) and 90.203(d) would provide that MSHA may revoke a person's certification for failing to pass the MSHA examination or failing to properly

carry out required sampling or maintenance and calibration procedures, as appropriate. MSHA included the additional persons needing retraining in the estimates presented above. The persons who fail a certification examination were included in the failure rates used for the re-certification estimates, and substitute persons requiring certifications were included in the turnover rates used for the new certification estimates. Therefore, no additional costs were estimated for this provision.

Costs to Develop and Submit CPDM Plans to MSHA for Approval

Proposed § 71.206(a) would require operators to develop and submit CPDM Performance Plans (Plan) to MSHA for approval prior to using CPDMs. However, MSHA assumes that no CPDM plans would be developed by surface coal mines unless they have Part 90 miners. Proposed § 90.206(b) would require operators who use CPDMs to develop and submit for approval a Plan prior to using them. The proposal specifies the information that would be required to be contained in the Plan and would establish Plan approval procedures. Each of the estimated 200 surface mines with Part 90 miners would need a Plan. MSHA increased this estimate by 10 percent to account for some plans having to be resubmitted for MSHA approval.

MSHA estimates that it would take a supervisor 4 hours to develop a proposed Plan and a clerical employee 15 minutes (0.25 hours) to copy and submit it for approval. MSHA estimate that copy and postage costs are $1.60 [(4 pgs. x $0.15) + $1 postage]. The average cost of developing and submitting a plan is $287.88 (4 x $69.98 + .25 x $25.45 + $1.60). MSHA applied a discounted factor of 0.934 based on 7 percent to the second-year costs bring them forward one year. This would result in estimated costs of $59,154: $8,872 in mines with 1-19 employees (33 mines x $287.88 per plan x 0.934); $43,804 in mines with 20-500 employees (163 mines x $287.88 per plan x 0.934); and $6,478 in mines with 501+ employees (24 mines x $287.88 per plan x 0.934).

The first year costs were then amortized over a 10 year life by applying an annualization factor of 0.142 based on 7 percent to arrive at annualized cost of approximately $8,400.

Costs of CPDM Training for Miners Expected to Use a CPDM

Proposed § 90.201(h) would require that CPDM training be provided to all Part 90 miners. The training shall be completed prior to a miner being required to wear a CPDM and repeated every 12 months thereafter. The training would include: 1) explaining the basic features and capabilities of the CPDM; 2) how to setup the CPDM for compliance sampling; 3) a discussion of the various types of information displayed by the CPDM and how to access that information; 4) how to start and stop a short-term sample run during compliance sampling; and 5) the importance of continuously monitoring dust concentrations and properly wearing the CPDM.

MSHA estimates that it would take the person certified in sampling with a CPDM, earning $28.66 per hour approximately 30 minutes (0.5 hours) to train each Part 90 miner, earning $ 31.84 per hour, on the CPDM. The cost of training each Part 90 miner would be $30.35 ($28.66 per hour x 0.5 hours + $31.84 per hour x 0.5 hours).

MSHA estimates the cost of training the 200 Part 90 miners at surface mines and facilities to be $6,050 per year: $907 for mines with 1-19 employees (30 miners x $30.35 per training session); $4,477 in mines with 20-500 employees (148 miners x $30.35 per training session); and $666 in mines with 501+ employees (22 miners x $30.35 per training session).

Costs of Records for CPDM Training

Proposed § 90.201(i) would require coal mine operators keep a record of miners who receive CPDM training. MSHA estimates that it would take a clerical employee 0.00833 hours (30 seconds) to make a record of each Part 90 miner who received CPDM training. The annual costs to make records for the 200 Part 90 miners receiving CPDM training would be approximately $42: $6 in mines with 1-19 employees (30 miners x 0.00833 hrs. x $25.45 hourly wage rate); $31 in mines with 20-500 employees (148 miners x 0.00833 hrs. x $25.45 hourly wage rate); and $5 in mines with 501+ employees (22 miners x 0.00833 hrs. x $25.45 hourly wage rate).

Costs to Provide Copies of Approved CPDM Plans to Part 90 Miners

Proposed § 90.206(d) would require that the Part 90 miners be given a copy of the approved CPDM plan and revisions. MSHA estimates that a clerical employee would take 5 minutes (0.083 hours) to copy and provide the plan to a Part 90 miner. Copy costs are the same as determined above, $1.60. The cost of providing the Part 90 miner with a copy of a plan is $7.96 (.25 x $25.45 + $1.60). MSHA applied a discounted factor of 0.934 based on 7 percent to the second-year costs bring them forward one year. This would result in estimated costs of $1,486: $223 in mines with 1-19 employees (30 plans x $7.96 per plan x 0.934); $1,100 in mines with 20-500 employees (148 mines x $7.96 per plan x 0.934): and $163 in mines with 501+ employees (22 plans x $7.96 per plan x 0.934). The first year costs were then amortized over a 10-year life by applying an annualization factor of 0.142 based on 7 percent to arrive at annualized cost of approximately $211.

Contents of CPDM Plan

Proposed § 90.206(c) specifies the information that would be required in CPDM Performance Plans. There are no additional costs associated with this requirement because the costs of addressing this requirement were already determined above when deriving the cost to develop and submit CPDM plans to MSHA for approval.

Costs of Revising Approved CPDM Plans

Costs to Revise and Submit Revisions to Approved CPDM Plans

MSHA anticipates that revisions to approved CPDM plans would occur from situations that develop as a result of proposed §§ 90.206(b), 90.209(e)(4), and 90.209(f)(4). MSHA estimates that 25 percent of surface mines with Part 90 miners would make revisions to approved CPDM plans each year. MSHA estimates that a supervisor would take 15 minutes (0.25 hours) to revise an approved plan and a clerical

employee would take 15 minutes (0.25 hours) to copy and submit the revision. Copy and postage costs per revision would be $1.30 [(2 pgs. x $0.15) + $1 postage]. The average cost of revising a plan is $25.16 (.25 x $69.98 + .25 x $25.45 + $1.30). Since these costs would begin in the second year, MSHA applied a discount factor of 0.925 based on 7 percent to discount this stream of costs by one year. This would result in estimated costs of $1,164: $175 in mines with 1-19 employees (7.5 plans x $25.16 per plan x 0.925); $861 in mines with 20-500 employees (37 plans x $25.16 per plan x 0.925); and $128 in mines with 501+ employees (5.5 plans x $25.16 per plan x 0.925).

Cost to Provide the Part 90 Miners with a Copy of the Revised CPDM Plans

Proposed § 90.206(d) would require operators to provide the Part 90 miners with a copy of the plan and revisions. On average, MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to copy and provide the revised plan to the Part 90 miners. Copy costs per revision would be $0.30 (2 pgs. x $0.15). There are no postage costs as the Part 90 miners are expected to be at the mine. The average cost of providing a plan is $6.66 (.25 x $25.45 + $0.30). Since these costs would begin in the second year, MSHA applied a factor of 0.925 based on 7 percent to discount this stream of costs by one year. This would result in estimated costs of $307: $46 in mines with 1-19 employees (7 plans x $6.66 per plan x 0.925); $228 in mines with 20-500 employees (37 plans x $6.66 per plan x 0.925); and $33 in mines with 501+ employees (5 plans x $6.66 per plan 0.925).

Costs Incurred When Using a CPDM to Sample

Costs to Purchase Equipment When Using a CPDM to Sample

Proposed § 90.201(a) would require that beginning 12 months after the effective date of the rule Part 90 miners be sampled with a CPDM. Operators would have to purchase the CPDM units as well as related equipment to transmit to MSHA on a weekly basis all daily sample and error data file information (proposed § 90.210(f)). The estimated 200 surface mines using the CPDM to sample Part 90 miners would need to purchase a computer and printer (including ink and paper) to handle the information generated by the CPDM at an estimated $1,000 per mine. These mines would also have to purchase a flow meter at an estimated cost of $1,700. MSHA estimates a 5 year service life for the computer, printer and flow meter. Since these costs would begin in the second year, MSHA applied a discount factor of 0.934 based on 7 percent to calculate the present value (first year costs) of purchasing the equipment in the second year. This would result in estimated costs of $504,360: $75,654 in mines with 1-19 employees (30 mines x $2,700 per mine x 0.934); $373,226 in mines with 20-500 employees (148 mines x $2,700 per mine x 0.934); and $55,480 in mines with 501+ employees (24 mines x $2,700 per mine). The first year costs were then amortized over a 5-year life by applying an annualization factor of 0.244 based on a 7 percent discount rate to arrive at annualized costs of $123,064.

Cost to Purchase CPDMs (including Warranty)

Proposed § 90.209(a)(1) would require operators to use a CPDM to sample the work environment of each Part 90 miner each shift beginning 12 months after the effective date of the standard. MSHA estimates an average cost of $10,000 per CPDM. MSHA expects that a 5-year warranty would be purchased at a cost of $2,875 with each CPDM sold and that the service life of a CPDM would be 5 years. In addition, MSHA increased the cost estimate by 10% in order to account for the cost of spares or leased units needed for the occasions when the CPDMs are not operating. Since these costs would begin in the second year, MSHA applied a discount factor of 0.934 based on 7 percent to calculate the present value (first year costs) of purchasing the CPDMs in the second year. This would result in estimated costs of $2,645,555: $369,833 in mines with 1-19 employees (30 miners x $14,163 per miner x 0.934); $1,957,711 in mines with 20-500 employees (148 miners x $14,163 per miner x 0.934); and $291,011 in mines with 501+ employees (22 miners x $14,163 per miner x 0.934). The first year costs were then amortized over a 5 -year service life by applying an annualization factor of 0.244 based on a 7 percent discount rate to arrive at annualized costs $645,516.

Cost for CPDM Filters

A new CPDM filter is needed for each CPDM used on every shift sampled. MSHA assumes that each Part 90 miner would require 250 filters per year (5 days per week x 50 weeks). Since these costs would begin in the second year, MSHA applied a factor of 0.925 to discount this stream of costs by one year. This would result in estimated costs of $254,375: $38,156 in mines with 1-19 employees (30 miners x $5.50 per filter x 250 filters per miner x 0.925); $188,238 in mines with 20-500 employees (148 miners x $5.50 per filter x 250 filters per miner x 0.925); and $27,981 in mines with 501+ employees (24 miners x $5.50 per filter x 250 filters per miner x 0.925).

Costs for CPDM Annual Maintenance

Proposed § 90.204(d) would require that when CPDMs are used, a person certified in sampling or in maintenance and calibration follow the examination, testing, and set-up procedures contained in the approved CPDM Performance Plan. According to the manufacturer's recommendations, the following maintenance must be performed on a CPDM each month: clean cyclone and inlet tubing; perform a sample line leak check; and perform a flow audit procedure.

MSHA estimates that monthly maintenance by a certified person earning $28.66 per hour would take 35 minutes to clean cyclone and inlet tubing; 5 minutes for sample line leak check; and 5 minutes for a flow audit (0.75 hours). The annual cost to perform monthly maintenance on a CPDM would be approximately $258 (12 mos. x 0.75 hrs. x $28.66 hourly wage rate). Also, a calibration audit must be performed on the CPDM once a year at a cost of approximately $29 (1 hr. for audit x $28.66 hourly wage rate).

There is also periodic maintenance for items on the CPDM unit that are not covered by the warranty and they may need to be replaced periodically. The manufacturer lists the following parts of the CPDM that are not covered by the warranty: auxiliary board; modified display; front and rear case assembly; PTO cable assembly; digital board; amplifier board; and cyclone assembly. During the warranty period, there is a

one-time free replacement of the pump assembly and battery pack. If these parts fail a second time, then the operator would absorb the costs of replacing these parts. Manufacturer costs for the items noted above range from $200 for a front case assembly to $1,300 for the LED cap lamp assembly. MSHA does not expect that each CPDM would need all of these items replaced annually. However, as these devices are deployed in the mining environment they would be damaged and replacement parts would be needed. MSHA projects $1,000 for annual replacement parts. MSHA estimates total annual maintenance costs for a CPDM would be approximately $1,287 ($258 + $29 + $1,000). Since these costs would begin in the second year, MSHA applied a factor of 0.925 based on a 7 percent discount rate to discount this stream of costs by one year.

This would result in estimated costs of $238,084: $35,712 in mines with 1-19 employees (30 miners x $1,287 per miner x 0.925); $176,182 in mines with 20-500 employees (148 miners x $1,287 per miner x 0.925); and $26,190 in mines with 501+ employees (24 miners x $1,287 per miner x 0.925).

Maintenance Cost on CPDM Performed Before Shift Begins

Based on manufacturer's recommendations, after the CPDM has been used on a shift and before it can be used again, the TEOM filter must be replaced and the grit pot, mass transducer area and sample lines must be cleaned. In addition, the CPDM has to be programmed before each shift on which it is used. MSHA estimates that it would take a certified person earning $28.66 per hour 15 minutes (0.25 hrs.) to perform the above tasks before every shift that a CPDM is used, which results in an estimated cost of $7.17 per use. Since these costs would begin in the second year, MSHA applied a factor of 0.925 based on 7 percent to discount this stream of costs by one year.

This before shift maintenance would result in estimated annual costs of $331,382: $49,708 in mines with 1-19 employees (30 miners x $7.17 per day x 250 days x 0.925); $245,222 in mines with 20-500 employees (148 miners x $7.17 per day x 250 days x 0.925); and $36,452 in mines with 501+ employees (22 miners x $7.17 per day x 250 days x 0.925).

Cost to Validate, Certify, and Transmit Electronically CPDM Data to MSHA

Proposed § 90.210(f) would require that, within 12 hours after the end of the last sampling shift of the work week, a designated mine official must validate, certify, and transmit electronically to MSHA all daily sample and error data file information collected during the previous calendar week and stored in the CPDM. The proposal would also require the operator to maintain all CPDM data files transmitted to MSHA for at least 12 months.

MSHA estimates that validating, certifying, and uploading the CPDM data from a CPDM to a computer and then transmitting it electronically to MSHA would take, a designated mine official earning a supervisory wage of $69.98, 6 minutes (0.1 hours) per week. Since these costs would begin in the second year, MSHA applied a factor of 0.925 based on 7 percent to discount this stream of costs by one year.

This would result in estimated costs of $64,732: $9,709 in mines with 1-19 employees (30 miners x $7.00 per week x 50 weeks x 0.925); $47,934 in mines with 20-500 employees (148 miners x $7.00 per week x 50 weeks x 0.925); and $7,089 in mines with 501+ employees (22 miners x $7.00 per week x 50 weeks x 0.925).

Cost to Validate, Certify and Provide CPDM Sampling Information to Part 90 Miners

Proposed § 90.211(c) would require operators to provide certain sampling information to Part 90 miners. The sampling results must include: the mine identification number; the location within the mine from which the samples were taken; the concentration of respirable dust for each valid sample; the total amount of exposure accumulated by the sampled occupation during the shift; the occupation code, where applicable; the reason for voiding a sample; the shift length; the Part 90 miner's MSHA Individual Identification Number (MIIN); and any other information required by the District Manager. This information is included on the printout from the CPDM, with the exception of the information concerning the shift length and the total amount of exposure accumulated by the sampled occupation during the shift. MSHA expects that the information not included on the CPDM printout would be written down on the printout.

Proposed § 90.201(f) would require the operator to make a record showing the length of each shift for each Part 90 miner, retain the records for at least six months, and make them available for inspection by authorized representatives of the Secretary and submit them to the District Manager when requested in writing.

A new CPDM filter is used every time a CPDM is used to sample and a printout is generated after the sample is taken. The number of printouts to be completed equals the number of CPDM filters used. MSHA estimates that a supervisor, earning $69.98 an hour, would take 3 minutes (0.05 hours) to perform the functions described above. MSHA also estimates it would cost $0.15 to make a copy of each printout. So the estimated cost per card is $3.65 ($69.98 x 0.05 + $0.15). Since these costs would begin in the second year, MSHA applied a factor of 0.925 based on 7 percent to discount this stream of costs by one year.

This would result in estimated costs of $168,767: $25,315 in mines with 1-19 employees (30 miners x $3.65 per card x 250 cards x 0.925); $124,887 in mines with 20-500 employees (148 miners x $3.65 per card x 250 cards x 0.925); and $18,565 in mines with 501+ employees (22 miners x $3.65 per card x 250 cards x 0.925).

Table V-37 shows that surface coal mine operators would incur approximately $4.3 million of first year costs related to using CPDMs to sample Part 90 miners.

Table V-37: Surface Coal Mine Operators' First Year Costs to Sample Part 90 Miners with CPDMs

Requirements	Mines with 1-19 Employees	Mines with 20-500 Employees	Mines with 501+ Employees	Totals
Surface Coal Operators				

Cost to Certify Persons	$17,260	$85,190	$12,600	$115,050
Turnover Cost of Certified Persons	$620	$2,460	$620	$3,700
Certified Persons Taking Exams for Certification	$1,500	$7,340	$1,090	$9,930
CPDM Training for Part 90 Miners	$910	$4,480	$670	$6,060
CPDM Training Records	$10	$30	$0	$40
Develop & Submit CPDM Plan for Approval	$8,870	$43,800	$6,480	$59,150
Provide CPDM Plan to Part 90 Miners	$220	$1,100	$160	$1,480
Revisions to CPDM Plan	$180	$860	$130	$1,170
Revisions of CPDM Plan to Miner	$50	$230	$30	$310
CPDM Related Equipment	$75,700	$373,200	$55,500	$504,400
CPDMs	$396,800	$1,957,700	$291,000	$2,645,500
CPDM Filters	$38,200	$188,200	$28,000	$254,400
CPDM Annual Maintenance	$35,700	$176,200	$26,200	$238,100
CPDM Before Shift Maintenance	$49,700	$245,200	$36,500	$331,400
Validate, Certify & Transmit CPDM Data	$9,700	$47,900	$7,100	$64,700
Validate, Certify & Provide Sample Data to Part 90 Miner	$25,300	$124,900	$18,600	$168,800
Totals	$643,460	$3,173,600	$472,080	$4,289,140

First Year Costs = First Year Costs + Annual Costs

Table V-38 shows, by mine size, that surface coal mine operators would incur approximately $1.9 million of annualized costs related to using CPDMs to sample Part 90 miners.

Table V-38: Surface Coal Mine Operators' Annualized Costs to Sample Part 90 Miners with CPDMs

Requirements	Mines with 1-19 Employees	Mines with 20-500 Employees	Mines with 501+ Employees	Totals
Surface Coal Operators				
Cost to Certify Persons	$2,500	$12,100	$1,800	$16,400
Turnover Cost of Certified Persons	$600	$2,500	$600	$3,700
Certified Persons Taking Exams for Certification	$1,500	$7,300	$1,100	$9,900
CPDM Training for Part 90 Miners	$910	$4,480	$670	$6,060
CPDM Training Records	$10	$30	$0	$40
Develop & Submit CPDM Plan for Approval	$1,300	$6,200	$900	$8,400

Provide CPDM Plan to Part 90 Miners	$30	$160	$20	$210
Revisions to CPDM Plan	$180	$860	$130	$1,170
Revisions of CPDM Plan to Miner	$50	$230	$30	$310
CPDM Related Equipment	$18,500	$91,100	$13,500	$123,100
CPDMs	$96,800	$477,700	$71,000	$645,500
CPDM Filters	$38,200	$188,200	$28,000	$254,400
CPDM Annual Maintenance	$35,700	$176,200	$26,200	$238,100
CPDM Before Shift Maintenance	$49,700	$245,200	$36,500	$331,400
Validate, Certify & Transmit CPDM Data	$9,700	$47,900	$7,100	$64,700
Validate, Certify & Provide Sample Data to Part 90 Miner	$25,300	$124,900	$18,600	$168,800
Totals	$278,480	$1,372,960	$204,350	$1,855,790

Annualized Costs = Annualized First Year Costs + Annual Costs

ECONOMIC FEASIBILITY

MSHA has traditionally used a revenue screening test—whether the annualized compliance costs of a regulation are less than 1 percent of revenues, or are negative (i.e., provide net cost savings)—to establish presumptively that compliance with the regulation is economically feasible for the mining industry. Based upon this test, MSHA has concluded that the requirements of the proposed rule are economically feasible. The annualized compliance costs of the proposed rule to underground coal mine operators are $35.6 to 39.7 million, which are approximately 0.2 percent of total annual revenue of $17 billion ($39.7 million / $17 billion) for all underground coal mines. The annualized compliance costs of the proposed rule to surface coal mine operators are $4.8 million, which are approximately 0.03 percent of total annual revenue of $16.6 billion ($4.8 million / $16.6 billion) for all surface coal mines. Since the estimated compliance costs for both underground and surface coal mines are below one percent of their estimated annual revenue, MSHA concludes that compliance with the provisions of the proposed rule would be economically feasible for the coal industry.

VI. 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 compliance cost impact of the proposed rule on small entities. Based on that analysis, MSHA certifies that the proposed rule would not have a significant economic impact on a substantial number of small entities in terms of compliance costs. 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 is required to use SBA's definition. The SBA defines a small entity in the mining industry as an establishment with 500 or fewer employees.

MSHA has also examined the impact of the proposed rule on mines with fewer than 20 employees, which MSHA and the mining community have traditionally referred to as "small mines." These small mines differ from larger mines not only in the number of employees, but also in economies of scale in material produced, in the type and amount of production equipment, and in supply inventory. Therefore, their costs of complying with MSHA's rules and the impact of the Agency's rules on them would also tend to be different. This analysis complies with the requirements of the RFA for an analysis of the impact on "small entities" while continuing MSHA's traditional definition of "small mines."

FACTUAL BASIS FOR CERTIFICATION

General Approach

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

Derivation of Costs and Revenues for Mines

The compliance costs noted in this chapter were previously presented in Chapter V of this document along with an explanation of how they were derived and the cost impact on mines, by size. Revenue for underground and surface coal mines is

derived from data on coal prices and tonnage. The 2008 price of coal was $51.35 per short ton for underground coal and $22.35 per short ton for surface coal.[6]

Total underground coal production in 2009 was approximately 5 million short tons for mines with 1-19 employees. Multiplying tons by the 2008 price per ton, 2009 underground coal revenue was $259 million for mines with 1-19 employees. Total underground coal production in 2009 was approximately 242 million short tons for mines with 1-500 employees. Multiplying tons by the 2008 price per ton, 2009 underground coal revenue was $12.4 billion for mines with 1-500 employees. Total underground coal production in 2009 was approximately 332 million short tons. Multiplying tons by the 2008 price per ton, total estimated revenue in 2009 for underground coal production was $17.0 billion.

Total surface coal production in 2009 was approximately 19.7 million short tons for mines with 1-19 employees. Multiplying tons by the 2008 price per ton, 2009 surface coal revenue was $441 million for mines with 1-19 employees. Total surface coal production in 2009 was approximately 495 million short tons for mines with 1-500 employees. Multiplying tons by the 2008 price per ton, 2009 surface coal revenue was $11.1 billion for mines with 1-500 employees. Total surface coal production in 2009 was approximately 743 million short tons. Multiplying tons by the 2008 price per ton, total estimated revenue in 2009 for surface coal production was $16.6 billion.

Screening Analysis for Underground Coal Mines

Table VI-1 below shows MSHA's estimate of the cost of the proposed rule compared to mine revenue, by mine size. The Agency has provided in Chapter V of the PREA a discussion of the costs of the proposed rule for each size category of mines.

Table VI-1: Cost of Proposed Rule Compared to Mine Revenues, by Mine Size for Underground Coal Mines

Mine Size	No. of Mines	Annualized Cost of Proposed Rule*	Estimated Revenues (in Millions)	Cost per Mine*	Cost of Proposed Rule as Percent of Revenues
1-19	81	$1,621,500	$259	$20,000	0.63%
1-500	412	$34,111,600	$12,406	$82,800	0.28%
All Mines	424	$39,683,800	$17,041	$93,600	0.23%

* Based upon the compliance cost estimates which include additional costs that might result from operators in three rare situations having to take actions beyond the typical engineering controls and work practices that MSHA projects will be sufficient to comply with the proposed rule.

As shown in Table VI-1, the annualized cost of the proposed rule for underground coal mines with 1-19 employees is approximately $1.6 million, or approximately $20,000 per mine. This is equal to approximately 0.63 percent of annual revenues. MSHA

6 U.S. DOE, EIA, "Annual Coal Report 2009," Table 28, October 2009.

estimates that some mines might experience costs somewhat higher than the average per mine in their size category while others might experience lower costs.

When applying SBA's definition of a small mine, the annualized cost of the proposed rule for underground coal mines with 1-500 employees is approximately $34.1 million, or approximately $82,800 per mine. This is equal to approximately 0.28 percent of annual revenue.

Based on this analysis, MSHA has determined that the proposed rule would not have a significant economic impact on a substantial number of small underground coal mine operators with 500 or fewer employees.

Screening Analysis for Surface Coal Mines

Table VI-2 below shows MSHA's estimate of the cost of the proposed rule compared to mine revenue, by mine size. The Agency has provided in Chapter V of the PREA a discussion of the costs of the proposed rule for each size category of mines.

Table VI-2: Cost of Proposed Rule Compared to Mine Revenues, by Mine Size for Surface Coal Mines

Mine Size	No. of Mines	Annualized Cost of Proposed Rule	Estimated Revenues (in Millions)	Cost per Mine	Cost of Proposed Rule as Percent of Revenues
1-19	620	$1,121,500	$441	$1,800	0.25%
1-500	1,111	$4,390,000	$11,058	$4,000	0.04%
All Mines	1,123	$4,796,900	$16,596	$4,300	0.03%

As shown in Table VI-2, the annualized cost of the proposed rule for surface coal mines with 1-19 employees is approximately $1.1 million, or approximately $1,800 per mine. This is equal to approximately 0.25 percent of annual revenues. MSHA estimates that some mines might experience costs somewhat higher than the average per mine in their size category while others might experience lower costs.

When applying SBA's definition of a small mine, the annualized cost of the proposed rule for surface coal mines with 1-500 employees is approximately $4.4 million, or approximately $4,000 per mine. This is equal to approximately 0.04 percent of annual revenue.

Based on this analysis, MSHA has determined that the proposed rule would not have a significant economic impact on a substantial number of small surface coal mine operators with 500 or fewer employees.

VII. OTHER REGULATORY CONSIDERATIONS

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

The National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et. seq.), requires each Federal agency to consider the environmental effects of final actions and to prepare an Environmental Impact Statement on major actions significantly affecting the quality of the environment. MSHA has reviewed the proposed standard in accordance with NEPA requirements, the regulation of the Council on Environmental Quality (40 CFR Part 1500), and the Department of Labor's NEPA procedures (29 CFR Part 11). As a result of this review, MSHA has preliminarily determined that this proposed rule would have no significant environmental impact.

THE UNFUNDED MANDATES REFORM ACT

MSHA has reviewed the proposed rule under the Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1501 et seq.). MSHA has determined that this proposed rule does not include any federal mandate that may result in increased expenditures by State, local, or tribal governments; nor would 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 U.S.C. 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) requires agencies to assess the impact of Agency action on family well-being. MSHA has determined that the proposed rule would have no effect on family stability or safety, marital commitment, parental rights and authority, or income or poverty of families and children. The proposed rule impacts the coal mine industry. Accordingly, MSHA certifies that the proposed rule would not impact family well-being.

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

This proposed rule does not implement a policy with takings implications. Accordingly, under E.O. 12630, no further Agency action or analysis is required.

EXECUTIVE ORDER 12988: CIVIL JUSTICE REFORM

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

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

The proposed rule would have no adverse impact on children. Accordingly, under E.O. 13045, no further Agency action or analysis is required.

EXECUTIVE ORDER 13132: FEDERALISM

The proposed rule does not have "federalism implications" because it would 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, under E.O. 13132, no further Agency action or analysis is required.

EXECUTIVE ORDER 13175: CONSULTATION AND COORDINATION WITH INDIAN TRIBAL GOVERNMENTS

The proposed rule does not have "tribal implications" because it would 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. The proposed rule has been reviewed for its impact on the supply, distribution, and use of energy because it applies to the coal mining industry. Insofar as the proposed rule would result in annualized compliance costs of $35.6 to 39.7 million for the underground coal industry relative to annual revenues of $17 billion in 2009 and annualized compliance costs of $4.8 million for surface coal industry relative to annual revenue of $16.6 billion in 2009, it is not a "significant energy action" because it is not "likely to have a significant adverse effect on the supply, distribution, or use of energy * * * (including a shortfall in supply, price increases, and increased use of foreign supplies)." Accordingly, Executive Order 13211 requires no further Agency action or analysis.

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

MSHA has thoroughly reviewed the proposed 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 proposed rule does not have a significant economic impact on a substantial number of small entities.

VIII. PAPERWORK REDUCTION ACT OF 1995

INTRODUCTION

This section shows the estimated paperwork burden hours and related costs to underground and surface mine operators under the proposed rule. The burden hour and cost estimates presented in this chapter are based upon the detailed analysis presented in Chapter V. The estimates for underground mine operators including Part 90 miners employed at underground mines are presented first followed by the estimates for the surface mine operators including Part 90 miners employed at surface mines.

SUMMARY OF PAPERWORK BURDEN HOURS AND RELATED COSTS

Table VIII-1 shows that, in the first year the proposed rule is in effect, coal mine operators would incur 120,864 hours with related costs of approximately $10.2 million at underground and surface operations.

Table VIII-1: Summary of Burden Hours and Costs

Detail of Burden	Year 1		Year 2		Year 3	
	Burden Hours	Cost	Burden Hours	Cost	Burden Hours	Cost
Periodic Examinations & Respiratory Protection	1,493	$94,769	170	$6,869	169	$6,864
Abatement Sampling	888	$37,310	945	$48,177	408	$20,448
Gravimetric Sampler	3,954	$147,004	-644	-$38,476	-1,209	-$62,408
Record of Shift Length	33,164	$1,542,941	33,164	$1,542,941	33,164	$1,542,941
Record of Material Produced	28,488	$2,412,933	28,488	$2,412,933	28,488	$2,412,933
Dust Data Cards	2,490	$210,903	33,806	$2,863,368	39,192	$3,319,562
CPDM Training Records	0	$0	65	$1,687	65	$1,687
75.362 Examinations	45,674	$5,417,880	45,674	$5,417,880	45,674	$5,417,880
CPDM Plans	2,216	$161,515	392	$15,945	392	$15,945
Supplemental Controls	479	$39,691	0	$0	0	$0
Submit Electronic Data	870	$73,689	10,488	$888,335	12,405	$1,050,705
DWP Lists	194	$9,222	19	$887	19	$887
Part 90 Surface CPDM's	954	$63,466	3,536	$246,381	3,500	$244,930
Totals	120,864	$10,211,323	156,103	$13,406,925	162,267	$13,972,373

DESCRIPTION OF PAPERWORK PROVISIONS

A. Proposed §§ 70.201(k) and 90.201(k) -**Training for Miners Using CPDMP**

Burden to Make Records for CPDM Training

Proposed § 70.201(k) and 90.201(k) would require that operators keep a record of the CPDM training. MSHA estimates that 7,813 miners would receive CPDM training each year. MSHA estimates that it takes a clerical employee earning $26.00 an hour 0.00833 hours (30 seconds) to make a record of each miner that received CPDM training. MSHA estimates that the annual burden hours and costs to make records for miners receiving CPDM training are approximately 65 hours (7,813 x 0.00833) and $1,690 (65 hours x $26.00 per hour).

B. Proposed §§ 70.201(g) and 90.201(f) **Record of Shift Length**

Burden to Make a Record of Shift Length for Underground Mines

Proposed § 70.201(g) and 90.201(f) would require the operator to record the actual length of each production shift for each MMU. MSHA estimates that a supervisor, earning $84.70 an hour, would take 1 minute (0.0167 hours) to record the length of each production shift.

MSHA estimates that there are 93 shifts per day in mines with 1-19 employees (69 MMUs with 1 shift per day + 12 MMUs with 2 shifts per day); 1,445 shifts per day in mines with 20-500 employees (45 MMUs with 1 shift per day + 589 MMUs with 2 shifts per day + 74 MMUs with 3 shifts per day) ; and 273 shifts per day in mines with 501+ employees (3 MMUs with 2 shifts per day + 89 MMUs with 3 shifts per day). Records would need to be made of the length of these shifts each working day. MSHA estimates that, on average, the number of workdays per year is: 200 days for mines with 1-19 employees (4 days per week x 50 weeks); 300 days for mines with 20 or more employees (6 days per week x 50 weeks) ; and 350 days for mines with 501+ employees (7 days per week x 50 weeks). MSHA's estimates of underground coal operators' annual burden hours and related costs are presented below (these estimates do not include the hours and costs for records of shift length at surface areas of underground mines; these are presented below).

Burden Hours

- 93 shifts per day x 200 days x 0.0167 hrs. = 311 hrs.
- 1,445 shifts per day x 300 days x 0.0167 hrs. = 7,239 hrs.
- 273 shifts per day x 350 days x 0.0167 hrs. = 1,596 hrs.

Burden Costs

- 9,146 hrs. x $84.70 wage rate = $774,666

C. Proposed § 71.201(d) Record of Shift Length

Burden to Make a Record of Shift Length for Surface Mines

Proposed § 71.201(d) would require the operator to record the actual length of each normal work shift for each DWP working at surface mines. MSHA estimates that a miner, earning $31.84 an hour, would take 1 minute (0.0167 hours) to record the length of each normal work shift.

MSHA estimates that the average number of shifts per day is: 1 shift per day in mines with 1-19 employees; 2 shifts per day in mines with 20-500 employees; and 2 shifts per day in mines with 501+ employees. Records would need to be made of the length of

these shifts each working day. MSHA estimates that, on average, the number of workdays per year is: 250 days for mines with 1-19 employees (5 days per week x 50 weeks); 300 days for mines with 20 or more employees (6 days per week x 50 weeks); and 350 days for mines with 501+ employees (7 days per week x 50 weeks). There are 2,930 DWPs at surface mines and facilities, 1,107 DWPs at mines with 1-19 employees; 1,759 DWPs at mines with 20-500 employees; and 64 DWPs at mines with 501+ employees. MSHA's estimates of surface coal operators' annual burden hours and related costs are presented below.

Burden Hours

- 1,107 DWPs x 1shift per day x 250 days x 0.0167 hrs. = 4,622 hrs.
- 1,759 DWPs x 2 shifts per day x 300 days x 0.0167 hrs. = 17,625 hrs.
- 64 DWPs x 2 shifts per day x 350 days x 0.0167 hrs. = 748 hrs.

Burden Costs

- 22,995 hrs. x $31.84 wage rate = $732,160

Burden to Make a Record of Shift Length for Surface Areas at Underground Mines

Proposed § 71.201(d) would require the operator to record the actual length of each normal work shift for each DWP working at surface areas of underground mines. MSHA estimates that a miner, earning $35.30 an hour, would take 1 minute (0.0167 hours) to record the length of each normal work shift.

MSHA estimates that the average number of shifts per day is: 1 shift per day in mines with 1-19 employees, 2 shifts per day in mines with 20-500 employees, and 3 shifts per day in mines with 501+ employees. Records would need to be made of the length of these shifts each working day. The number of workdays is the same as estimated above for underground mines: 200 days for mines with 1-19 employees, 300 days for mines with 20-500 employees and 350 days for mines with 501+ employees. There are 89 DWPs at surface areas of underground mines, which consist of: 13 DWPs at mines with 1-19 employees, 47 DWPs at mines with 20-500 employees and 29 DWPs at mines with 501+ employees. MSHA's estimates of underground coal operators' annual burden hours and related costs are presented below.

Burden Hours

- 13 DWPs x 1shift per day x 200 days x 0.0167 hrs. = 43 hrs.
- 47 DWPs x 2 shifts per day x 300 days x 0.0167 hrs. = 471 hrs.
- 29 DWPs x 3 shifts per day x 350 days x 0.0167 hrs. = 509 hrs.

Burden Costs

- 1,023 hrs. x $35.30 wage rate = $36,112

D. Proposed § 70.201(i) Record of Material Produced

Burden to Make a Record of Material Mined

Proposed § 70.201(i) would require the operator to record the amount of run-of-mine material produced by each MMU during each shift. Some mines already record the

material produced per shift, however, most do not. MSHA estimates that a supervisor, earning $84.70 an hour, would take 5 minutes (0.0833 hours) to record the material produced on each shift.

MSHA estimates that material produced is not recorded for 90% of shifts in mines with 1-19 employees and75% of shifts in mines with 20-500 employees. All mines with 501+ employees currently record the material produced on each shift. MSHA estimates that material produced is not recorded for 84 shifts per day in mines with 1-19 employees (93 shifts x 0.90) and 1,084 shifts per day in mines with 20-500 employees (1,445 shifts x 0.75. MSHA's estimates of underground coal operators' annual burden hours and related costs are presented below.

Burden Hours

- 84 shifts per day x 200 days x 0.0833 hrs. = 1,399 hrs.
- 1,084 shifts per day x 300 days x 0.0833 hrs. = 27,089 hrs.

Burden Costs

- 28,488 hrs. x $84.70 wage rate = $2,412,933

E. Proposed §§ 70.206 and 90.206 Burden to Write, Submit, and Revise CPDM Plans to MSHA for Approval and Related Provisions

Burden to Write and Submit CPDM Plans to MSHA for Approval

Proposed § 70.206(a) and § 90.206(a) and (b) for underground coal mines would require that operators using a CPDM must have an approved CPDM Performance Plan to ensure that no miner working on an MMU shall be exposed to concentrations of respirable coal mine dust in excess of the applicable standard. MSHA assumes that underground operators would develop one CPDM plan that covers all miners working at underground mines including Part 90 miners. So each underground coal operator would need a plan and the number of plans would be equal to the number of mines, i.e., 424. On average, MSHA estimates that a supervisor will take 4 hours to write a proposed CPDM plan and a clerical employee will take 15 minutes (0.25 hours) to copy and submit it. MSHA's estimates of underground coal operators first year burden hours and related costs are presented below.

Burden Hours

- 424 plans x 4 hrs. = 1,696 hrs.
- 424 plans x 0.25 hrs. = 106 hrs.

Total burden hours = 1,802 hrs.

Burden Costs

- 1,696 hrs. x $84.70 wage rate = $143,651
- 106 hrs. x $26.00 wage rate = $2,756

Total burden cost = $146,407

Burden to Revise CPDM Plans Submitted to MSHA for Approval

MSHA estimates that 35 percent of mine operators that submit CPDM plans to the Agency for approval would need to revise the plans before MSHA approval could be obtained. MSHA estimates that 148 plans would be revised (424 x 0.35). On average, MSHA estimates that it would take a supervisor 0.5 hours (30 minutes) to write revisions to a proposed plan and a clerical employee 15 minutes (0.25 hours) to copy and submit the plan. MSHA's estimates of underground coal operators first year burden hours and related costs are presented below.

Burden Hours

- 148 revised plans x 0.5 hrs. = 74 hrs.
- 148 revised plans x 0.25 hrs. = 37 hrs.

Total burden hours = 111 hrs.

Burden Costs

- 74 hrs. x $84.70 wage rate = $6,268
- 37 hrs. x $26.00 wage rate = $962

Total burden cost = $7,230

Cost to Notify and Provide to the Representative of Miners CPDM Plans Submitted to MSHA for Approval

Proposed § 70.206(a)(1) would require that operators notify the representative of miners at least 5 days prior to submission of a CPDM Performance Plan and any revisions. If requested, the operator shall provide a copy to the representative of the miners. MSHA assumes that 100 percent of the time the representative of the miners would request to be provided with the plan. MSHA estimates that 572 plans (424 proposed plans + 148 revised plans) would be provided to the miners' representative. MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to notify and provide a copy of the CPDM plan. MSHA estimates that first year burden hours and related costs to underground coal operators to notify and provide to the miners representative proposed and revised CPDM plans submitted to MSHA for approval are 143 hours (572 plans x 0.25) and $3,718 (143 hrs. x $26.00).

Burden to Post CPDM Plans Submitted to MSHA for Approval

Proposed § 70.206(a)(3) would require that a copy of proposed CPDM Performance Plans and any revisions submitted for approval be posted on the mine bulletin board. Proposed § 90.206(d) would require that if a mine has Part 90 miners, then they need to be given a copy of the plan. The number of proposed and revised CPDM plans submitted for approval determined above would be posted or provided to a Part 90 miner. MSHA estimates that a clerical employee would take 0.25 hours (15 minutes) to copy and post or copy and provide the plan to a Part 90 miner. MSHA estimates that first year burden hours and related costs to underground coal operators to copy and post proposed and revised CPDM plans submitted to MSHA for approval are 143 hours (572 plans x 0.25) and $3,718 (143 hrs. x $26.00).

Posting and Providing Approved Plans

Proposed §§ 70.206(c) would require a copy of the approved plan to be posted and to be provided to the miners' representative upon request. MSHA has not assessed any additional burden or costs for this proposed requirement because the burden and costs of posting and providing copies to the miners' representatives of all of the proposed plans and revisions were included in the previous estimates. Once the plans are approved the miners' representative would already have the copy and would just have to be notified. If the plans are not approved the cost for the revisions (including the posting and providing copies to the mines' representative) was also included in the estimates presented above.

Proposed § 90.206(d) would require that Part 90 miners be given a copy of the plan. The number of Part 90 miners as of January 2010 is: no Part 90 miners in mines with 1-19 employees, 47 Part 90 miners in mines with 20-500 employees, and 19 Part 90 miners in mines with 501+ employees.

MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to provide a copy of the plan to a Part 90 miner. MSHA estimates that first year burden hours and cost would be approximately 17 hours (66 plans x 0.25 hours) and $429 (17 hours x $26.00).

F. Proposed §§ 70.206 70.208, 70.209, 90.206, and 90.209 Burden of Revisions to MSHA Approved CPDM Performance Plans

Burden to Revise and Submit Revisions to Approved CPDM Plans

MSHA anticipates that revisions to approved CPDM plans by underground coal operators would occur under proposed §§ 70.206(d), 70.208(f)(4), 70.208(g)(4), 70.209(g)(4), 90.206(b), 90.206(e), 90.209(e)(4) and 90.209(f)(4). MSHA estimates that 25 percent of mine operators would make revisions to approved CPDM plans each year. This estimate includes the small number of plans being submitted by "new" mines where the operator revises a "model" plan supplied by MSHA or a plan previously used at another location. Thus, 106 underground coal operators would make revisions to an approved CPDM plan each year (424 x 0.25). MSHA estimates that there would be 390 revisions each year: 40 revisions for mines with 1-19 employees (20 mines x 2 revisions), 332 revisions in mines with 20-500 employees (83 mines x 4 revisions), and 18 revisions with 501+ employees (3 mines x 6 revisions). On average, MSHA estimates that a supervisor takes 0.25 hours (15 minutes) to revise an approved plan, and a clerical employee takes 0.25 hours (15 minutes) to copy and submit the revision. Since CPDMs are not required to be used until 12 months after the final rule becomes effective, revisions to approved plans are not assumed to occur until after that time. MSHA's estimates of the annual burden hours and related costs to underground coal operators beginning in the second year are presented below.

Burden Hours

- 390 revisions x 0.25 hrs = 98 hrs.
- 390 revisions x 0.25 hrs = 98 hrs.

Total burden hours = 196 hrs.

Burden Costs

- 98 hrs. x $84.70 wage rate = $8,301

- 98 hrs. x $26.00 wage rate = $2,548

  Total burden cost = $10,849

Burden to Notify and Provide to the Representative of the Miners Revisions to Approved CPDM Plans

Under proposed § 70.206(c)(3) revisions to approved CPDM plans must be provided to the miners representative, if requested. MSHA assumes that a 100% of the time the miners' representative would request the revisions to an approved CPDM plan. On average, MSHA estimates that a clerical employee takes 0.25 hrs. (15 minutes) to copy and provide the revisions to the approved CPDM plan. MSHA estimates that the annual burden hours and related costs to underground coal operators to provide approved CPDM plan revisions to the representative of the miners are approximately 98 hours (390 revisions x 0.25) and $2,548 (98 hours x $26.00).

Burden to Post Approved CPDM Plans and Revisions

Proposed § 70.206(c)(3) would require that revisions of approved CPDM plans be posted on the mine bulletin board. Proposed § 90.206(d) would require Part 90 miners to be given a copy of the plan. Out of the number of approved CPDM plan revisions determined above, there would be 66 posted or provided to the Part 90 miners. MSHA estimates that a clerical employee takes 0.25 hours (15 minutes) to copy and post or copy and provide revisions to a Part 90 miner. MSHA estimates that annual burden hours and related costs to underground coal operators to copy and post approved CPDM plan revisions are approximately 17 hours (66 revisions x 0.25) and $442 (17 hours x $26.00).

G. Proposed § 70.208(h) Use of Supplementary Controls

Proposed § 70.208(h) would require that during the period specified, if an operator is unable to maintain compliance with the applicable standard for an MMU and has determined that all feasible engineering or environmental controls are being used on the MMU, the operator may request through the District Manager that the Administrator for Coal Mine Safety and Health approve the use of supplementary controls for a period not to exceed 6 months.

MSHA estimates that a supervisor takes 8 hours to write an initial request to use supplementary controls for each MMU and a clerical employee 15 minutes (0.25 hrs.) to copy and submit the request. MSHA estimates that a total of 29 MMUs would need to request the use of supplementary controls. MSHA estimates the operators would make an average of 2 requests per MMU during the year, since approvals for such requests are only good for 6 months. MSHA's estimates of the first year burden hours and costs to underground coal operators are presented below.

Burden Hours

- 29 MMUs x 2 requests x 8 hrs to write the request = 464 hrs.
- 29 MMUs x 2 requests x 0.25 hrs to copy and submit = 15 hrs.

  Total burden hours = 479 hrs.

Burden Costs

- 464 hrs. x $84.70 wage rate = $39,301

- 15 hrs. x $26.00 wage rate = $390

  Total burden cost = $39,691

H. Proposed §§ 70.210 and 90.210 Respirable Dust Samples; Transmission by Operator

Cost to Validate, Certify, and Transmit CPDM Data Electronically to MSHA

Proposed §§ 70.210(f) and 90.210(f) require underground coal operators to have a designated mine official validate, certify, and transmit electronically to MSHA within 12 hours after the end of the last sampling shift of the work week all daily samples and error data file information collected during the previous week. MSHA estimates that validating, certifying, and uploading the data from a CPDM to a computer and then transmitting the data electronically to MSHA would take a designated mine official earning a supervisor's wage, 6 minutes (0.1 hours). MSHA estimates that each CPDM would be used for 50 working weeks per year.

Year 1

MSHA assumes that CPDMs associated with the use of supplementary controls would typically only be used in the first year (i.e., supplementary controls would not be permitted after the second year and CPDM use for DOs, Part 90 miners and ODOs would not be required until the second year.) MSHA estimates that first year burden hours and cost to underground coal operators to validate, certify, and transmit electronically CPDM data from supplementary controls to MSHA would be approximately 870 hours (174 CPDMs x 50 weeks x 0.1 hrs) and $73,689 (870 hours x $84.70).

Year 2

In the second year the use of CPDMs associated with supplementary controls would be phased out. Sampling of the DOs and Part 90 miners would begin at the start of the second year and sampling of the ODOs would begin after 6 months. Annual burden hours and costs beginning the second year would be 8,570 hours (1,714 CPDMs x 50 weeks x 0.1 hrs.) and $725,880 (8,570 hrs. x $84.70) for DOs and Part 90 miners. For ODOs the burden hours and costs would be 1,918 hours (767 CPDMs x 25 weeks x 0.1 hrs.) and $162,455 (1,918 hrs. x $84.70).

Year 3

In the third year the CPDM would be used to sample DOs and Part 90 miners as well as ODOs. Annual burden hours and costs in the third year would be 12,405 hours (2,481 CPDMs x 50 weeks x 0.1 hrs.) and $1,050,705 (12,405 hrs. x $84.70).

I. Proposed §§ 70.211(c) and 90.211(c) CPDM Sampling Information

Burden to Validate, Certify, and Post CPDM Sampling Information

Proposed §§ 70.211(c) and 90.211(c) would require the operator to validate and certify sampling information after each shift. The information for underground miners must be posted on the mine bulletin board, and the sampling information for each Part 90 miner must be provided to the miner. Proposed § 70.201(g) and § 90.201(f) require a record to be made of the length of each shift for each MMU. MSHA assumes that this would be done at the same time as the posting of sampling information, which also would require a record of the shift length. The paperwork burden hours and costs for proposed §

70.211(c) that were developed below include the hours and cost of both proposed § 70.201(g) and § 90.201(f). MSHA estimates that a supervisor, earning $84.70 an hour, would take 3 minutes (0.05 hours) to complete copy and post each set of sampling information.

Year 1

Mines that request and use supplementary controls would be required to sample using a CPDM. Every time a CPDM is used to sample, a new CPDM filter is used and sampling information is generated after the sample is taken. Therefore, the number of sets of sampling information to validate, certify, and post, or provide to the Part 90 miner, equals the number of CPDM filters used. MSHA estimates that 49,800 filters would be used to monitor workers using CPDMs associated with supplementary controls during the first year. MSHA estimates that the first year burden hours would be 2,490 (49,800 sampling information x 0.05 hours) and the cost would be $210,903 (2,490 hours x $84.70).

Year 2

Based upon the estimated shifts worked at each mine size and the estimated days of production each year MSHA estimates that underground mine operators would take 568,400 samples with the CPDM each year for DO and Part 90 miners and have to fill out 568,400 sets of sampling information. The annual burden hours for underground DO and Part 90 samples is 28,420 (568,400 sample information x 0.05 hours) and the cost is $2,407,174 (28,420 hours x $84.70 per hour).

Based upon the estimated shifts worked at each mine size, MSHA estimates that 3,847 ODO samples would be taken during each day of sampling. The proposed rule would require each ODO to be sampled for 14 days each quarter; therefore, MSHA estimates that 53,858 ODO samples would be taken each quarter. ODO sampling begins after 18 months; therefore there would be 2 quarters of ODO sampling in the second year. MSHA estimates that the second year burden and cost to complete and post a dust data card printouts for each CPDM after each shift of ODO sampling is approximately 5,386 hours (53,858 samples per quarter x 2 quarters x 0.05 hours) and a cost of $456,194 (5,386 hours x $84.70).

Year 3

The annual burden hours and cost for underground DO and Part 90 samples are the same as the second year, 28,420 hours and $2,407,174. The annual burden hours and cost for ODO sampling would be twice as high as in the second year because 4 quarters of sampling will occur rather than 2 - 10,772 hours and $912,388.

J. Proposed §§ 70.210(c), 70.211(b), 71.208(c), 71.209(b), 90.210(c) and 90.211(b) Gravimetric Sampling

Burden of Transmitting the Samples

Proposed §§ 70.210(c), 71.208(c) and 90.210(c) would require each sample to be transmitted to MSHA along with a completed dust data card. MSHA estimates that a certified dust technician with an estimated hourly wage of $31.77 in an underground coal mine and $28.66 in a surface coal mine would take 6 minutes (0.1 hours) to prepare and send one sample, along with the dust data card, to MSHA. After filling out the dust data card, a certified person signs the card and writes the certification number on it. On

average, MSHA estimates that a certified person (normally the mine safety inspector or an equivalent person) with an estimated hourly wage of $84.70 in an underground mine and $69.98 in a surface mine takes 1.5 minutes (0.025 hours) to complete and sign the dust data card. MSHA's estimates of the burden hours and costs are presented below.

Estimate for Underground Mines:

Due to phasing out of the gravimetric sampler for the monitoring of DOs and Part 90 miners (in 12 months) and ODOs (in 18 months), the estimates for underground coal operators vary by year.

Year 1

Due to the increased sampling required under the proposed provisions, in year 1, there would be an increase of 15,298 samples for underground mines.

Burden Hours

- 15,298 samples x 0.1 hrs. = 1,530 hrs.
- 15,298 samples x 0.025 hrs. = 382 hrs.

Total burden hours = 1,912

Burden Costs

- 1,530 hrs. x $31.77 wage rate = $48,608
- 382 hrs. x $84.70 wage rate = $32,355

Total burden cost = $80,964

Year 2

Due to the shift from the gravimetric sampler to the CPDM for DOs and Part 90 miners at the beginning of the second year, and for ODOs after 18 months, MSHA estimates that there would be an overall decrease of 16,972 samples for underground mines.

Burden Hour Savings

- 16,972 samples x 0.1 hrs. = 1,697 hrs. saved
- 16,972 samples x 0.025 hrs. = 424 hrs. saved

Total burden hours = 2,121 hrs. saved

Burden Cost Savings

- 1,697 hrs. x $31.77 wage rate = $53,914
- 424 hrs. x $84.70 wage rate = $35,913

Total burden cost savings= $89,826

Year 3

Due to the shift from the gravimetric sampler to the CPDM (for DOs, Part 90 miners and ODOs) during the second year, MSHA estimates that there would be an overall decrease of 21,492 samples for underground mines.

Burden Hour Savings

- 21,492 samples x 0.1 hrs. = 2,149 hrs. saved
- 21,492 samples x 0.025 hrs. = 537 hrs. saved

Total burden hours = 2,722 hrs. saved

Burden Cost Savings

- 2,149 hrs. x $31.77 wage rate = $68,274
- 537 hrs. x $84.70 wage rate = $45,484

Total burden cost savings = $113,758

Surface Mines (Annual Estimate):

Do to the increased sampling required under the proposed provisions, there would be an annual increase of 9,878 samples for surface mines.

Burden Hours

- 9,878 samples x 0.1 hrs. = 988 hrs.
- 9,878 samples x 0.025 hrs. = 247 hrs.

Total burden hours = 1,235 hrs.

Burden Costs

- 988 hrs. x $28.66 wage rate = $28,316
- 247 hrs. x $69.98 wage rate = $17,285

Total burden cost = $45,601

Cost of Posting the Sample Results

Proposed §§ 70.211(b) and 71.209(b) would require mine operators to post the sample results on the mine bulletin board. Proposed § 90.211(b) would require mine operators to provide Part 90 miners with a copy of the sample results. For purposes of this burden analysis, MSHA assumes that it takes the same amount of time to provide a copy of the sample results to the Part 90 miner as it does to post the sample results on the mine bulletin board.

On average, MSHA estimates that it takes a clerical employee, making $26.00 an hour in underground mines and $25.45 an hour at surface mines, 0.1 hours (6 minutes) to copy and post the sample results. MSHA's estimates of the burden hours and costs are presented below.

Underground Mines:

Due to the phasing out of the gravimetric sampler for the monitoring of DOs and Part 90 miners (in 12 months) and ODOs (in 18 months), the estimates for underground coal operators vary by year.

Year 1

In the first year, there would be no change to the number of times the DO results would have to be posted. The posting of the DA results and providing the Part 90 miner results would decrease by 2 occasions due to the decrease in the sampling frequency from bimonthly to quarterly. Therefore MSHA estimates a decrease of 1,810 postings in

underground mines in the first year. MSHA estimates that the burden hour and cost savings to underground coal mines in the first year are approximately 181 saved hours (1,810 postings x 0.1 hours) and $4,706 (181 hours x $26.00) in saved costs.

Year 2

Due to the shift from the gravimetric sampler to the CPDM for DOs and Part 90 miners at the beginning of the second year and for the ODOs after 18 months, MSHA estimates that there would be an overall decrease of 7,464 postings for underground mines. MSHA estimates that the burden hour and cost savings to underground coal mines in the second year are approximately 746 saved hours (7,464 postings x 0.1 hours) and $19,396 (746 hours x $26.00) in saved costs.

Year 3

Due to the shift from the gravimetric sampler to the CPDM (for DOs, Part 90 miners and ODOs) during the second year, MSHA estimates that there would be an overall decrease of 7,464 postings for underground mines in the third year. MSHA estimates that the burden hour and cost savings to underground coal mines in the third year are approximately 746 saved hours (7,464 postings x 0.1 hours) and $19,396 (746 hours x $26.00) in saved costs.

Surface Mines:

The posting of the DWP results would increase by twice the number of additional DWPs, therefore MSHA estimates an annual increase in samples for surface mines of 9,878. MSHA estimates that the annual burden hours and costs to surface mines are approximately 988 hours (9,878 samples x 0.1 hours) and $25,145 (988 hours x $25.45).

K. Estimated Burden and Cost for Abatement Resulting from Proposed Rule

Burden to Submit Corrective Actions - Proposed §§ 70.207(g)(2), 70.208(f)(3), 70.209(e)(2), 71.207(k)(2), 90.208(e)(2), 90.209(e)(3) and Revising Mine Ventilation or Dust Control Plan – Proposed §§ 70.207(h), 70.209(f), 71.207(l), 71.300(a), 90.208(f) and 90.300(a)

Underground coal operators (under proposed §§ 70.207(g)(2), 70.209(e)(2), and 90.208(e)(2)) and surface coal operators (under proposed § 71.207(k)(2)) would be required, during the abatement time fixed in a citation for violation of the applicable standard to submit corrective actions for MSHA approval. Underground coal operators under proposed §§ 70.208(f)(3) and 90.209(e)(3) would be required to submit corrective actions for MSHA approval when a valid end-of-shift equivalent concentration measurement meets or exceeds the applicable ECV, or exceeds a weekly permissible accumulated exposure.

For underground coal operators (under proposed §§ 70.207(h), 70.209(f), 90.208(f) and 90.300(a)) and surface coal operators (under proposed §§ 71.207(l), 71.300(a), 90.208(f) and 90.300(a)), one of the conditions for terminating a citation for violation of the applicable standard is that the underground operator submits revised dust control parameters as part of the mine ventilation plan, or a dust control plan or revisions, and the surface operator submits a new or revised dust control plan applicable to the DWP or Part 90 miner identified in the citation. Further, underground coal operators under

proposed § 90.300(a) and surface coal operators under proposed § 71.300(a) would need to submit a dust control plan or revision to a dust control plan identified in a citation.

MSHA estimates that a supervisor (earning $84.70 per hour in an underground coal mine and $69.98 per hour in a surface coal mine) would take 15 minutes (0.25 hours) to write up the corrective actions for submission; and a clerical employee (earning $26 per hour in an underground coal mine and $25.45 in a surface coal mine) would take 6 minutes (0.1 hours) to submit the corrective actions. MSHA's estimates for burden hours and costs are presented below.

Year 1

MSHA estimates the number of corrective action submissions in the first year would be 504 for underground and 76 for surface mines.

Underground Mines:

Burden Hours

- 504 submissions x 0.25 hrs. = 126 hrs.
- 504 submissions x 0.1 hrs. = 50 hrs.

Total burden hours = 176 hrs.

Burden Costs

- 126 hrs. x $84.70 wage rate = $10,672
- 50 hrs. x $26.00 wage rate = $1,300

Total burden cost = $11,972

Surface Mines:

Burden Hours

- 76 submissions x 0.25 hrs. = 19 hrs.
- 76 submissions x 0.1 hrs. = 8 hrs.

Total burden hours = 27 hrs.

Burden Costs

- 19 hrs. x $69.98 wage rate = $1,330
- 8 hrs. x $25.45 wage rate = $204

Total burden cost = $1,534

Year 2

MSHA estimates the number of corrective action submissions in the second year would be 666 for underground coal operators and 59 for surface mines.

Underground Mines:

Burden Hours

- 666 submissions x 0.25 hrs. = 167 hrs.
- 666 submissions x 0.1 hrs. = 66 hrs.

Total burden hours = 233 hrs.

Burden Costs

- 167 hrs. x $84.70 wage rate = $14,145
- 66 hrs. x $26.00 wage rate = $1,716

Total burden cost = $15,861

Surface Mines:

Burden Hours

- 59 submissions x 0.25 hrs. = 15 hrs.
- 59 submissions x 0.1 hrs. = 6 hrs.

Total burden hours = 21 hrs.

Burden Costs

- 15 hrs. x $69.98 wage rate = $1,050
- 6 hrs. x $25.45 wage rate = $153

Total burden cost = $1,203

Year 3

MSHA estimates the number of corrective action submissions in the third year would be 269 for underground mines and 36 for surface mines.

Underground Mines:

Burden Hours

- 269 submissions x 0.25 hrs. = 68 hrs.
- 269 submissions x 0.1 hrs. = 28 hrs.

Total burden hours = 96 hrs.

Burden Costs

- 68 hrs. x $84.70 wage rate = $5,760
- 28 hrs. x $26.00 wage rate = $728

Total burden cost = $6,488

Surface Mines:

Burden Hours

- 36 submissions x 0.25 hrs. = 10 hrs.
- 36 submissions x 0.1 hrs. = 4 hrs.

Total burden hours = 14 hrs.

Burden Costs

- 10 hrs. x $69.98 wage rate = $700
- 4 hrs. x $25.45 wage rate = $102

Total burden cost = $802

Burden of Completing Dust Data Card and Sending the Gravimetric Sample and Card to MSHA

Underground coal operators (under proposed §§ 70.210(c) and 90.210(c)) and surface coal operators (under proposed § 71.208(c)) must complete the dust data card and submit the card to MSHA along with the sample.

On each dust data card, the person completing the dust data card is a certified dust technician with an estimated hourly wage of $31.77 in an underground coal mine and $28.66 in surface mines. On average, MSHA estimates that a certified dust technician takes 6 minutes (0.1 hours) to complete the dust data card, sign it and send it along with the sample to MSHA. After filling out the dust data card, a certified person signs the card and writes the certification number on it. On average, MSHA estimates that a certified person (normally the mine safety inspector or an equivalent person) takes 1.5 minutes (0.025 hours) to review and sign the dust data card. A supervisor's hourly wage is estimated to be $84.70 in an underground mine and $69.98 in a surface mine.

Year 1

Underground Mines:

In year 1 underground mines would be using the gravimetric sampler, thus the number of dust data cards equates to the number of abatement samples taken. Five abatement samples must be taken if there is a violation of the applicable dust standard or the sample exceeds the applicable standard but is below the ECV. Therefore, for underground coal mines, MSHA estimates that the number of dust data cards to complete, sign, and send would be 2,645 (529 times standard was exceeded x 5 samples). MSHA's estimates of the burden hours and costs are presented below.

Burden Hours

- 2,645 submissions x 0.025 hrs. = 66 hrs.
- 2,645 submissions x 0.1 hrs. = 265 hrs.

Total burden hours = 331 hrs.

Burden Costs

- 66 hrs. x $84.70 wage rate = $5,590
- 265 hrs. x $31.77 wage rate = $8,419

Total burden cost = $14,009

Surface Mines:

As is explained in Chapter V of the PREA, MSHA has not projected any additional costs for surface coal mines completing dust data cards and sending them along with the samples to MSHA in the first year because the existing standards currently require surface mine operators to take 5 additional samples, complete the data cards and send the results to MSHA whenever a sample result exceeds the applicable standard.

Year 2

Underground Mines:

As explained in Chapter V of the PREA, MSHA has not projected any additional costs for underground coal mines completing dust data cards and sending them along with the samples to MSHA in the second year because these mines would be using the CPDM to sample every day.

Surface Mines:

The number of dust data cards equates to the number of samples taken. Therefore, for surface coal mines, MSHA estimates that the number of dust data cards to complete, sign, and send would be 315. MSHA's estimates of the burden and cost to complete, sign, and send dust data cards, along with samples, to MSHA in the second year that the final rule is in effect are presented below.

Burden Hours

- 315 submissions x 0.025 hrs. = 8 hrs.
- 315 submissions x 0.1 hrs. = 32 hrs.

Total burden hours = 40 hrs.

Burden Costs

- 8 hrs. x $69.98 wage rate = $560
- 32 hrs. x $28.66 wage rate = $917

Total burden cost = $1,477

Year 3

Underground Mines:

As is explained in Chapter V of the PREA, MSHA has not projected any additional costs for underground coal mines completing dust data cards and sending them along with the samples to MSHA in the third year because these mines would be using the CPDM to sample every day.

Surface Mines:

MSHA estimates that the number of dust data cards to complete, sign, and send in the third year would be 195.

Burden Hours

- 195 submissions x 0.025 hrs. = 5 hrs.
- 195 submissions x 0.1 hrs. = 20 hrs.

Total burden hours = 25 hrs.

Burden Costs

- 5 hrs. x $69.98 wage rate = $350
- 20 hrs. x $28.66 wage rate = $573

Total burden cost = $923

Posting and Providing Copies of Sample Results – Proposed §§ 70.211(b), 71.209(b), 90.211(b)

Underground coal operators (under proposed §§ 70.211(b)) and surface coal operators (under proposed § 71.209(b)) must post sample results. Proposed § 90.211(b) would require mine operators to provide Part 90 miners with a copy of the sample results.

MSHA assumes that it takes the same amount of time to provide a copy of the sample results to the Part 90 miner as it does to post the sample results on the mine bulletin board. On average, MSHA estimates that a clerical employee takes 0.1 hours (6 minutes) to copy and post the sample results. The number of sample results to post equates to the number of samples taken.

Year 1

Underground Mines:

MSHA estimates that the number of samples to post would be 529. MSHA estimates that the burden and cost to post sample results in the first year that the rule is in effect would be approximately 53 hours (529 summaries x 0.1 hours) and $1,378 (53 hours x $26.00).

Surface Mines:

As noted above, since there is no additional sampling in surface coal mines in the first year of the final rule there are no cost for posting sample results.

Year 2

Underground Mines:

As explained in Chapter V of the PREA, MSHA has not projected any additional costs for underground coal mines posting the gravimetric sample results in the second year because these mines would be using the CPDM to sample every day.

Surface Mines:

MSHA estimates that the number of samples to post would be 63. MSHA estimates that the burden and cost to post sample results in the second year that the rule is in effect would be approximately 7 burden hours (63 results x 0.1 hours) and a cost of $178 (7 hours x $25.45).

Year 3

Underground Mines:

As is explained in Chapter V of the PREA, MSHA has not projected any additional costs for underground coal mines completing posting the gravimetric sample results in the second year because these mines would be using the CPDM to sample every day.

Surface Mine:

MSHA estimates that the number of samples to post in the third year would be 39. MSHA estimates that the burden and cost to post sample results in the third year that the rule is in effect would be approximately 4 burden hours (39 results x 0.1 hours) and a cost of $102 (4 hours x $25.45).

Make Existing 75.363 Record - Proposed §§ 70.207(i)(3), 70.208(f)(5), 70.208(g)(3), 70.209(g)(3), 90.208(g)(3), 90.209(e)(5) and 90.209(f)(3)

Under proposed § 70.207(i)(3), 70.208(f)(5), 70.208(g)(3), 70.209(g)(3), 90.208(g)(3), 90.209(e)(5), and 90.209(f)(3), when sample results collected by the underground coal

operator indicate the equivalent concentration of a sample result is above the applicable standard a record of the corrective actions taken must be made in the same manner as the record required by existing § 75.363.

Under existing § 75.363 a certified person would make the record and the record must be countersigned by a mine foreman or equivalent mine official. MSHA estimates that a certified person (earning a supervisor's wage rate) would take 6 minutes (0.1 hrs.) make the record and a mine official (also earning a supervisor's wage rate) would take 3 minutes (0.05 hrs.) to countersign the record.

Underground Mines:

Year 1

For underground coal mines, MSHA estimates the number of records in year 1 would be 25. MSHA's estimates for the burden hours and costs are presented below.

Burden Hours

- 25 records x 0.05 hrs. = 1 hr.
- 25 records x 0.1 hrs. = 2 hrs.

Total burden hours = 3 hrs.

Burden Costs

- 1 hr. x $84.70 wage rate = $85
- 2 hrs. x $84.70 wage rate = $169

Total burden cost = $254

Year 2

For underground coal mines, MSHA estimates the number of records in the second year would be 700.

Burden Hours

- 700 records x 0.05 hrs. = 35 hrs.
- 700 records x 0.1 hrs. = 70 hrs.

Total burden hours = 105 hrs.

Burden Costs

- 35 hrs. x $84.70 wage rate = $2,965
- 70 hrs. x $31.77 wage rate = $2,224

Total burden cost = $5,189

Year 3

For underground coal mines, MSHA estimates the number of records in the third year would be 282.

Burden Hours

- 282 records x 0.05 hrs. = 14 hrs.

- 282 records x 0.1 hrs. = 28 hrs.

  Total burden hours = 42 hrs.

Burden Costs

- 14 hrs. x $84.70 wage rate = $1,186
- 28 hrs. x $31.77 wage rate = $890

  Total burden cost = $2,022

Operator Adjustments to Plan – Proposed §§ 70.207(c)(2), 70.209(b)(2), 71.207(h)(2), and 90.208(b)(2)

For underground coal operators (under proposed §§ 70.207(c)(2), 70.209(b)(2), and 90.208(b)(2) and surface coal operators (under proposed § 71.207(h)(2)) if a sample result is above the new applicable standard, the underground coal operator must make necessary adjustments to the dust control parameters in the mine ventilation plan and the surface coal operator must revise the dust control parameters.

MSHA estimates that the number of occasions where operators would make adjustments would be 25 in underground mines and 5 in surface mines. On average, MSHA estimates that it would take a supervisor (earning $84.70 per hour in an underground mine and $69.98 per hour in a surface mine) 15 minutes (0.25 hrs.) to make adjustments. MSHA's estimates for the burden hours and costs in the first year for underground mines are 6 burden hours (25 revisions x 0.25 hours) and a cost of $508 (6 hours x $84.70). MSHA's estimates for the burden hours and costs in the first year for surface mines are 1 hour (5 revisions x 0.25 hours) and $70 (1 hour x $69.98).

Notify Representative of the Miners – Existing §§ 75.370(a)(3)(i), 75.370(f)(1) and Proposed §§ 71.300(a)(1) and 71.300(d)(1)

Existing §§ 75.370(a)(3)(i) and 75.370(f)(1) for underground coal operators and proposed §§ 71.300(a)(1) and 71.300(d)(1) for surface coal operators would require notification to the representative of miners of a plan revision. MSHA estimates that a clerical employee takes 15 minutes (0.25 hours) to notify and provide a copy of the plan to the representative of the miners. MSHA assumes that all miners' representatives would request a copy of the plan. MSHA estimates that the number of notifications would be equal to the number of occasions corrective actions were submitted, which was determined above.

Year 1

The number of notifications in the first year would be 504 for underground coal operators and 76 for surface coal mines. MSHA estimates that the burden and cost to notify the miners' representative and provide a copy if requested in the first year that the rule is in effect would be approximately 126 hours (504 notifications x 0.25 hours) and $3,276 (126 hours x $26.00) for underground coal operators and 19 hours (76 notifications x 0.25) and $484 (19 hours x $25.45) for surface coal operators.

Year 2

The number of notifications in year 2 would be 666 for underground coal operators and 59 for surface coal mines. MSHA estimates that the burden and cost to notify the miners'

representative and provide a copy if requested in the second year that the rule is in effect would be approximately 167 hours (666 notifications x 0.25 hours) and $4,342 (167 hours x $26.00) for underground coal operators. For surface operators MSHA estimates 15 hours (59 notifications x 0.25 hours) and $382 (15 hours x $25.45).

Year 3

The number of notifications in the third year would be 269 for underground coal operators and 36 for surface coal mines. MSHA estimates that the burden and cost to notify the miners' representative, and provide a copy if requested, in the third year that the rule is in effect would be approximately 68 hours (269 notifications x 0.25 hours) and $1,768 (68 hours x $26.00) for underground coal operators and 10 hours (36 notifications x 0.25 hours) and $255 (10 hours x $25.45) for surface coal operators.

Post Copy of Plan Revision – Existing §§ 75.370(a)(3)(iii), and 75.370(f)(3) and Proposed §§ 71.301(a)(3), and 71.301(d)(3)

Underground coal operators under existing §§ 75.370(a)(3)(iii) and 75.370(f)(3) and surface coal operators under proposed §§ 71.301(a)(3), and 71.301(d)(3) would be required to post a copy of the proposed or revised Plan on the mine bulletin board. MSHA estimates that a clerical employee would take 15 minutes (0.25 hours) to copy and post.

Year 1

MSHA estimates that the number of postings in year 1 would be 504 in underground mines and 76 for surface mines. MSHA estimates that the burden and cost to copy and post in the first year the final rule is effective would be approximately 126 hours (504 notifications x 0.25 hours) and $3,276 (126 hours x $26.00) for underground coal operators and 19 hours (76 x 0.25) and $484 (19 hours x $25.45) for surface coal operators.

Year 2

MSHA estimates that the number of postings in the second year would be 666 in underground mines and 59 in surface coal mines. MSHA estimates that the burden and cost to copy and post in the second year the final rule is effective would be approximately 167 hours (666 notifications x 0.25 hours) and $4,342 (167 hours x $26.00) for underground coal operators. For surface operators MSHA estimates 15 hours (59 notifications x 0.25 hours) and $382 (15 hours x $25.45) for surface coal operators.

Year 3

MSHA estimates that the number of postings in the third year would be 269 in underground mines and 36 in surface coal mines. MSHA estimates that the burden and cost to copy and post in the third year the final rule is effective would be approximately 68 hours (269 notifications x 0.25 hours) and $1,768 (68 hours x $26.00) for underground coal operators and 10 hours (36 notifications x 0.25 hours) and $255 (10 hours x $25.45) for surface coal operators.

Review CPDM Plan - Proposed §§ 70.208(f)(4), 70.208(g)(4), 70.209(g)(4), 71.207(k)(4), 71.207(n)(2), 90.209(e)(4) and 90.209(f)(4)

Underground coal operators under proposed §§ 70.208(f)(3) and 90.209(e)(4) must review the adequacy of the approved CPDM Performance Plan and submit any necessary revisions when a valid end-of-shift equivalent concentration measurement meets or exceeds the applicable ECV or a weekly accumulated exposure exceeds the weekly permissible accumulated exposure. Surface coal operators under proposed § 71.207(k)(4) must review the adequacy of the approved CPDM Performance Plan and submit any revisions upon issuance of a citation for violation of the applicable standard. In addition, for underground coal operators (under proposed §§ 70.208(g)(4), 70.209(g)(4), and 90.209(f)(4)) and surface coal operators (under proposed § 71.207(n)(2)) the CPDM plan must be reviewed when a valid end-of shift equivalent concentration measurement exceeds the applicable standard but is below the applicable ECV.

As noted in Chapter V of the PREA, MSHA does not project any additional citations for Part 90 miners and expects that surface operators would choose to use the gravimetric sampler. Therefore, no costs were estimated for reviewing the CPDM plan due to the sampling results of either the Part 90 miners or the DWPs exceeding the applicable standard. MSHA estimates that an underground coal supervisor would take 15 minutes (0.25 hrs.) to review a CPDM plan.

Year 2

MSHA estimates that the number of CPDM plans to review would be 700 for underground coal operators. On average, MSHA estimates that the burden and cost to submit corrective actions in the second year that the final rule is effective would be approximately 175 hours (700 reviews x 0.25 hours) and $14,823 (175 hours x $84.70).

Year 3

MSHA estimates that the number of CPDM plans to review in the third year would be 282 for underground coal operators. MSHA estimates that the burden and cost to submit corrective actions in the third year that the final rule is effective would be approximately 71 hours (282 reviews x 0.25 hours) and $6,014 (71 hours x $84.70).

L. Proposed § 72.100 Periodic Examinations

Burden to Develop Periodic Examinations Plan

Proposed § 72.100 (d) would require each coal operator to develop and submit to NIOSH a plan for providing miners with the required chest x-rays, spirometry, symptom assessment, and occupational history and a roster specifying the name and current address of each miner covered by the plan. Proposed paragraph (e) would require the operator to post the approved plan on the mine bulletin board.

Under Title 42, § 37.4, each operator of an underground coal mine is already required to submit to the Secretary of Health and Human Services a plan for providing miners with the required chest x-rays and to post it on the mine bulletin board. NIOSH has required that rosters be provided since the early 1990s, so this requirement would not create an additional burden for mine operators.

Year 1

MSHA assumes that, in the first year of the proposed rule, underground coal operators would simply revise the existing rosters and plans for chest x-rays to add spirometry,

symptom assessment, and occupational history. MSHA estimates that it would take a supervisor, earning $84.70 an hour, ten minutes (0.167 hours) to revise the plan and roster and a clerical employee, earning $26.00 an hour, five minutes (0.0833 hours) to copy and submit the revised plan and roster. Each surface coal operator would have to develop and submit to NIOSH a roster and plan for providing chest x-rays, spirometry, symptom assessment, and occupational history. MSHA estimates that it would take a supervisor earning $69.98 an hour, one hour to develop the plan and roster and a clerical employee, earning $25.45 an hour 5 minutes (0.083 hours) to copy and submit the plan and roster. MSHA estimates that there are 424 underground mines that would need revisions and 1,123 surface mines that will need to develop and submit plans and rosters. MSHA's estimates of first-year burden and costs under proposed § 72.100 (d) and (e) are presented below.

Underground Mines:

Burden Hours

- 424 Revisions x 0.167 hrs. = 71 hrs.
- 424 Revisions x 0.083 hrs. = 35 hrs.

Total burden hours = 106 hrs.

Burden Costs

- 71 hrs. x $84.70 wage rate = $6,014
- 35 hrs. x $26.00 wage rate = $910

Total burden cost = $6,924

Surface Mines:

Burden Hours

- 1,123 plans x 1 hr. = 1,123 hrs.
- 1,123 plans x 0.083 hrs. = 94 hrs.

Total burden hours = 1,217 hrs.

Burden Costs

- 1,123 hrs. x $69.98 wage rate = $78,588
- 94 hrs. x $25.45 wage rate = $2,392

Total burden cost = $80,980

Burden to Revise Plan in Years 2 and 3

Since chest x-rays, spirometry, symptom assessment, and occupational history must be provided at least once every 5 years, MSHA assumes that each year one fifth of the mines would have to revise a plan and roster. MSHA estimates that 84 underground mines and 224 surface mines will need revisions. MSHA estimates that it would take a supervisor, earning $84.70 an hour in an underground coal mine or $69.98 an hour in a surface coal mine, ten minutes (0.167 hours) to revise the plan and roster and a clerical employee, earning $26.00 an hour in an underground coal mine or $25.45 an hour in a surface coal mine, five minutes (0.0833 hours) to copy and submit the revised plan and roster.

MSHA's estimates of the burden and cost to revise the plan and roster are presented below.

Underground Mines:

Burden Hours

- 84 Revisions x 0.167 hrs. = 14 hrs.
- 84 Revisions x 0.083 hrs. = 7 hrs.

Total burden hours = 21 hrs.

Burden Costs

- 14 hrs. x $84.70 wage rate = $1,186
- 7 hrs. x $26.00 wage rate = $182

Total burden cost = $1,368

Surface Mines:

Burden Hours

- 224 revisions x 0.167 hrs. = 37 hrs.
- 224 revisions x 0.083 hrs. = 19 hrs.

Total burden hours = 56 hrs.

Burden Costs

- 37 hrs. x $69.98 wage rate = $2,589
- 19 hrs. x $25.45 wage rate = $484

Total burden cost = $3,073

M. §§ 71.201, 71.206, 71.208, 71.209, 90.201, 90.206, 90.209, 90.210 and 90.211 CPDM Costs for Surface Mines

Burden to Write and Submit CPDM Plans to MSHA for Approval

Proposed §§ 71.206(a) and 90.206(b) would require operators who use CPDMs to develop and submit for approval a CPDM Performance Plan (Plan) prior to using them. The proposal specifies the information that would be required to be contained in the Plan and would establish Plan approval procedures.

As discussed in Chapter V of the PREA, MSHA assumes that no surface operator would choose to use the CPDM unless they have Part 90 miners. MSHA estimates that 200 surface mines would have Part 90 miners and that each would need a CPDM plan. In addition, MSHA estimate that 20 plans (10 percent) would have to be resubmitted before approval. On average, MSHA estimates that it takes a supervisor, earning $69.98 an hour, 4 hours to write a proposed CPDM plan and a clerical employee, earning $25.45 an hour, 15 minutes (0.25 hours) to copy and submit it. MSHA's estimates of the burden and cost to write, copy and submit a CPDM plan are presented below.

Burden Hours

- 220 plans x 4 hrs. = 880 hrs.

- 220 plans x 0.25 hrs. = 55 hrs.

Total burden hours = 935

Burden Costs

- 880 hrs. x $69.98 wage rate = $61,582
- 55 hrs. x $25.45 wage rate = $1,400

Total burden cost = $62,982

Burden to Make Records for CPDM Training

Proposed §§ 71.201(h) and 90.201(i) would require coal operators keep a record of miners who receive CPDM training. As discussed in Chapter V of the PREA, MSHA assumes that no surface operator would choose to use the CPDM unless they have Part 90 miners. MSHA estimates that 200 Part 90 miners at surface mines would receive CPDM training. MSHA estimates that it takes a clerical employee 0.00833 hours (30 seconds) to make a record of each Part 90 miner who received CPDM training. MSHA estimates that the annual burden and cost to make a record of CPDM training would be approximately 2 hours (200 records x 0.00833 hours) and $51 (2 hours x $25.45).

Burden to Notify and Provide to the Representative of Miners CPDM Plans Submitted to MSHA for Approval

Proposed § 71.206(a)(1) would require that a copy of the CPDM plan be provided to the representative of the miners, if requested, and proposed § 71.206(c)(1) would require a copy of any revision be provided as well. MSHA assumes that no surface operator would use CPDMs for anyone except Part 90 miners. Since surface operators do not have to provide a copy of Part 90 CPDM plans to the representative of the miners, MSHA assumes that there is no burden or cost to surface operators for these two provisions.

Burden to Post and Provide a Copy of the CPDM Plans to the Part 90 Miners

Proposed § 71.206(a)(3) would require a copy of the CPDM performance plan to be posted and § 90.206(d) would require that the Part 90 miners be given a copy of the CPDM plan. As discussed in Chapter V of the PREA, MSHA assumes that no plans would be posted because no surface operator would choose to use the CPDM unless they have Part 90 miners. MSHA estimates that a clerical employee would take 5 minutes (0.083 hours) to copy and provide the plan to a Part 90 miner. MSHA estimates that there are 200 Part 90 miners who would receive a copy of the CPDM plan. MSHA estimates that the first year burden and cost to provide the plan to all Part 90 miners would be approximately 17 hours (200 plans x 0.0833 hours) and $433 (17 hours x $25.45).

Burden to Revise and Submit Revisions to Approved CPDM Plans

MSHA anticipates that revisions to approved CPDM plans would occur from situations that develop as a result of proposed §§ 71.206(c), 71.206(d), 90.206(b), 90.206(e), 90.209(e)(4) and 90.209(f)(4). MSHA estimates that approximately 49 surface mines (25 percent) with Part 90 miners would make revisions to approved CPDM plans each year. On average, MSHA estimates that a supervisor takes 15 minutes (0.25 hours) to revise an approved plan and a clerical employee takes 15 minutes (0.25 hours) to copy

and submit the revision. MSHA's estimates of the burden and cost to make and submit revisions to the plan are presented below.

Burden Hours

- 49 revisions x 0.25 hrs. per revision = 12 hrs.
- 49 revisions x 0.25 hrs. per copy and submission = 12 hrs.

Total burden hours = 24

Burden Costs

- 12 hrs. x $69.98 wage rate = $840
- 12 hrs. x $25.45 wage rate = $305

Total burden cost = $1,145

Burden to Provide the Part 90 Miners with a Copy of the Revised CPDM Plans

Proposed § 71.206(c)(3) would require a copy of the CPDM performance plan revisions to be posted and § 90.206(d) would require that the Part 90 miners be given a copy of the CPDM plan revisions. As discussed in Chapter V of the PREA, MSHA assumes that no plans would be posted because no surface operator would choose to use the CPDM unless they have Part 90 miners. On average, MSHA estimates that a clerical employee takes 15 minutes (0.25 hours) to copy and provide the plan to the Part 90 miners. MSHA estimates that there are 49 Part 90 miners who would receive a copy of the revised CPDM plan. MSHA estimates that the second year and subsequent years burden hours and cost to provide the revised plan to Part 90 miners would be approximately 12 hours (49 plans x 0.25) and $305 (12 hours x $25.45).

Burden to Validate, Certify, and Transmit Electronically CPDM Data to MSHA

Proposed §§ 71.208(f) and 90.210(f) would require that, within 12 hours after the end of the last sampling shift of the work week, a designated mine official must validate, certify, and transmit electronically to MSHA all daily sample and error data file information collected during the previous calendar week and stored in the CPDM. As discussed in Chapter V of the PREA, MSHA assumes that since no surface operator would choose to use the CPDM unless they have Part 90 miners.

MSHA estimates that validating, certifying, and uploading the CPDM data from a CPDM to a computer and then transmitting it electronically to MSHA takes a designated mine official, earning a supervisor's wage of $69.98, 6 minutes (0.1 hours) per CPDM per week. The number of CPDMs is equal to the number of Part 90 miners. MSHA is assuming 50 weeks per year for all mine sizes. MSHA estimates that the annual burden and cost to validate, certify, and transmit electronically to MSHA all daily sample and error data file information would be approximately 1,000 hours (200 CPDMs x 50 weeks x 0.1 hours) and $69,980 (1,000 hours x $69.98).

Burden to Validate, Certify, and Post CPDM Sampling Information

Proposed §§ 71.209(c) and 90.211(c) would require operators to post certain sampling information and provided it to Part 90 miners. This information is included on the dust data card that can be printed from the CPDM, with the exception of the information concerning the shift length and the total amount of exposure accumulated by the sampled

occupation during the shift. MSHA assumes that the information not included on the dust data card printout would be written down on the dust data card printout.

Proposed §§ 71.209(c) and 90.201(f) would require the operator to make a record showing the length of each shift for each DWP and Part 90 miner. As discussed in Chapter V of the PREA, MSHA assumes that no surface operator would choose to use the CPDM unless they have Part 90 miners; therefore, the shift lengths of the DWPs would not have to be recorded. The shift lengths of the 200 Part 90 miners would have to be recorded every time the CPDM is used.

A new CPDM filter is used every time a CPDM is used to sample, and a dust data card printout is generated after the sample is taken. The number of dust data card printouts to be completed and posted equals the number of CPDM filters used. MSHA estimates that miners are working 5 days per week for 50 weeks or 250 days a year. MSHA estimates that a supervisor, earning $69.98 an hour, would take 3 minutes (0.05 hours) to do the functions described above. MSHA estimates that the annual burden and cost to make a record for the length of each shift for each Part 90 miner would be approximately 2,500 hours (200 Part 90 miners x 250 days x 0.05 hours) and $174,950 (2,500 hours x $69.98).

N. Proposed §§ 70.212 and 71.210 Change in Status Report

Burden to Change Status Report

Proposed §§ 70.212(c) and 71.210(c) are new and would require the mine operator to report status changes that affect the operational readiness of any CPDM unit. Since the CPDM is a new technology, MSHA has no basis upon which to estimate the number of times this would occur. However, this requirement should represent a minimal burden since the reporting can be done electronically and the mines using the CPDM would all have computers (in order to download and transmit the CPDM sampling data) to do the reporting. MSHA has assessed one burden hour for this provision at a cost of $84.70, the supervisor's wage rate for underground mines, where the preponderance of the CPDMs would be used.

O. Proposed § 71.207(c) Listing DWPs

Estimated Burden for Listing the DWPs

Proposed § 71.207(c) would require mine operators to provide the district manager with a list identifying the specific work positions where DWP samples would be collected. MSHA estimates that it would take a supervisor 5 minutes (0.0833 hours) to prepare the list. The supervisor's wage rate is $84.70 at underground mines and $69.98 at surface mines. A clerical employee would take 5 minutes (0.0833 hours) to type the list and mail it to MSHA. The clerical wage is $26.00 at underground mines and $25.45 at surface mines.

First Year Costs

In the first year the number of lists would be equal to the number of surface areas at underground mines plus the number of surface mines and facilities.

Surface Areas at Underground Mines

MSHA estimates that there are 32 surface areas at underground mines. MSHA's estimate of the first year burden and cost to underground mines is presented below.

Year 1

Burden Hours

- 32 lists x 0.0833 hrs. = 2.7 hrs.
- 32 lists x 0.0833 hrs. = 2.7 hrs.

Total burden hours = 5.4 hrs

Burden Costs

- 2.7 hrs. x $84.70 = $229
- 2.7 hrs. x $26.00 = $70

Total burden cost = $299

Surface Mines and Facilities

MSHA estimates that there are 1,123 surface mines and facilities. MSHA's estimate of the first year burden hours and cost to surface mines is presented below.

Year 1

Burden Hours

- 1,123 lists x 0.0833 hrs. = 94 hrs.
- 1,123 lists x 0.0833 hrs. = 94 hrs.

Total burden hours = 188 hrs.

Burden Costs

- 94 hrs. x $69.98 = $6,578
- 94 hrs. x $25.45 = $2,392

Total burden costs = $8,970

Annual Costs

MSHA assumes that about 10 percent of underground mines with surface areas and 10 percent of surface mines and facilities would have to submit a new list of DWPs. The 10 percent includes new mines and facilities submitting a list for the first time and existing mines and facilities revising the list to account for changes in their operations.

Surface Areas at Underground Mines

MSHA estimates that there are 3 (32 x 0.1) surface areas at underground mines that would have to submit a new DWP list. MSHA's estimate of the annual burden hours and cost to surface mines is presented below.

Burden Hours

- 3 lists x 0.0833 hrs. = 0.3 hrs.
- 3 lists x 0.0833 hrs. = 0.3 hrs.

Total burden hours = 0.6 hrs.

Burden Costs

- 0.3 hrs. x $84.70 = $25
- 0.3 hrs. x $26.00 = $8

Total burden costs = $33

Surface Mines and Facilities

MSHA estimates that there are 112 surface mines and facilities (1,123 x 0.1) that would have to submit a new DWP list. MSHA's estimate of the annual burden hours and cost to surface mines is presented below.

Burden Hours

- 112 lists x 0.0833 hrs. = 9 hrs.
- 112 lists x 0.0833 hrs. = 9 hrs.

Total burden hours = 18 hrs

Burden Costs

- 9 hrs. x $69.98 = $630
- 9 hrs. x $25.45 = $229

Total burden costs = $859

Proposed § 72.700 Respiratory Equipment; Respirable Dust

Burden to Make a Record of Respiratory Training

Proposed §§ 72.700 (c) would require coal operators to make a record after completion of the respirator training. MSHA estimates that 11,047 underground miners would need the training annually. For surface mines, the number of miners needing the training due to a violation of the standard equals the estimated number of violations projected for the DWPs. MSHA increased this estimate by 5 percent to account for the times when the result exceeded the standard but did not exceed the ECV. The number of miners to be trained in surface coal mines would vary according to the estimated number of violations, 80 miners in the first year, 62 miners in the second year, and 38 miners in the third year.

MSHA estimates that it would take a clerical employee, earning $26.00 an hour in an underground coal mine or $25.45 an hour in a surface mine, thirty seconds (0.00833 hours) per trainee to make a record of respirator training. MSHA's estimates of the burden hours and costs are presented below.

Underground Mines

Burden Hours

- 11,047 records x 0.0083 hrs. = 92 hrs.

Burden Costs

- 92 hrs. x $26.00 wage rate = $2,393

Surface Mines

The estimates for surface mines are based upon the projected number of citations and vary from year to year. MSHA estimates that one miner would receive respirator training for each citation.

Year 1

- 80 miners x 0.0083 hrs. = 0.66 hr.
- 0.66 hr. x $25.45 wage rate = $17

Year 2

- 62 miners x 0.0083 hrs. = 0.51 hr.
- 0.51 hr. x $25.45 wage rate = $13

Year 3

- 38 miners x 0.0083 hrs. = 0.32 hr.
- 0.32 hr. x $25.45 wage rate = $8

Proposed § 75.362 On-Shift Examinations

Burden to make a record of the examinations results and have them verified and countersigned

Burden to make a record of examinations

In order to ensure compliance with the respirable dust control parameters specified in the mine ventilation plan proposed § 75.362(a)(2) would require that the person conducting the examination at underground mines also record the results of the examination and corrective actions taken at the end of each shift for each MMU. MSHA estimates that a supervisory person, earning $84.70 per hour, would take 3 minutes (0.05 hours) to make a record of the examination for the average mine in all mine sizes.

Based upon the number of shifts operated at each mine size, MSHA estimates that the examination for 547,650 shifts would have to be recorded each year. MSHA estimates that underground coal operators annual burden hours and cost to record the results of on-shift examinations are approximately 27,383 hours (547,650 records x 0.05 hours per record) and $2,319,340 (27,383 hours x $84.70).

Burden to certify examination by initials, date, and time at examination location

Proposed § 75.362(g)(2)(i) would require that the proposed § 75.362(a)(2) record be certified by initials, date and time on a board maintained at the section load-out or similar location showing that the examination was made prior to resuming production. The certified person directing the on shift examination would do the certification. This proposed standard does not add any new burdens or costs and is already being done under existing § 75.362(g)(1) and § 75.362(g)(2).

Burden to have the record verified and countersigned

Proposed § 75.362(g)(2)(ii) would require that the proposed § 75.362(a)(2) record be verified by initials and date for compliance with the respirable dust control parameters specified in the mine ventilation plan. Verification would have to be made no later than the end of the shift for which the examination was made. Proposed § 75.362(g)(3) would

require that the mine foreman or equivalent official countersign each examination record under proposed § 75.362(a)(2) after it is verified by the certified person directing the examination under proposed § 75.362 (g)(2)(ii). MSHA estimates that: it takes 1 minute (0.0167 hours) to verify the record by a certified person earning $84.70 per hour ; and another 1 minute (0.0167 hours) to review and countersign the record by a mine foreman or equivalent mine official earning $84.70 per hour. MSHA estimates that underground coal operators annual burden hours and costs to verify and countersign the proposed § 75.362(a)(2) record are approximately 18,292 hours (547,650 records x 0.0334 hours) and $3,098,582 (18,292 hours x $84.70).

IX. SUMMARY OF ESTIMATED BENEFITS AND COSTS

This section presents a summary of estimated benefits and costs of the proposed rule for informational purposes only. Under the Mine Act, MSHA is not required to use estimated net benefits as the basis for its decision. MSHA's estimates suggest, however, that net benefits are positive, with estimated annualized benefits ranging from $99 to $197 million and estimated annualized costs ranging from $40 to $44 million. The estimates of costs and benefits are only roughly comparable due to both limitations in the data and different underlying assumptions.

The annualized dollar value of the benefits MSHA estimated range from a low of $99 million per year for only two provisions of the proposed rule and an assumption of a 10 year latency period at a discount rate of 7% to a high of $197 million per year for four of the provisions of the rule and an assumption of no latency. These estimates are both incomplete and highly uncertain because they do not include the potential impacts of other provisions of the proposed rule and because MSHA does not have the data necessary to either a) calculate benefits to those with historical exposures and pre-existing conditions or b) estimate how long into the future it will be until the benefits of this regulation might begin to accrue. With respect to the latter, the comparison of benefits streams from assuming no latency to assuming a ten-year latency highlights the degree of uncertainty. While an estimate of no latency is unrealistic, so are the implicit assumptions that there would be no benefits of the provisions that were not included and no benefits would accrue to those with significant historical exposures. Thus, these estimates encompass a significant amount of uncertainty. MSHA requests comments on methods to both improve the comprehensiveness of the benefits estimates and better characterize timing of the stream of benefits.

Table IX-1 Annualized Benefits
7% Discount Rate (Millions of 2009 Dollars)

Distribution Assumptions:	2 provisions	4 provisions
Immediate, evenly distributed		
Underground/Part 90	$128.5	$158.3
Surface	$30.8	$38.5
….Total	$159.3	$196.8
10-year latency, evenly distributed		
Underground/Part 90	$79.9	$98.5
Surface	$19.2	$24.0
….Total	$99.1	$122.4

The annualized costs MSHA estimated range from $40.4 to $44.5 million. The lower value represents MSHA's most likely estimate. The higher value includes additional costs for those rare instances where some operators of underground mines may encounter implementation issues as they attempt to comply with the proposed requirements and may need to take additional measures to comply with the proposed

standard. MSHA requests comments on the cost estimates and solicits information on data sources to better characterize the cost range.

Table IX-2: Annualized Costs of Proposed Rule
7% Discount Rate (Millions of 2009 dollars)

	1-19	20-500	501+	Totals
Most Likely Estimated Costs				
Underground Operators	$1.6	$29.6	$4.4	$35.6
Surface Operators	$1.1	$3.3	$0.4	$4.8
Total	$2.7	$32.9	$4.8	$40.4
Most Likely Estimated Costs plus Additional Costs for Rare Situations				
Underground Operators	$1.6	$32.5	$5.6	$39.7
Surface Operators	$1.1	$3.3	$0.4	$4.8
Total	$2.7	$35.8	$6.0	$44.5

The range of benefits and costs estimated by MSHA do not correspond to the same assumptions: the benefit range corresponds to changes in assumptions about latency periods while the cost range corresponds to assumptions about whether some mines may incur additional costs. Thus, the probability that the benefits will be at the high end of the benefit distribution is entirely independent of the probability that the costs will be at the high end of the cost distribution. A comparison of benefits and costs, therefore, encompasses a broad range of independent assumptions.

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