

$$P_x = 1000 \times \frac{x}{1+x}$$

$$\text{where } x = e^{a_0 + a_1 \times \text{age} + a_2 \times (\text{years of exposure}) \times (\text{reduced mean annual exposure})} \quad (\text{Eq. 3})$$

Note that the “reduced mean annual exposure” is the current mean annual exposure (based on 2001 data) reduced by eliminating overexposures on just that percentage of shifts for which overexposures have been shown to currently occur.

MSHA then estimated the impact of eliminating all overexposures on individual shifts by calculating (for ages 65, 73, and 80) the differences:

$$\Delta = P_y - P_x \quad (\text{Eq. 4})$$

It is these differences that are presented in Table VI-1. The calculations for each specific entry are detailed in the EXCEL workbook, RiskRdxn.xlw, which has been placed into the public record.¹²

(c) *Technological Feasibility*

The following discussion is a Summary of Chapters 3 and 4 of the Preliminary Regulatory Economic Analysis (PREA). The PREA is available in hard copy by request and also available on MSHA's Web page under Statutory and Regulatory Information. This discussion parallels the Regulatory Impact Analysis discussion in the accompanying notice of proposed rulemaking, “Verification of Underground Coal Mine Operators” Dust Control Plans and Compliance Sampling for Respirable Dust,” published by MSHA, RIN 1219-AB14, in today's **Federal Register**.

MSHA, in consultation with NIOSH, believes that compliance with the proposed Single Sample rule would be technologically feasible for the mining industry. The Single Sample rule would predominantly affect MSHA's

procedures since MSHA alone conducts inspector sampling. However, due to the promulgation of the Single Sample rule, some operators would experience a slight increase in the number of abatement samples they would conduct using current technology. After the promulgation of the proposed Single Sample rule, coal operators would continue to comply with the existing respirable dust concentration limit of 2.0 mg/m³. Such compliance with the applicable standard has proven feasible over the years. Furthermore, compliance determination based on an inspector, single sample result was found to be technologically feasible during the prior effective Interim Single-Sample Enforcement Policy (Single Sample), in effect from March 2, 1998 through September 4, 1998.

(d) *Economic Feasibility*

The following discussion is a Summary of Chapters 3 and 4 of the Preliminary Regulatory Economic Analysis (PREA). The PREA is available in hard copy by request and also available on MSHA's webpage under Statutory and Regulatory Information. This discussion parallels the Regulatory Impact Analysis discussion in the accompanying notice of proposed rulemaking, “Verification of Underground Coal Mine Operators” Dust Control Plans and Compliance Sampling for Respirable Dust published by MSHA, RIN 1219-AB14, in today's **Federal Register**.

MSHA, in consultation with NIOSH, believes that the Single Sample rule would be economically feasible for the coal mining industry based on its most recent cost estimates. The coal mining industry would incur costs of approximately \$3.1 million yearly to comply with the proposed Single Sample rule. Coal mine operators would also incur approximately an additional \$1.7 million yearly in penalty costs associated with the additional citations arising from the proposed Single Sample rule.¹³ That the total \$4.8

million borne yearly by the coal mining industry as a result of the proposed Single Sample rule is well less than 1 percent (about 0.03 percent) of the industry's yearly revenues of \$17.7 billion provides convincing evidence that the proposed rule is economically feasible.

Since single sample and plan verification are complementary NPRMs intended to be promulgated at the same time, the detailed presentation of assumptions and estimates for each are available in the same Preliminary Regulatory Economic Analysis (PREA)(MSHA, February 2003).

(e) *Costs and Benefits: Executive Order 12866*

In accordance with Executive Order 12866, the Agencies have revised the PREA of the estimated costs and benefits associated with the proposed rule for the underground and surface coal mining sectors. The key findings are summarized below.

1. **Compliance Costs**

The Agencies estimate that the cost of this NPRM would be approximately \$3.1 million annually, of which all but about \$57,000 would be borne by underground coal mine operators (the residual \$57,000 to be borne by surface coal mine operators). Table XIII-1 (Summary of Compliance Costs) summarizes the estimated compliance costs by provision, for underground and surface coal mines, for the following three mine size categories: (1) Those employing fewer than 20 workers; (2) those employing between 20 and 500 workers; and (3) those employing more than 500 workers.

The compliance costs arising from the Single Sample NPRM would occur as a result of an increase in the number of MSHA inspector citations issued to underground and surface coal mine operators due to the determination of noncompliance being based on the results of a MSHA single sample rather than the average of multiple-shift sample results. The additional citations

¹² The method used here provides an approximation of the expected risk reduction (Δ), assuming approximate linearity of the exposure-response relationship over the exposure range of interest. This differs from the method used in the previous proposed rule, where lower bounds on the risk reduction were calculated. The calculations in the previous proposed rule defined

$A = P_y - P_x$,
where $y' = y/x$ and x and $x' = e^{a_0 + a_1 \times \text{age}}$

The previous method results in lower values than those shown in Table VI-1. For example, for “CWP 1+” among affected DO miners at age 73, applying the previous method to 2001 operator and MSHA data would have resulted in a calculated risk reduction of 16.3 per thousand instead of the 24.4 per thousand presented in Table VI-1. MSHA believes the method used in the current proposed rule more accurately represents the reduction in risk that can be expected if all individual shift overexposures are eliminated.

¹³ The estimate of the number of additional citations MSHA anticipates issuing under the single sample rule reflects a substantial increase over the number of additional citations anticipated under the July 7, 2000 proposed rule. This is because the baseline period employed in the revised cost estimates (August through December 2001) reflects the time period after which MSHA ceased issuing citations based upon multiple samples collected over a single shift. As a result, the number of

citations during the revised base period is lower than the number of citations for the base period used in the July 7, 2000 cost estimate. The estimate of the number of additional citations MSHA expects to issue under the single sample proposed rule rose from 561 in the July 7, 2000 PREA to 909 in the 2003 revised PREA. This increase in the number of additional citations is primarily responsible for the increase in the revised total cost estimate for the single sample proposed rule.