

Chronic Hazards and Acute Enforcement: Dilemma for Occupational Health Enforcement Policy

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MANY OCCUPATIONAL DISEASES ARE CHRONIC, developing insidiously over several years. A principal method of preventing such diseases is by government regulation in the form of setting and enforcing standards of exposure to harmful substances. Based on scientific research and balanced against questions of feasibility, occupational health standards are designed to permit persons to work for their entire working lives without experiencing adverse health effects caused by the regulated substance (Paull 1984).

This paper is concerned with enforcement policy for the prevention of chronic occupational disease. It is prompted by a legal decision affecting the mining industry, a decision that ultimately raised an important question of general interest: How are occupational health standards to be enforced in order to prevent chronic disease? One answer is that they should be enforced in the same way that other standards are—by documenting violations, assessing their seriousness, and imposing penalties. An important stage in this procedure is assessing the seriousness of each violation, because the severity of penalties and other sanctions depend on this risk assessment. Because of the nature of chronic occupational disease and because of the purpose of standards, this micro-level risk assessment is difficult, if not impossible to conduct.

The problem of enforcing health standards designed to prevent

chronic occupational disease was brought to public attention by a decision of the Federal Mine Safety and Health Review Commission.¹ By 4 to 1, the commission outlined criteria that mine inspectors must use in determining whether a violation of a health or safety standard should be considered "significant and substantial" (S and S). The term "significant and substantial" is taken from Sec. 104(d)(1) of the Federal Mine Safety and Health Act of 1977,² which provides in part:

If upon any inspection of a coal or other mine, an authorized representative of the Secretary finds that there has been a violation of any mandatory health or safety standard, and *if he also finds that, while the conditions created by such violation do not cause imminent danger, such violation is of such nature as could significantly and substantially contribute to the cause and effect of a coal or other mine safety or health hazard*, and if he finds such violation to be caused by an unwarrantable failure of such operator to comply with such mandatory health or safety standards, he shall include such finding in any citation given to the operator under this Act. [emphasis added]

The S and S designation in this section has a rough philosophical analog in Section 17(k) of the Occupational Safety and Health Act (29 U.S.C. Sec. 666) which states:

[A] *serious* violation shall be deemed to exist in a place of employment if there is a substantial probability that death or serious physical harm could result from a condition which exists . . . in such place of employment." [emphasis added]

In the *National Gypsum* decision, the majority of the commission held that,

. . . a violation is of such a nature as could significantly and substantially contribute to the cause and effect of a mine safety or health hazard if, based upon the particular facts surrounding that violation, there exists a reasonable likelihood that the hazard contributed to will result in an injury or illness of a reasonably serious nature (p. 825).

¹ *Secretary of Labor v. Cement Division, National Gypsum Co.* Federal Mine Safety and Health Review Commission Docket no. VINC 79-154-pm. Reported at 3 FMSHRC 822 (1981).

² Federal Mine Safety and Health Act of 1977. 30 U.S.C. Section 801 *et. seq.* 1982.

With this decision, the commission rejected the Secretary of Labor's policy of determining all violations to be significant and substantial except those of a purely technical or bookkeeping nature. The commission also placed responsibility for determining whether a violation of a standard should be S and S in the hands of the mine inspector, saying ". . . the inspector's independent judgement is an important element in making significant and substantial findings, which should not be circumvented" (pp. 825-26).

In the context of mine safety regulation, the importance of the S and S finding is twofold. First, it permits the Federal Mine Safety and Health Administration (MSHA) to impose larger civil penalties against the mine operator for violations of the standards than would be possible under the current regulations. The less stringent alternative would have MSHA impose a maximum \$20 fine (30 Code of Federal Regulations Part 100). Second, it permits MSHA to accumulate violations that could be considered as a so-called "pattern of violations" (Sec. 104(e)), which would place a mine under close scrutiny and could result in its closing until no S and S violations are found.

The pattern-of-violations feature of S and S citations was a prominent part of the commission's opinion in *National Gypsum*. A mine being placed under such an order remains hypothetical, however, since MSHA has not drafted regulations that would implement this section of the act.

The *National Gypsum* criteria arise from what appears to be a common-sense concept: the penalty should fit the crime. It assumes, moreover, that the effects of the crime can be assessed by an inspector during an inspection. It is conceivable that such an assessment could be made for violations of safety standards and this is the intuitive basis for the *National Gypsum* criteria. Whether these criteria are adequate for the task of evaluating violations of safety standards or standards designed to prevent exclusively acute occupational disease is not addressed in this paper.

There has been a profound effect on enforcement practices following the *National Gypsum* decision. For example, the proportion of all violations (most of which concern safety) that are classified S and S declined sharply from about 80 percent in February 1981 to 29 percent in August 1981. The proportion of violations classified as S and S also varies widely among MSHA districts, suggesting some uncertainty about how to interpret the *National Gypsum* decision. And there are

numerous controversial citations for violations of safety standards which were not classified as S and S.

We are concerned with the effect the decision may have on enforcing the standard for coal mine dust, the causative agent for coal workers' pneumoconiosis (CWP) and other chronic occupational respiratory diseases among coal miners. At the heart of the problem is a dilemma: Those respiratory diseases caused by exposure to coal mine dust are chronic diseases that develop after many years of repeated exposure. Except under extreme circumstances, no exposure over a short time period (a week, for example) taken by itself would be sufficient to cause "reasonably serious" disease. The *National Gypsum* decision, however, would require deference to the professional opinion of the mine inspector, focusing his attention on the "particular facts" surrounding a violation to determine whether there was a "reasonable likelihood" of disease. CWP is a chronic disease; yet, *National Gypsum* would have the mine inspector evaluate violations of the coal mine dust standard as if it were acute. These issues are of general interest beyond mining. The precedent set in *National Gypsum* may also affect the development of rational and effective policies for the prevention of chronic occupational diseases in other industries.

A recent report by the National Research Council, Committee on the Institutional Means for Assessment of Risks to Public Health (1983) concluded, among other things, that "the basic problem in risk assessment is the sparseness and uncertainty of the scientific knowledge of the health hazards addressed," an issue so prominent that it was reiterated in the letter of transmittal. Uncertainty is less of a problem in regulating exposure to coal mine dust. In coal mining, knowledge about exposure is well documented; respirable dust is required to be measured at least thirty times each year in each section of underground coal mines and less often for surface mines (30 CFR Parts 70, 71). For the nation's underground coal mines, this resulted in more than 60,000 dust samples being taken in 1982, a year when unemployment among miners approached 30 percent. In addition, the risk of disease, in the form of a dose-response relationship, has been well described (Hurley et al. 1982; Jacobsen et al. 1970, 1971; Jacobson 1970).

The effort to reduce the risk of occupational respiratory disease among coal miners is something of a paradigm that deserves careful study. Problems associated with the enforcement of other occupational

health standards as suggested by the National Research Council report above—specifically, less well-documented standards and less information about actual workplace exposure—are not as prominent in coal mining as elsewhere. Consequently, there is less uncertainty about the implications of various policy options. Empirical research on the effectiveness of regulation is possible and would be useful.

Progress in dust control following passage of the Federal Coal Mine Health and Safety Act of 1969³ (which was incorporated into the 1977 Mine Safety and Health Act) is well documented. During this time, the average concentration of respirable dust for continuous miner operators, the dustiest job in the most common type of mining, dropped from 6.5 milligrams per cubic meter in the late 1960s to 3.1 in 1970 and 1.3 in 1980 (Jacobson 1970; Parobek and Jankowski 1979; Costantino and Wheeler 1983). At the very least, this reduction in concentration of respirable dust is consistent with the intent of the act; it is tempting to conclude that it is due to the aggressive enforcement effort of the Mining Enforcement and Safety Administration, predecessor agency to MSHA, then to MSHA itself.

Background: Significant and Substantial Violations

The “significant and substantial” language of the Mine Safety and Health Act was carried over from the 1969 Federal Coal Mine Health and Safety Act. In carrying over the language, Congress noted the tortuous history of interpretation to which the phrase had been subjected by the Interior Board of Mine Operations Appeals, predecessor to the current Federal Mine Safety and Health Review Commission.

The board initially had taken a strict view of the S and S language and limited it to situations where the inspector found “a probable risk of serious bodily harm or death.”⁴ In a separate but related case, the United States Court of Appeals for the District of Columbia Circuit rejected this approach.⁵ Although the court did not directly spell out how the S and S test should be applied, the board recognized that

³ Federal Coal Mine Health and Safety Act of 1969. P.L. no. 91-173, 83 Stat. 742 *et. seq.*

⁴ *Secretary of the Interior v. Eastern Associated Coal Corp.* 3 IBMA 331 (1974).

⁵ *United Mine Workers of America v. Kleppe.* 532 F.2d 1403 (D.C. Cir., 1976).

“an honest reading of the court’s opinion thus compels us to overrule *Eastern Associated Corp.*, and to revoke the ‘probable risk’ test.”

In a later case (*Sec. of the Interior v. Alabama By-Products Corporation*),⁶ the board decided that the S and S determination could apply to all violations except the “purely technical violations posing no risk of injury,” or those that posed a source of injury that had only a “remote or speculative chance of coming to fruition.”

When the U.S. Congress passed the Mine Safety and Health Act in 1977, the Senate Report agreed with the above approach and noted “with approval” the board’s determination that “only notices for purely technical violations could not be issued under Section 104(c)(1)” (U.S. Senate Committee on Human Resources. Subcommittee on Labor 1977, 31). MSHA policy was consistent with these views and persisted up to the *National Gypsum* case.

This congressional stamp of approval should have settled the matter. This was not the case. In April 1981 the Federal Mine Safety and Health Review Commission issued the *National Gypsum* decision and continued the tortuous history of the interpretation of this language.

A Brief Summary of the *National Gypsum* Decision

Between April 18, 1978, and May 9, 1978, MSHA inspectors issued 11 “significant and substantial” citations under Section 104(a) of the act to National Gypsum Company. An administrative law judge upheld 10 of the 11 citations and assessed penalties accordingly. The judge found that 9 of the 10 violations were of a “significant and substantial” nature. National Gypsum appealed the judge’s decision to the FMSHRC on the ground that the judge’s interpretation of the S and S provisions was overly inclusive. The commission eventually agreed.

The commission reasoned that the language of Section 104(d) of the act clearly indicates that an S and S finding is to be made *in addition* to a finding of a violation. Therefore, something more than the violation of a standard itself is required. The commission said that the interpretation urged by the secretary would result in virtually all violations that may contribute to an injury being categorized as “significant and substantial” and would be inconsistent with the two-

⁶ *Secretary of the Interior v. Alabama By-Products Corp.* 7 IBMA 85 (1976).

fold finding (i.e., first a violation of a standard and second an evaluation of whether it should be considered S and S) required by Section 104(d).

The commission said that the interpretation urged by the secretary would have an untenable effect on the implementation of Section 104(e)'s "pattern" provisions. Subsection (e)(1) provides that an operator can be required to withdraw miners from the mine if it has a pattern of S and S violations. If an S and S violation is found within 90 days of that notice, an additional withdrawal order is to be issued. A pattern order is lifted only upon an inspection of the entire mine that discloses no S and S violations. If the secretary were correct that almost all violations are to be considered "significant and substantial," most mines would be subject to withdrawal orders under the pattern provisions. This is particularly true for large mines. As a practical matter, an inspection of the entire mine will rarely, if ever, disclose *no* S and S violations.

The commission was not persuaded by the Senate Report. It concluded the legislative history was "contradictory and at odds with the Act's language."

The lone dissenting commissioner argued that the majority's standard was confusing, especially in the area of health violations. He maintained that the secretary's position would not result in all violations being classified as "significant and substantial," as the majority feared. He pointed out that the majority's concern that an operator would never be able to get out from under a pattern order was premature, since no such order had ever been issued by the secretary, nor had criteria been developed for its issuance. He felt the Senate Report clearly indicated Congress's approval of the secretary's enforcement policy.

Missing from the *National Gypsum* decision is any consideration of the need for a policy that would be effective over the working life of the miner, the time span considered in the dust standard. The commission confined its attention to policies designed to evaluate violations one at a time.

Since this decision, the question of how to apply the *National Gypsum* criteria to the enforcement of health standards has arisen. MSHA adopted an interim policy to the effect that violations of health standards should be cited as S and S with an exception allowed for use of personal protective equipment such as dust masks.

Meanwhile, some coal operators, having been issued S and S citations for violations of the respirable dust standard, appealed these actions.

The appeals process begins with a hearing before an administrative law judge (ALJ). The decision of the ALJ can be appealed by the operator to the Federal Mine Safety and Health Review Commission and then into the federal judiciary system, if needed. Operators have argued that designating violations of the respirable dust standard as S and S was contrary to the criteria articulated in *National Gypsum*, i.e., that the violations could not be construed to create a "reasonable likelihood that the hazard contributed to [would] result in an injury or illness of a reasonably serious nature." In one of these cases, a lengthy and "definitive" record was established with expert testimony offered by the government and the operator.⁷ In this case, the ALJ upheld the S and S designation and concluded that *National Gypsum* did not apply. He wrote, "I conclude that every drop in the bucket significantly and substantially contributes to a health hazard." The operator appealed this case to the review commission. The commission accepted review but has not yet issued a decision. Action on other cases has been delayed pending outcome of this case.

Prevention of Dust-induced Respiratory Disease in Coal Miners

Coal workers' pneumoconiosis (CWP), silicosis, chronic bronchitis, and emphysema are chronic lung diseases caused by the inhalation of coal mine dust (Hyatt, Kistin, and Mahan 1964; Leigh et al. 1983; Lyons et al. 1981; Morgan and Lapp 1976; Rogan et al. 1973; Ruckley et al. 1984). CWP and silicosis are unambiguously occupational in origin while chronic bronchitis and emphysema may also be caused by other factors, the most common being cigarette smoking. These diseases develop over a relatively long time period and are refractory to treatment. Risk of these occupational respiratory diseases can be reduced by reducing the concentrations of airborne coal mine dust.

In the Coal Mine Health and Safety Act of 1969 (P.L. 91-173), and later in the Federal Mine Safety and Health Act of 1977, the U.S. Congress established public policy to prevent occupation-related

⁷ *Consolidation Coal Co. v. Secretary of Labor*. Federal Mine Safety and Health Review Commission, Docket no. WEVA 82-209. Reported at 3 FMSHRC 378 (1983).

disease among coal miners by providing a working environment that is sufficiently free of dust to permit each miner the opportunity to spend his "entire working life without incurring disability from CWP or any other occupation-related disease" (Sec. 201(b)). To achieve this goal, the Congress requires each coal mine operator "to continuously maintain the average concentration of respirable dust for each miner on each shift at or below 2.0 milligrams per cubic meter of air" (Sec. 202(b)(2)), a standard that was phased in from July 1972 to December 1975.

The Federal Mine Safety and Health Administration (MSHA) in the Department of Labor is responsible for enforcing the 2.0 milligram standard. Current MSHA regulations (30 CFR Part 70.201-220) require operators of underground coal mines to take measurements of dust concentration six times each year for each section of each mine. At each sampling cycle, operators are to take samples on five production shifts for certain specified occupations and areas that are known to be dusty. These samples and supporting data are transmitted to MSHA for analysis and if the average of five valid samples is over the standard, the operator is issued a citation for noncompliance. It is at this point that MSHA may designate the violation as S and S and where the *National Gypsum* decision looms large.

Enforcing sanctions commensurate with risk is an adaptation of the conceptual framework for making decisions about safety standards. But health hazards are different from safety hazards, especially for chronic disease. For example, working under an unsupported roof is clearly a serious safety hazard; in 1982, a typical year, roof falls accounted for the largest proportion of underground coal mine fatalities—52 out of 95, or 55 percent. Yet a miner can work under an unsupported roof and if it does not fall, he is none the worse for it. The miner carries no residual risk with him. A miner who inhales coal mine dust over one or even five shifts may experience minor reversible acute effects but will retain a small amount of dust which will add to his risk of disease.

To borrow terminology from mathematics, given an exposure, risk of chronic occupational disease is a dependent and continuous variable; risk of accidental injury is a discrete variable, independent of prior and subsequent exposure. Risk of chronic dust-induced disease depends on other exposures both before and after any particular time and is cumulative. Risk of accidental injury is not cumulative; each exposure

is independent. To reduce risk analysis for occupational disease to the facts surrounding a particular violation ignores these differences. Such an approach is inconsistent with the essential nature of chronic occupational diseases such as coal workers' pneumoconiosis.

The philosophy surrounding the coal mine dust standard and the nature of the diseases caused by exposure to coal mine dust stand in sharp contrast to the requirements laid out in *National Gypsum*. Prevention of chronic disease requires attention to 30 years' exposure; *National Gypsum* would require us to limit attention to the average of five shifts or, by extrapolation, to two months (the time interval between samples). It has taken teams of medical researchers and epidemiologists many years to estimate the likelihood of disease given 30 years exposure; *National Gypsum* effectively constrains inspectors to make the same assessment on the basis of five measurements. Strict adherence to the *National Gypsum* criteria would result in arbitrary and nonsensical decisions about the severity of sanctions for violations of the respirable dust standard.

Criteria for an Enforcement Policy to Prevent Chronic Occupational Disease

The fundamental dilemma is that coal workers' pneumoconiosis is a chronic disease while standards enforcement remains an "acute" activity precluding the type of quasi-scientific risk assessment implied in *National Gypsum*. In what follows, we suggest criteria for policy making that apply to preventing respiratory disease among coal miners as well as to other chronic occupational diseases. In setting enforcement policies for prevention of chronic occupational disease, we suggest three important considerations: (1) Enforcement policies should be consistent with the nature of the disease they are designed to prevent; (2) enforcement policies should create incentives sufficient to cause reduction of exposure to concentrations over a sufficiently long time period in order to minimize the risk of disease; (3) risk assessment is more appropriate for standards-setting activity than it is for making enforcement policy.

For enforcement policies for health standards to be effective, they should be constructed on a thorough understanding of the diseases they are designed to prevent, as is done for other public health measures. The features of respiratory diseases caused by the inhalation

of coal mine dust that are relevant to this discussion are that these diseases are (a) chronic conditions with negligible acute effects, (b) irreversible, and (c) disabling. They develop insidiously.

Given these features the objectives of a policy should be to prevent disease by reducing exposure to the causative agents over a long time period—the working life of a miner. The potential for compensation liabilities in the event workers become disabled due to dust inhalation provides a theoretical incentive for an entire industry to protect its workers from chronic disease. This incentive is delayed, however, and nonspecific; liabilities for payment begin with disability and fall upon a miner's last employer, not necessarily the one that contributed most to his or her disease.

Another incentive is regulation, i.e., setting and enforcing occupational health standards as illustrated by the passage of the 1969 Federal Coal Mine Health and Safety Act. In passing this act, Congress appears to have anticipated a concerted effort to prevent disease. That dust concentrations have been reduced during the 15 years the act has been in effect has been noted above. Congress demonstrated the seriousness of its concern with respiratory disease among miners in several ways. For example, the coal mine dust standard is the only occupational health standard that is defined by statute. It is the only standard that requires frequent monitoring. Operators are expected continuously to maintain average dust concentrations at or below the standard. The Federal Black Lung Compensation Program created by the act is the most extensive of any compensation program for occupational disease, currently paying annual benefits of \$1.7 billion.

While never addressing the specific question of whether violations of the dust standard were to be considered S and S, the Senate nevertheless indicated that it expected civil penalties to be the chief incentive to obtain compliance with all standards (U.S. Senate. Committee on Human Resources. Subcommittee on Labor. 1977). Past performance by the Mining Enforcement and Safety Administration was considered a "great disappointment to the [Senate Labor and Public Welfare] Committee." Given this expectation and given the considerable amount of data that exists documenting concentrations of respirable dust, empirical research designed to evaluate the effectiveness of regulation for reducing dust concentrations would be useful.

The *National Gypsum* decision also raises the question, At what level in the policy-making apparatus should policy be made? It is not consistent with the nature of dust-induced respiratory diseases, nor

with the need for incentives operating over a long time span to delegate enforcement policy to an individual inspector who confines his attention to a few samples. It should be established at a higher level.

This can be demonstrated by discussing, for the sake of argument, the concept of residual risk. A miner (or other worker) carries risk of disease not only from day to day but also from job to job and mine to mine. The regulated entity, however, is the workplace, in this case the mine or mine section. The intent of policy is to prevent disease in miners indirectly by regulating dust levels in mines. It would not be valid to assume that a miner (or any other worker) would remain in one job, one section, or one mine throughout his or her working life. If a worker is to be protected by a policy to prevent disease, he or she should be able to go from one section or job or day to another without losing that protection.

A significant measure of protection would be lost by a policy that is designed as though the risk of chronic disease could be assessed on the basis of "particular facts surrounding a violation" in a particular mine or mine section. Delegating enforcement policy (in the form of whether a citation should be S and S, for example) to the assessment of a single inspector will neither achieve the results intended by the act nor adhere to established principles of public health. A policy for the industry as a whole, set at a higher level among policy makers (for example, by the Secretary of Labor or Congress) is needed.

Conclusion

It is a well-understood principle of public health, indeed of disease control in general, that preventive efforts must be consistent with the natural history of a targeted disease. A principal method of preventing occupational disease is through governmental regulation, i.e., setting and enforcing standards for exposure to health hazards encountered on the job. Enforcement policies as well as standards setting should be consistent with relevant features of the disease in question. Using recent cases concerned with enforcement policies for the federal coal mine dust standard, we have shown that strategies for disease control cannot be adapted from strategies for controlling safety hazards because the natural history of industrial accidents differs from the natural history of many occupational diseases. If disease develops insidiously,

then enforcement policy should consider a sufficiently long time period to be effective. If there is no acute phase, then an enforcement policy that requires a demonstration of harm or the risk of harm caused by isolated measurements of exposure will go begging for evidence and will render enforcement powerless. If we cannot predict with precision who will be affected, policy should be sufficiently broad in scope to protect all potentially exposed workers. If the disease process is irreversible, then it is more important that prevention must be the principal objective of policy.

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