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Federal Mine Safety and Health Review Commission
Office of Administrative Law Judges

SECRETARY OF LABOR, MINE SAFETY AND HEALTH ADMINISTRATION (MSHA), PETITIONER	Civil Penalty Proceedings Docket No. PENN 82-177 A.O. No. 36-00970-03 120
v.	Maple Creek No. 1 Mine
U. S. STEEL MINING CO., INC., RESPONDENT	Docket No. PENN 82-220 A.O. No. 36-03425-03104
	Maple Creek No. 2 Mine
U. S. STEEL MINING CO., INC., CONTESTANT	Contest of Citations
v.	Docket No. PENN 82-73-R Citation No. 9901282; 1/20/82
SECRETARY OF LABOR, MINE SAFETY AND HEALTH ADMINISTRATION (MSHA), RESPONDENT	Maple Creek No. 1 Mine Docket No. PENN 82-76-R Citation No. 9901285; 1/22/82
	Maple Creek No. 2 Mine

DECISION AND ORDER

These consolidated review-penalty cases are before me on the parties' waiver of hearing and cross motions for summary decision on stipulated facts. The dispute centers on the proper interpretation of the facts and applicable law. The core issues are:

1. Whether a sample of respirable dust taken on a single shift by a duly certified representative of the Secretary (a coal mine inspector) is in accord with the procedure prescribed by the statute.

2. Whether a sample of respirable dust taken on a single shift was, as a matter of scientific fact, sufficient to determine the average concentration of respirable quartz present in the atmosphere of the mechanized mining units sampled.

3. Whether the violations charged "could have contributed to a significant and substantial" mine health hazard.

Findings and Conclusions

The fundamental requirement of the respirable dust standard is that the average concentration be continuously maintained at or below 2 milligrams per cubic meter of air (2mg/m3). Section 202(a), 30 C.F.R. 70.100. The two milligram standard must be lowered, however, whenever the total respirable dust mass in the mine atmosphere contains more than 5% quartz. Section 205, 30 C.F.R. 70.101. Consequently, when sections 202(a) and 205 are read together the statutory respirable coal mine dust standard is 2 milligrams (not to exceed 5% quartz) per cubic meter of air.

When the presence of an excessive concentration of quartz is detected, the operator is thereafter required to maintain the respirable dust mass below an average concentration of 2 milligrams of air cubed. The applicable standard is determined by dividing the percentage of quartz into the number 10. 30 C.F.R. 70.101. The formula for determining the applicable respirable dust standard when quartz is present was prescribed by the Secretary of Health Education and Welfare, now the Secretary of Health and Human Services. It was derived from

the Threshold Limit Values (TLV) first published for free silica by the American Conference of Governmental Industrial Hygienists in 1968.

In these cases, the percent of quartz present on the mechanized mining units in question was 11%. Therefore, the average concentration of respirable dust in the mine atmosphere associated with the two units had to be thereafter maintained at 0.9 milligrams of respirable dust per cubic meter of air (10/11 equals 0.9 mg/m3).

I

Samples for determining the percent of concentration of quartz in the respirable dust mass present in the mine atmosphere are taken by the Secretary of Labor through duly certified coal mine inspectors. Such single shift samples are not used to determine compliance with the mine dust standard in effect at the time the sample is taken. The percent of quartz is merely used to set the standard for future sampling. But if the percent of quartz in the sample analyzed is more than 5 the Secretary will give the operator notice of a lowered standard which will thereafter be used to establish compliance or noncompliance on the basis of averaging multi-shift samples taken by the operator during his next bi-monthly sampling period. 30 C.F.R. 70.201, 207.

The operator says this procedure is contrary to the Act which, it contends, requires all respirable dust samples be taken by the operator. MSHA, the operator claims can only

take dust samples for the purpose of checking "on the accuracy of the operator's sampling program". For this reason, the operator asserts the respirable dust samples taken by certified persons who are not employed by the operator are not samples that can be used to lower the 2 milligram standard.

I find the contention without merit.

Section 202(g) specifically authorizes the Secretary of Labor or his delegate to "cause to be made such frequent spot inspections as he deems appropriate of the active workings of coal mines for the purpose of obtaining compliance with [the respirable dust standards] of [Title II]. Legislative History, Coal Act, 1124 (1970). This authority is complemented by that found in section 104(f) which sanctions use of "samples taken during an inspection by an authorized representative of the Secretary" to determine whether the "applicable limit on the concentration of respirable dust required to be maintained under this Act is exceeded", and, if so, for issuance of a "citation fixing a reasonable time for abatement."

The broad underlying authority, of course, is section 103(a)(1) and (4) which authorize inspections, and therefore sampling, to obtain "information relating to health conditions and the causes of diseases" and to determine "whether there is compliance with the mandatory health standards . . . or other requirements of this Act". The cumulative import of this authority provides compelling support for the view that Congress intended the Secretary have power, independent of

the operator, to police compliance with the quartz limitation mandated by section 205.(FOOTNOTE 1)

II

Under section 205 of the Coal Act the Secretaries of Interior and of Health, Education and Welfare were delgated authority to develop and promulgate a formula that would permit a reduction in the applicable respirable dust standard whenever the quartz content of respirable dust in the atmosphere exceeded 5 percent.(FOOTNOTE 2) The formula, which issued in March 1971, 30 C.F.R. 70.101, required that whenever the "concentration of respirable dust in the mine atmosphere" contained "more than 5 percent quartz" the applicable respirable dust standard for that working place should be reduced by an amount computed "by dividing the percent of quartz into the number 10"(FOOTNOTE 3)

For many years the threshold limits for dust containing quartz have been based on the concept that the magnitude of the toxicity of the dust is proportional to the concentration of quartz in the dust. Based on studies done in 1929 and 1935, it was determined the toxicity limit (TLV) for quartz dust was 0.1 milligrams per cubic meter of air. The formula developed by the National Institute for Occupational Safety and Health (NIOSH) for applying this limit was: TLV equals 10 divided by the percent of respirable quartz found in a sample of respirable dust.(FOOTNOTE 4)

Thus, if the quartz component of the average concentration of respirable dust during a single shift is 5 percent of a 2 milligram mass, the concentration of quartz is 100 micrograms (.1 milligrams) per cubic meter of air and no reduction in the total concentration of respirable dust (2mg/m3) is mandated. (10/5 equals 2). On the other hand, if the respirable mass standard was 3 milligrams of air cubed, the 5 percent limit would still require it be lowered to 2 (10/5 equals 2) if the quartz content exceeded 5 percent.

In the instant case, it was found that the quartz component had increased to a concentration level of 11 percent. Consequently, the miners were being exposed to approximately 190 micrograms of concentrated quartz dust which was almost twice the permissible dosage-exposure for each shift. The record shows this exposure which began some time in September 1981 continued until abated in January 1982.

The quartz standard issued in March 1971 and was reissued without substantive change in April 1980. 45 F.R. 23995.(FOOTNOTE 5) From the inception of the enforcement program to February 1981, the procedure for evaluation of respirable quartz concentrations was known as the Standard Method A7, or KBr (Potassium bromide) method. To perform the necessary chemical analysis and infrared spectrophotography a sample of respirable dust weighing 1 to 4 milligrams was required. Because samples collected during a mine health inspection usually contained less than this amount it was often necessary to combine from 10 to 30 samples to make a composite sample of 1 to 4 milligrams. The composite sample was then ashed, combined with potassium bromide, pelletized and analyzed for quartz content by making an infrared spectrophotograph of the absorbance traces for crystalline silicon dioxide.

Collecting and making composite samples was not only time consuming but also severely limited the number of mines on which quartz determination could be made. For example, in 1980 approximately 59,000 samples were collected and submitted for quartz analysis. From these, only 1,500 quartz analyses could be performed.

To increase the number of samples available for testing, MSHA modified its analytical method in February 1981. The new method permit a quartz content determination to be made on a single sample containing as little as 0.5 milligrams of respirable mine dust. It was first developed by the National Institute of Occupational Safety and Health (NIOSH) in 1977.

Under the new method, the sample is ashed in a low-temperature, radio-frequency (RF) asher, the ashed residue is combined with potassium bromide, pelletized and analyzed for quartz using infrared spectrophotometry. Use of the RF asher affords the advantage of being able to make a quartz analysis of a sample containing as little as 0.5 milligrams of respirable mine dust. The new method, which is capable of detecting about one percent quartz in an ashed sample weighing 0.5 milligrams is known as the Single Sample, Low Temperature Ash (LTA) method of quantifying the quartz in a single valid sample of respirable mine dust. Mine Safety and Health Administration's Procedure for Determining Quartz Content of Respirable Coal Mine Dust (Unpublished 1982).

Equivalency between the "old" and the "new" methods was demonstrated by analyzing replicate samples of respirable dust using both methods and comparing the analytical results. This showed that quartz determinations with the "new" method were within approximately 1 percent of the determinations obtained with the "old" method (i.e., for a determination of 8 percent with the "old" method, the determination with the "new" method would be 7, 8 or 9 percent). In addition, a number of single samples were analyzed to quantify the intersample variability of the "new" method. This showed the coefficient of variability was 17 percent as compared to the "old" method which was 10.8 percent. The difference in variability was of no practical significance since the results of quartz determinations are truncated and reported as whole percentages, that is, an analysis that results in a determination of 5.9 percent quartz is reported as 5 percent.

The variability of disparate samples is admittedly based on a limited amount of data. Samples to determine the day-to-day or multi-shift variability were collected from five mines and 17 sections. From a quantitative standpoint, 80 percent of the time the average standard deviation about the mean, determined from at least five samples, was 2 percent. For single shift samples, i.e., those collected from the same face on the same day, the variability was within a range of plus or minus 1 percent. The evidence shows, and the operator does not dispute, that the variability between and among the analyses

of single and multi-shift samples of respirable mine dust for quartz content is relatively low. Ibid.

The operator claims all this is irrelevant because, the single sample method fails to comply with the requirement that the quartz determination be based on averaging five samples of respirable dust. 30 C.F.R. 207.

The dispositive issue, therefore, is whether the limit on respirable quartz dust can be enforced on the basis of a single shift gravimetric sample of the atmosphere of the mechanized mining units cited or must be a composite of the five multi-shift samples taken to determine compliance with the total respirable mine dust concentration.

Support for the operator's position is found, it is claimed, in MSHA's determination that "a single-shift respirable dust sample should not be relied upon for compliance determinations when the respirable dust concentration being measured" is near 2 milligrams. 45 F.R. 23997 (1980). Pointing out that each of the samples in question was less than 2 milligrams, the operator argues the sampling procedure followed to determine quartz content was not a valid statistical technique because it violated the long-established requirement for multiple sample averaging. 30 C.F.R. 207.

The Secretary's answer is that the statute does not mandate multi-sample averaging to determine the concentration of respirable quartz dust. Section 202(f)(2). MSHA further claims that all the regulation requires is that enforcement

of a lowered standard be based on operator samples collected on five consecutive production shifts or five production shifts worked on consecutive days. 30 C.F.R. 207. Neither Congress, nor the Secretary, it is argued ever intended the pre-compliance quartz sample, i.e., the sample used to establish the lowered dust standard, be derived from a statistically valid sample of the average concentration of the total airborne respirable dust to which the miners were exposed. The Secretary carries his burden, it is claimed, if he shows persuasively that, after applying valid statistical techniques, a single shift sample of respirable mine dust pictures, with scientific accuracy, the concentration of respirable quartz dust in the atmosphere during the shift on which the sample was taken.

Since a single shift sample of each of the continuous miner operators (high risk occupations) cited showed a quartz concentration of 11 percent, the Secretary claims he had a non-discretionary duty to lower the total respirable dust standard to .9 milligrams of air cubed and thereafter to enforce that standard on the basis of multi-sample averaged "compliance" samples.(FOOTNOTE 6)

Resolution of the parties' dispute requires an analysis and interpretation of sections 202(e), 202(f), and 205 of the Mine Safety Law.

Section 205 provides:

> In coal mining operations where the concentration of respirable dust in the mine atmosphere of any working place contains more than 5 percent quartz, the Secretary of Health, Education and Welfare shall prescribe an appropriate formula for determining the applicable respirable dust standard under this title for such working place and the Secretary [of Labor] shall apply such formula in carrying out his duties under this title.

Section 202(e) provides:

> References to concentrations of respirable dust in this title mean the average concentration of respirable dust measured with a device approved by the Secretary and the Secretary of Health, Education and Welfare.

Section 202(f) provides:

> For the purpose of this title, the term "average concentration" means a determination which accurately represents the atmospheric conditions with regard to respirable dust to which each miner in the active workings of a mine is exposed (1) as measured during the 18 month period following the date of enactment of this Act, over a number of continuous production shifts to be determined by the [Secretaries], and (2) as measured thereafter, over a single shift only, unless [the Secretaries] find, in accordance with the provisions of section 101 of this Act, that such single shift measurements will not, after applying valid statistical techniques, to such measurement, accurately represent such atmospheric conditions during such shift.

The legislative history of section 202(f) shows there was a sharp disagreement between the Senate and House over the most reliable method for sampling atmospheric conditions to determine the "average concentration" of respirable dust.

The Senate bill mandated single shift sampling and prohibited the averaging of dust measurements over several shifts. As the operator points out, however, Congressmen representing the operators' interests succeeded in persuading the House to adopt an amendment that would have required multi-shift sampling to determine the "average concentration". The matter was finally resolved in the Conference Committee. Its report states:

> The substitute adopted by the conference requires the operator to maintain continuously the average concentration of respirable dust in the mine atmosphere during each shift to which each miner is exposed at or below the established maximum standard or the permitted maximum standard. It also provides that the term "average concentration" means that for a maximum period of 18 months after enactment, measurements of a minimum number of the same production shifts in consecutive order are authorized to obtain a statistically valid sample. At the end of this 18-month period, it requires that the measurements be over one production shift only, unless the Secretary and the Secretary of Health, Education and Welfare find, in accordance with the standard setting provisions of section 101, that single-shift measurements will not accurately represent the atmospheric conditions during the measured shift to which the miner is continuously exposed. H. Rpt. 91-761, 91st Cong., 1st Sess., 75; Legislative History Coal Act 1037 (1970).

From this, it is clear that the legislative preference is for single shift sampling and that multi-shift averaging is the exception, not the rule. The operator, in fact, concedes that "the Secretaries have never expressly determined that a single shift sample will not accurately represent [the average concentration of respirable quartz dust] after

applying valid statistical techniques". All the Secretaries have determined is that application of valid statistical techniques mandates continued use of the exceptional method, i.e., multi-sample averaging as the basis for the issuance of citations to enforce a lowered standard. 45 F.R. 23997.

I find that as a matter of law, section 202(f) of the Act plainly authorizes use of single shift samples as the basis for determining the concentration of quartz and that the best available scientific evidence supports use of such a procedure.

The operator has chosen not to challenge the evidence adduced by the Secretary to show that, after applying valid statistical techniques, a single shift sample of respirable mine dust can be analyzed by a method which accurately measures the concentration of respirable quartz dust in the atmosphere during that shift.(FOOTNOTE 7) Instead it has generally cited studies relating to the validity of gravimetric measurements of respirable coal mine dust masses.

There is, of course, no dispute about the fact that personal gravimetric samplers were used to collect the respirable mine dust in question. Furthermore, the relevant literature shows that true dust concentrations in coal mines vary from

shift to shift with a coefficient of variation between 30 and 70 percent. Indeed, it is not unusual to find that the dust concentration in the atmosphere of a continuous miner operator has a standard deviation of 70 percent. IC 8753, Respirable Dust Measurement 13-14 (1977).

But, says the Secretary, all this is irrelevant because after applying valid statistical techniques to the infrared spectroscopy method of analyzing single shift samples for quartz it was found that the variability between and among single and multiple samples was relatively low, plus or minus 1 or 2 percent. Indeed, this conclusion seems to be corroborated by a study done by the operator's own industrial hygienists in 1970 or 1971. This study found it was possible using an x-ray diffraction technique to "estimate the quartz and calcite on individual filters where the dust loading was 0.20 mg." The same report recommended that infrared techniques being used in England and Germany be carefully studied to "determine whether this analytical procedure can be applied to individual respirable dust samples". MSHA claims, and I find its evidence supports the conclusion, that by 1981 the infrared technique had been perfected to the point where it could be applied to samples with as little as 0.5 milligrams of dust with the reproductibility error (coefficient of variation) between single and multiple samples so small as to be negligible.

From the standpoint of scientific reliability, it makes no difference whether the quartz analysis is made from a composite of the operator's five samples or an inspector's single sample because only 0.5 milligrams of dust is analyzed in either instance to determine the quartz content. As a practical matter, of course, it makes quite a difference because of the time and effort required to work with five rather than one sample.(FOOTNOTE 8)

The percent quartz content, as previously indicated, is not used as a standard but only as a factor in the formula for reducing the total respirable dust mass. The object is to keep the quartz exposure within the permissible limit. The fact that a 7% quartz content of a .7 milligram sample might be used to reduce the 2 milligram standard to 1.4 milligrams does not mean that a 49 microgram standard for quartz is being enforced. A simple calculation shows the quartz content of the .7 mg sample would have to reach 14% before it would equal 100 micrograms (.7 mg equals 700 ug x 14% equals 98 ug). The formula, on the other hand, is designed to ensure that the quartz content of the reduced standard (mass) does not exceed 100 micrograms or 0.1 mg quartz/m3 (1.4 mg/m3 x 7% equals 0.1 mg/3 quartz). Obviously, if the operator is achieving a .7 mg/m3 concentration of respirable dust he will have no difficulty in complying with the lowered 1.4 mg standard.

Accordingly, I conclude that the Secretary has carried his burden of showing that the single shift samples of respirable mine dust in question provided scientifically valid samples (representative samples) of the average concentration of quartz dust in the relevant atmosphere during the shifts in question. The operator's contest of the validity of the pre-compliance samples, i.e., those used to lower the total dust standard is, therefore, denied.

III

The operator claims the violations in question were not "significant and substantial" because there is no probative evidence that exposure of miners to free silica (quartz dust) generated "naturally in mining" is a significant health hazard. The Secretary responded with a report and supporting documentation from the National Institute for Occupational Safety and Health (NIOSH). This report concluded that an "intermittant or continuous" exposure to more than 100 micrograms per cubic meter of respirable quartz dust, regardless of the size of the total respirable dust mass, "constitutes a serious and substantial hazard to the health of miners." (Exhibit 3).(FOOTNOTE 9)

Based on the expert opinion expressed in the NIOSH report and the accompanying medical literature, the Secretary contends that exposure to high levels of silica dust (100 plus micrograms) in the presence of coal dust results in a synergistic effect that exacerabates the health risk involved in exposure to respirable mine dust. The Secretary argues Congress intended a finding of "significant and substantial" be made whenever an "incipient" health hazard can, on the basis of the best available evidence, be said to pose a significant risk of material health impairment over the long run. Finally, it is claimed that a finding of "significant and substantial" is warranted wherever the fraction of free silica in the mine

atmosphere exceeds 5 percent of the total respirable dust mass because such a condition can, standing alone, contribute to a serious health hazard, namely silicosis.

As noted, the NIOSH report found that "intermittant or continuous" exposure to any concentration of quartz dust in excess of the established hygientically safe level of 100 micrograms per meter of air cubed and more particularly a concentration of 11 percent (190 micrograms) in a respirable dust mass of 1.7 milligrams "constitutes a serious and substantial hazard to the health of a worker".(FOOTNOTE 10) (Exhibit 3). The operator offered no fact-specific rebuttal to this evidence. Thus, the matter is before me on the operator's claim that the Secretary's evidence is, as a matter of law, insufficient to establish the violations charged were "of such nature as could have significantly and substantially contributed to the cause and effect" of a mine health hazard.(FOOTNOTE 11) Section 104(e).

The NIOSH report is probative of the realtionship between quartz exposure and the severity of the resultant health hazard. Well-reasoned expert testimony and opinion based on what is known and uncontradicted may in and of itself be substantial evidence when first-hand evidence on the question is unavailable. Industrial Union v. American Petroleum Institute, 448 U.S. 607, 707 (1980), Dissenting Opinion; Richardson v. Parales, 402 U.S. 389 (1971). I note that while the NIOSH report and its supporting documentation are not part of the stipulated record the operator, in the face of that report, continues to stand on its cross motion and has offered no evidence to contradict the report. With the matter in this posture, I am free to infer there is no evidence other than the pleadings and supporting instruments

to be considered, and so need only examine those materials to ascertain whether an issue of material fact exists. S.E.C. v. Am Commodity Exch., 546 F.2d 1361, 1365-66 (10th Cir. 1976); Manetas v. International Petroleum Carriers, Inc., 541 F.2d 408, 414 (3d Cir. 1976); Commission Rule 64. My review of the parties materials leads me to conclude there is no triable issue of fact with respect to the charge that the violations cited were "significant and substantial".

I deal first with the Secretary's claim that any concentration of quartz in excess of the 100 micrograms allowed by section 205, 30 C.F.R. 70.101, is per se a significant and substantial violation.

Silicosis is a condition of massive fibrosis of the lungs marked by shortness of breath. It results from inhalation of silica dust, is dose and time dependent and medically incurable. Only technical preventive measures in the workplace can control or eliminate the problem. A description of silicosis, extracted from a primer prepared for workers, graphically illustrates the disease's progress.

> The main symptom is shortness of breath, at first occurring only during physical activity, but soon appearing after less and less exertion, until eventually the victim is short of breath even at rest. This is caused by many small round lung scars that develop from irritation by silica dust. These hard inelastic scars -- just like those on skin that result from an operation -- make the lungs stiff, so that it takes more work to inflate them with air. The scars also thicken the walls of the air sacs, blocking transfer of oxygen into the blood; tired blood is

> a characteristic finding in silicosis. The area surrounding each scar becomes stretched and distorted, breaking down the normally tiny, delicate air sacs so that they form larger thicker-walled sacs, a form of localized emphysema. Further reaction to the silica may cause scars to join into larger scars; some may occupy the entire lung. This process, progressive massive fibrosis, is frequently accompanied by increasing susceptibility to tubercuolsis and other infections. Finally, the heart, which must pump blood through these stiff, inelastic lungs, becomes weakened and enlarged and fails to pump effectively.(FOOTNOTE 12)

Silicosis is a "continuum" or progressive disease. The amount of silica estimated to be inhaled in 50% of those who die from silicosis is 5 grams. (Exhibit 3, Reference 5). This is about one-half a teaspoon. While there is some uncertainty over the manner in which the disease progresses from its least serious to its disabling stage, it is certain that prolonged exposure above safe limits contributes to the progression. It also appears that a severe stage of the disease may result from brief as well as intermittant or interrupted exposure. (Exhibit 3, References 5, 6). In its most serious form, silicosis is a chronic and irreversible obstructive pulmonary disease that like black lung or in association with black lung can create an additional strain

on cardiovascular functions and can contribute to death from heart failure. While there is some disagreement in the scientific and medical community over the true role of quartz in the development of black lung, the present consensus in reputable medical and scientific thinking is that quartz dust exposure in excess of the established and accepted threshold limit of 0.1 milligrams per cubic meter of air may be an important factor in the development and rapid progression of coalworkers' pneumonoconiosis. In fact, there is no discernable disagreement over the fact that exposure of miners to high concentrations of free silica (in excess of 5%) may, standing alone, or when mixed with coal mine dust trigger over the short or long run, depending on individual susceptibility, adverse pathogenic or fibrogenic reactions in lung tissue.(FOOTNOTE 13)

IV

A series of studies of mining and other dusty occupations in the second decade of the twentieth century revealed that silicosis was a severe health problem in the United States. In 1933, the United Mine Workers of America and the Pennsylvania Department of Labor and Industry surveyed pulmonary disease among anthracite miners.(FOOTNOTE 14) This study confirmed that the threshold or permissible quartz concentration of a respirable dust mass should not exceed 5 percent.

In 1950 the U. S. Department of Interior, Bureau of Mines, reviewed the literature on dusts, with emphasis on the relationship to dust diseases. Efforts to control industrial dusts have historically relied on the medicolegal principle of dose response. This principle holds there is a systematic relationship between the severity of a response to an industrial dust hazard such as quartz and the degree of exposure. This in turn is based on the concept that the magnitude of toxicity of quartz dust is proportional to its concentration in the total respirable coal mine dust mass. Thus, as the level of exposure decreases there is a decrease in the risk of injury, and the risk becomes negligible when exposure falls below certain tolerable (threshold or permissible) levels or concentrations. (Exhibit 3, Reference 3).

Utilizing this principle and concept, the American Conference of Governmental Industrial Hygienists (ACGIH) adopted a formula known as the Threshold Limit Value-Time Weighted Average (TLV-TWA) respirable-mass formula. Under this formula as the percent of quartz increases the allowable total respirable coal mine dust mass is decreased.(FOOTNOTE 15) This is the type of formula which Congress had in mind in enacting section 205 and from which the Secretary of HEW derived the formula promulgated in 30 C.F.R. 70.101. 42 F.R. 59294 (1977). It is specifically designed to accommodate the 2 milligram limit on the total respirable dust mass in surface and underground coal mines.

NIOSH and the ACGIH continuously review and monitor the toxicity of airborne contaminants to determine the safe concentrations to which most workers can be exposed without endangering health. TLV-TWA's and NIOSH's criteria papers (Exhibit 3, Reference 8) are based on the best available evidence from industrial experience, from experimental human and animal studies, and, when possible, from a combination of the three.(FOOTNOTE 16) The medical and scientific basis for the

quartz limit is carefully documented in the ACGIH's publication entitled "Documentation of Threshold Limit Values". (Exhibit 3, Reference 8). Since the TLV respirable mass formula for quartz dust has been incorporated in an improved health standard, 30 C.F.R. 70.101, it has the force and effect of law.

Applying the formula to the cases in question, the Secretary reduced the applicable 2 milligram standard to .9 milligrams. Thereafter compliance or enforcement sampling showed the lowered standard had been violated. The operator does not dispute this. It is clear that the violations charged did, in fact occur.

Further a preponderance of the evidence shows that for many years the medical and scientific communities have accepted as established fact that the exposure of miners to free silica in concentrations that exceed 5 percent of the total respirable dust mass in their environment poses a significant risk to their short and long term health.(FOOTNOTE 17) (Exhibits 2, 3).

It is obvious that in enacting section 205 Congress made a conscious decision to call upon the expertise of NIOSH and MSHA and to delegate to them the authority to make a policy determination that would strike a balance between what is and is not the safe upper limit of quartz exposure.

They have done that by promulgating the TLV-TWA respirable mass formula for use wherever the free silica in the atmosphere of a single production shift exceeds 5 percent of the total respirable dust mass. All of this was done with prudence and deliberation in a lengthy public rulemaking proceeding. The operator's suggestion that the formula was plucked out of thin air and arbitrarily applied is clearly mistaken.

I find there is an indisputable correlation between the level and duration of exposure of the respiratory tract to free silica and the development of fibrogenic tissue in the lungs. Where, as here, the exposure substantially exceeded the threshold limit for an extended period of time all doubts as to the significance of the risk of a material health impairment must be resolved in favor of the miners.(FOOTNOTE 18)

This postulate, I find, was recognized by Congress when it defined in section 205 the basic relationship between the level of quartz concentrations that do and do not present significant risks of material health impairment. I further find the Secretaries' complementary determination of the line between the safe and the unsafe while not demonstrable with mathematical nicety accords with the best available medical and scientific evidence. This, I believe, is all that is required. Compare American Textile Mfgrs. Inst. v. Donovan, 452 U.S., supra, 495-504, 509. Indeed in view of the legislative determination that the dose response curve is to be set at a 5 percent concentration in a total respirable dust mass of 2 milligrams (0.1 mg) any attempt to alter that curve and thereby reduce the protection afforded the miners by the existing standard would fall afoul of section 101(a)(9) of the Act unless and until it can be shown that a less stringent standard will provide the same protection.(FOOTNOTE 19)

The operator's reliance on Consolidation Coal Company v. Secretary, 4 FMSHRC 1559 (1982) is misplaced. There the trial judge vacated an S&S charge on the ground the Secretary failed

to prove any relationship between the dose exposure and a significant risk to the health of the miners. That deficiency was cured in this case.

A preponderance of the probative medical and scientific evidence in these cases shows there was a measurable relationship between the concentrations of respirable quartz found and the pulmonary disorders of miners regularly exposed to such concentrations. There is therefore substantial evidence to support the conclusion that the concentrations in question "could be a major cause of a danger to . . . health". Secretary v. National Gypsum Company, 3 FMSHRC 822, 827 (1981).

I am mindful that the statute does not require that an exposure to fibrogenic concentrations of quartz dust present an imminent health hazard, only a "reasonable likelihood of an . . . illness of a reasonably serious nature" during a miner's normal working life as the result of such exposure. National Gypsum, supra, 828. It is undeniable that silicosis is an illness of a "reasonably serious nature". Further, the undisputed medical and scientific evidence shows that even intermittant exposure creates a "likelihood" or possibility that a one-time (single shift) exposure could lead to a serious health impairment or functional disability. Indeed, unless the threshold limit is to be rendered meaningless it must be accorded the status of the determinant between what is and is not significant and substantial. A statute may

not be construed to impute to Congress a purpose to paralyze with one hand what it sought to promote with another.

V

Section 101(a)(6) of the 1977 amendments to the 1969 Coal Act adopted almost in haec verba the language of section 6(b)(5) of the Occupational Safety and Health Act.(FOOTNOTE 20) Under section section 101(a)(6), the validity of procedures and standards designed to attain "the highest degree of health and safety protection for the miner" are to be judged by whether the Secretary has shown by the "best available evidence" that "it is more likely than not" that the permissible exposure limit (100 plus micrograms) presents a significant risk of material health impairment. Industrial Union v. American Petrol. Inst., 448 U.S. 607, 653 (1980). This standard constitutes a recognition by Congress of special problems in regulating health risks as opposed to safety risks. Id. at 649, n. 54; American Textile Inst. v. Donovan, 452 U.S. 490, 512 (1981). As the Court noted, in the case of safety hazards the risks are generally immediate and obvious, while in the case of health hazards the risks may not be apparent until

a worker has been exposed for a long period of time.(FOOTNOTE 21)

In both the Benzene and Brown Lung cases, the Court took notice of the fact that to protect workers from material health impairment, a regulatory agency must rely on predictions of possible future events and extrapolations from limited data. Industrial Union, supra, at 655-656; American Textile Mfgrs., supra, at 495-505, and n. 25. This does not mean that MSHA is clothed with unreviewable discretion. What it does mean is that MSHA's mandate necessarily requires it to act, even where information is incomplete, when the best available evidence indicates a serious threat to the health of miners. At the same time, to support a finding that a health hazard is significant and substantial MSHA has a duty to pinpoint the factual evidence and the policy considerations upon which it relied. This requires explication of the assumptions underlying predictions and extrapolations and of the basis for its resolution of conflicts and ambiguities. Thus, as I view the matter a Commission trial judge must examine not only MSHA's factual support, but also the "judgment calls" and reasoning that contribute to its final decision. American Federation of Labor, ETC. v. Marshall, 617 F.2d 636, 651 (D.C. Cir. 1979), affd. 452 U.S. 490 (1981); Industrial Union Dept., AFL-CIO v. Hodgson, 499 F.2d 467, 475-476 (1974).

This I have, to the best of my ability, endeavored to do. And having done so, I conclude that the latest and best scientific and medical evidence available supports the view that the violations in question were significant and substantial. Accordingly, I find the report and documentation supplied by the Secretary and NIOSH are legally sufficient to support the S&S charges.

Order

The premises considered, it is ORDERED that the contest of the citations in question be, and hereby are, DENIED. It is FURTHER ORDERED that for the violations of 30 C.F.R. 70.101 found the operator pay a total penalty of $198 and that subject to payment the captioned matters be DISMISSED.

Joseph B. Kennedy
Administrative Law Judge

FOOTNOTES START HERE-

1 The operator has withdrawn its improvident assertion that as a "practical matter" the trial judge should take notice of the fact that the integrity of the entire sampling program may be jeopardized by allowing federal coal mine inspectors to take samples. Counsel for the operator admit they have no evidence to support such inflammatory assertions.

2 Section 205 constitutes a legislative recognition of the fact that epidemiological studies show that the different components of inhaled dust such as quartz and coal dust as well as its total atmospheric concentration or density are factors which affect the formation of fibrotic lung tissue and the development of pulmonary massive fibrosis.

3 Quartz (crystalline silicon dioxide) is classified as a fibrogenic dust that causes scar tissue (fibrosis) to be formed in the lungs when inhaled in excessive amounts. In 1968, the American Conference of Governmental Industrial Hygienists established a Threshold Limit Value (TLV) of 100 micrograms (.1 milligrams) per cubic meter of air over an eight hour period. This is the airborne concentration of quartz to which it is believed most workers, including miners, may be repeatedly exposed day after day without adverse effect. NIOSH has recommended that the concentration level be reduced to 50 micrograms (.05 milligrams) but thus far MSHA has declined to adopt this as the basis for its formula for reducing the applicable respirable dust standard. 45 F.R. 23995 (1980).

4 Documentation of the Threshold Limit Values for Airborne Contaminants, ACGIH, 1981 Supplement 364-365. This report notes that because the "percent quartz in respirable dust is often quite different from the percentage in . . . total airborne dust, . . . the percent quartz for use in the respirable-mass TLV formula must be determined in a sample of respirable dust.

Id.

5 Apparently through inadvertance the phrase "concentration of" was deleted before the words "respirable dust" in the rule as reissued. Since no notice was given of any proposal to change the statutory definition found in section 202(e), it seems obvious the Secretaries did not intend to change the "average concentration" standard.

6 While the Secretary claims single shift samples are never used to find a violation, one of the "Enforcement Examples" given in the directive to inspectors states that where an analysis of a single sample from an area subject to a lowered standard has generated an even higher concentration or percentage of quartz, "the inspector should issue a citation upon receipt of the quartz analysis because there was a violation at the time the sample was collected". Coal Mine Safety & Health Memorandum No. 81-183-H, p. 8.

7 The operator's claim that the standard as applied arbitrarily reduces the total dust level no matter how insignificant the amount of quartz present is demonstrably incorrect. (Exh. 2). The operator makes no claim that exposure to more than 100 micrograms of respirable quartz dust for eight hours a day, day-after-day, is a biologically benign atmospheric condition. The purpose of section 205 is to insure that concentrations of quartz in the workplace atmosphere will be maintained at or below 100 micrograms per cubic meter of air.

8 It is estimated that the use of the single sample procedure will result in "an annual decrease of about 2 inspector years in sampling". CHS&H Memo 81-183 H.

9 As the Goldberg affidavit and the NIOSH report point out, the operator has failed to understand that the threshold limit of 100 micrograms per cubic meter of air for quartz is not a standard but the resultant of the formula adopted to reduce the 2 milligram standard when the free silica content of an analyzed sample exceeds 5 percent. The 100 microgram limit is a constant that does not vary with the size of the sample analyzed and is used solely as a regulator of the permissible respirable dust mass of 2 milligrams. The purpose is to insure that the concentration of respirable quartz in the atmosphere is maintained at or below 100 micrograms. For example, if a single analyzed sample weighs .5 milligrams and the free silica content is 6 percent, the 2 milligram standard will be reduced to 1.6 (10/6 equals 1.6 mg). Thereafter compliance is measured against the reduced respirable dust standard of 1.6 mg, not the threshold limit of 100 micrograms for quartz. The fact that the quartz content of the sample analyzed weighed only 25 micrograms (.5 mg equals 500 ug x 5% equals 25 ug) is irrelevant and does not mean that a 25 ug "standard" is being enforced when the limit is 100 ug. It simply means that since the compliance or enforcement standard is 1.6 mg the actual amount of quartz in the environment may regress to 100 micrograms or 20 percent of the total mass (.5 mg equals 500 ug x 20% equals 100 ug) before the reduced standard (1.6 mg) would be violated. In the cases at hand, it

appears the analyzed samples were 1.7 milligrams and contained 11 percent quartz. This means the analyzed sample had 190 micrograms of quartz ((.11) (1.7)) equals 0.19 mg per meter cubed or 190 ug per meter cubed). The enforcement or compliance samples averaged 1.3 mg and 1 mg respectively. This means that in the case of the 1.3 mg sample the quartz content may have been approximately 15 percent (1.3 mg/.19 mg equals 0.146%) and in the case of the 1 mg sample approximately 19 percent (1 mg/.19 equals 19%).

10 1.7 milligrams was apparently the weight of the single samples analyzed for quartz (11% x 1.7 mg equals .19 mg or 190 ug). Inasmuch as the compliance samples averaged 1.3 and 1 milligrams, respectively, it appears that the concentrations of quartz involved in the violations charged ranged from 190 to 200 micrograms. This was substantially in excess of the permissible exposure limit value of 100 micrograms.

11 Although the matters are before me on the parties' cross motions for summary decision, each has the burden of showing the indisputability of the facts which warrant judgment in his favor. Moore's Federal Practice Par. 56.13. The Secretary's evidence clearly establishes that the 100 plus microgram limit is indisputably accepted by the scientific and medical community as the safe limit for exposure to free silica. The operator does not challenge this but claims such an exposure does not constitute a "significant and substantial" health hazard because there is no evidence that the inhalation of quartz dust generated naturally increases the risk of developing silicosis or black lung in either the short or long term. This bald assertion is unsupported by any medical or scientific evidence. It apparently depends upon a claim that an examination of studies conducted in Great Britain concerning the relationship between quartz dust and the development of coal-workers' pneumonocoiosis shows there is no correlation. These studies are unidentified and were not submitted for the record. The NIOSH report, on the other hand, deals specifically with this issue and concludes the weight of reputable scientific and medical thought is that "a key factor in the development of silicosis is the duration of exposure multiplied by dust concentration". (Exhibit 3, Para. 8). The studies submitted by NIOSH, and not disputed by the operator, also show that quartz must be regarded as a possible cause of black lung, "especially where mixed dust exposure may be low, but the proportion of quartz high". (Exhibit 3, Reference 7, p. 1275; Reference 11, pp. 123-125, Reference 14, p. 191).

12 Stellman and Daum, Work is Dangerous to Your Health, Vintage Books, New York (1973), 168. Only dust containing free (uncombined silica can cause silicosis. The disease is one of the pneumonoconioses, a group of lung diseases which result from inhalation of excessive amounts of respirable dust in industrial environments such as mining, quarrying, foundrys and textile mills See, American Textile Mfgrs. Inst. v. Donovan, 452 U.S. 420 (1981).

13 Contrary to the operator's contention, the statute does not restrain MSHA from acting to prevent irreversible health

damage until miners actually suffer the early symptoms of silicosis or black lung. Instead the law is a mandate to reduce the risk of that irreversible damage--especially for those miners who have regular exposure to the causal agent, respirable mine dust. In the present case, MSHA and NIOSH have adequately documented the risk of such damage attributable to continued exposure to quartz dust. The medical evidence shows that the acute symptoms of silicosis alone or in conjunction with black lung (anthracosis) weaken the miner's pulmonary system and increase his or her susceptibility to the adverse effects of subsequent pathogenic exposure. See sections 106(a)(6), (7), 202, 205 and relevant legislative history together with Exhibit 3 and its attached References and Bibliography. For these reasons, I hold MSHA is authorized to categorize as significant and substantial any level of exposure to quartz dust that passes the threshold of the medically permissible exposure level of 100 micrograms.

14 Sayers, Anthraco-Silicosis Among Hard Coal Miners, U.S. Public Health Service Bulletin #221 (Dec. 1935).

15 Documentation of Threshold Limit Values, (ACGIH, 4th ed.) 364-365 (1981). The formula was first adopted in 1968 based on work done by Ayer. See, Ayer, H.E., The proposed ACGHI mass limits for quartz: Review and Evaluation. Am. Ind. Hyg. Assoc. J. 1968; 29:336-342; Id. 30:117 (1969).

16 TLV's Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment (1982), at 2.

17 In fact, NIOSH has urged that the limit be reduced to 2.5 percent or 50 micrograms. 42 F.R. 23995 (1980).

18 When Congress enacted section 101(a)(6) of the Act in 1977, it recognized that the validity and enforceability of health standards should be judged by criteria that are different than those applied to safety standards. The Supreme Court has confirmed this. See Industrial Union Dept. v. American Petroleum Institute, 448 U.S., supra, 649, n. 54; American Textile Mgfrs. Inst. v. Donovan, 452 U.S. 490, 512 (1981). Indeed in the Benzene case the Court held that so long as an agency's findings as to the safe level of a toxic or carcinogenic substance or physical agent are supported by a body of reputable medical and scientific thought "the agency is free to use conservative assumptions in interpreting the date . . . risking error on the side of overprotection rather than underprotection". Industrial Union, supra, at 656. It is axiomatic that occupational health legislation is to be liberally construed to effectuate the Congressional purpose. Whirlpool Corp. v. Marshall, 445 U.S. 1, 13 (1980).

19 Section 101(a)(9) provides that "No mandatory health or safety standard promulgated under this title shall reduce the protection afforded miners by an existing mandatory health or safety standard". A rejection of the S&S charge would be tantamount to a finding that exposure to quartz dust above the threshold or safe level is insignificant or de minimis and the

risk insubstantial. This would vitiate the deterrent effect of the S&S charge and run counter to the Congressional purpose that underlies section 104(e).

20 The only difference was the omission of the "feasibility" requirement found in the first sentence of section 6(b)(5). A "feasibility" requirement is, however, to be found in the third sentence of section 101(a)(6). The operator does not claim that the 100 microgram standard is technologically or economically infeasible.

21 Congress wanted the Secretary to protect miners not only against known harms, but also against risks of harms not wholly understood. Comparable provisions in the OSH Act have been construed to embrace protection from the "subclinical effects" of a toxic substance. United Steelworkers of America v. Marshall, 647 F.2d 1189, 1251-1252 (D.C. Cir. 1980). Use of the S&S charge to deter violations is obviously in furtherance of MSHA's authority to control not only actual symptoms but to prevent early symptoms from becoming chronic.