

MEMORANDUM FOR: R. DAVIS LAYNE
Acting Assistant Secretary for
Occupational Safety and Health

FROM: JOSEPH M. WOODWARD
Associate Solicitor for
Occupational Safety and Health

SUBJECT: Favorable decision in Ohio Cast Products, Inc. v. Occupational Safety and Health Review Commission and Alexis M. Herman. U.S. Sec'y of Labor,
Nos. 99-4398 & 99-4409 (6th Cir. April 13, 2001)

In a published decision, a panel of the U.S. Court of Appeals for the Sixth Circuit (Wellford, Siler, Batchelder) has affirmed a decision of the Occupational Safety and Health Review Commission, concluding: (1) that the Secretary's method of calculating workplace exposure to silica under §1910.1000(c), Table Z-3, derives from a reasonable interpretation of that regulation; and (2) that the employer had fair notice of the Secretary's methodology for determining such exposure exceeds the permissible exposure limit.

As expressed in Table Z-3, the PELs for crystalline quartz silica and for inert (or nuisance) dust are interrelated. 29 C.F.R. § 1910.1000, Table Z-3. If "0" (representing dust with no quartz in it) is inserted into the crystalline quartz silica formula, the result is the PEL for inert dust, 5 mg/m^3 . Similarly, the PEL for pure respirable silica can be calculated by inserting "100%" in the denominator of the formula, which results in a PEL of $.098 \text{ mg/m}^3$. The formulas operate in such a way as to create a sliding scale of PELs depending on the percentage of the total dust or the total respirable fraction of the dust that is crystalline quartz silica. In this way, the legal limit becomes more stringent as the percentage of silica in the dust increases. OSHA calculates employee exposure to crystalline quartz silica in relation to the total amount of respirable dust collected in the sample.

At issue here is whether the PEL calculated from the formula must be compared to the total amount of dust in the mixture or only to the amount of silica in that dust. Ohio Cast's employee was exposed to dust containing 0.125 mg/m^3 of pure silica. This amount of pure silica *exceeds* the PEL for pure silica (0.098 mg/m^3) and would, standing alone, violate the silica standard. However, as construed by Ohio Cast, a violation of the silica standard can be abated by *increasing* the total amount of respirable dust a worker breathes.

On appeal, we argued: (1) that the Secretary interprets the standard to apply to the total respirable dust, not simply the part that is silica, because the standard already takes the percentage of silica into account when the PEL is calculated; (2) that the Secretary's interpretation is reasonable because it is consistent with the formula's sliding-scale approach for determining overexposure; and (3) that the Secretary has consistently taken the position that the proper point of comparison is the total amount of respirable dust.

In its decision (Siler, J.) the court indicated that the employer's position was not entirely without merit. For example, it characterized as "persuasive" Ohio Cast's contention that the plain meaning of the "crystalline quartz -silica (respirable)" standard in Table Z-3 precludes consideration of non-silica dust in determining actual silica exposure. It added: "[I]t seems unfair that non-silica dust is counted against an employer under a silica dust standard. If asked to create a regulatory scheme for crystalline quartz silica, this court might create one that set a PEL for silica exposure that was a function of solely silica dust."

Nevertheless, the Court acknowledged (1) that evaluating silica as a component of total dust is reasonable, given the reality of workplace exposure to contaminants, and (2) that other components of Table Z-3 suggest that the substance listed as "crystalline quartz silica (respirable)" has regulatory meaning beyond its plain meaning. It concluded: "[T]his court has no power to second guess the Secretary. Our review is limited to whether the Secretary's interpretation of the regulation *as it exists* is reasonable [emphasis in original]. And, given the undisputed meaning of the PEL and its meaning within the framework of Table Z-3 as a whole, that interpretation is reasonable."

The court rejected Ohio Cast's fair notice claim, noting that unrebutted evidence demonstrated that the Secretary has enforced the silica standard in a consistent manner since its adoption in 1971.

The court's decision is significant because it validates the current silica exposure standard – under which silica remains an OSHA enforcement priority – while the agency considers rulemaking on a revised standard. See 65 *Federal Register* 74112 (Nov. 30, 2000).

cc: Richard Fairfax

RECOMMENDED FOR FULL-TEXT PUBLICATION

Pursuant to Sixth Circuit Rule 206

ELECTRONIC CITATION: 2001 FED App. 0114P (6th Cir.)

File Name: 01a0114p.06

UNITED STATES COURT OF APPEALS

FOR THE SIXTH CIRCUIT

Ohio Cast Products, Inc., <i>Petitioner,</i> <i>v.</i> The Occupational Safety & Health Review Commission and Alexis M. Herman, Secretary of Labor, <i>Respondents.</i>	Nos. 99-4398/4409
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Appeal from the Occupational Safety

and Health Review Commission.

No. 96-0774.

Argued: November 30, 2000

Decided and Filed: April 13, 2001

Before: WELLFORD, SILER, and BATCHELDER, Circuit Judges.

COUNSEL

ARGUED: Keith A. Ashmus, FRANTZ & WARD, Cleveland, Ohio, for Petitioner. John Shortall, OFFICE OF THE SOLICITOR, Washington, D.C., for Respondents.

ON BRIEF: Keith A. Ashmus, FRANTZ & WARD, Cleveland, Ohio, for Petitioner.

John Shortall, Bruce Justh, OFFICE OF THE SOLICITOR, Washington, D.C., for Respondents.

OPINION

SILER, Circuit Judge. Petitioner Ohio Cast Products, Inc. ("Ohio Cast") contests citations issued to it by the Secretary of Labor ("Secretary") for failure to protect its workers against respirable dust containing crystalline quartz silica pursuant to 29 C.F.R. § 1910.1000(c). Ohio Cast contends that the Secretary's method of calculating actual crystalline quartz silica exposure was an unreasonable interpretation of § 1910.1000(c) and that it did not have fair notice of the Secretary's calculation method. The Occupational Safety and Health Review Commission ("OSHRC") affirmed the citations, holding that the Secretary's method of calculating actual crystalline silica exposure was reasonable and that Ohio Cast did have fair notice of that method. We affirm.

I. Background

Ohio Cast is a manufacturer of iron automotive products in Canton, Ohio. As an employer engaged in a business affecting commerce, Ohio Cast is subject to the requirements of the Occupational Safety and Health Act of 1970, 29 U.S.C. §§ 651-78 ("OSH Act").

In May 1996, the Secretary cited Ohio Cast for several alleged violations under the OSH Act. These violations were detected during a March-April 1996 inspection of its facility by Marc Snitzer, a compliance officer with the Occupational Safety and Health Administration ("OSHA"). Ohio Cast and OSHA subsequently entered into a settlement agreement on all matters except one. They continued to disagree about the correct method of calculating actual employee exposure to "crystalline quartz silica (respirable)" pursuant to 29 C.F.R. § 1910.1000(c) and, as a result, Ohio Cast contested citations received for crystalline quartz silica overexposure.

During the OSHA inspection, Snitzer and William Nixon, Ohio Cast's industrial hygiene consultant and a former OSHA compliance officer, sampled the respirable dust around employee Rick Hill. Ohio Cast knew that Hill's work activities involved the use of sand containing silica, but it provided him with no respiratory protection. Snitzer (OSHA) determined that Hill was overexposed to crystalline quartz silica, while Nixon (Ohio Cast) determined that he was not overexposed. Air samples collected by OSHA and Ohio Cast differed slightly, but that difference did not explain their disagreement about whether Ohio Cast overexposed Hill to silica pursuant to § 1910.1000(c). Their difference of opinion about silica overexposure resulted from different methods of calculating Hill's actual exposure to silica.

Arguing that its method of calculating actual worker exposure to crystalline quartz silica was the only reasonable one, Ohio Cast and the Secretary each respectively filed for summary judgment before an Administrative Law Judge ("ALJ"). The ALJ, and then OSHRC on review, granted summary judgment for the Secretary. Ohio Cast was fined \$8,000 for failing to protect its workers against overexposure to respirable dust containing crystalline quartz silica.

II. Discussion

Ohio Cast argues that the Secretary's interpretation of how actual workplace exposure to respirable silica is calculated under 29 C.F.R. § 1910.1000(c) is contrary to the plain language of that regulation, and that enforcement of that interpretation constitutes a denial of due process because it had no notice that OSHA would calculate silica exposure according to that interpretation. Therefore, it argues that citations issued for Hill's overexposure to silica should be vacated.

No federal court has previously addressed whether the Secretary's method of calculating actual workplace exposure to "crystalline quartz silica (respirable)," *see* 29 C.F.R. § 1900-1000(c) (2000), Table Z-3, is reasonable. In fact, there is no precedent regarding calculation of actual exposure for any of the regulated substances listed in Table Z-3. We hold that the Secretary's method of calculating actual workplace exposure to silica under § 1910.1000(c), Table Z-3 derives from a reasonable interpretation of that regulation, that Ohio Cast had fair notice of how the Secretary enforced that interpretation, and that the citations received by it for silica overexposure were valid.

i) Standard of Review

This court sets aside agency action that is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A); *Reich v. General Motors Corp.*, 89 F.3d 313, 315 (6th Cir. 1996). An administrative agency's interpretation of its own regulations is entitled to substantial deference. *See Udall v. Tallman*, 380 U.S. 1, 16 (1965). This court accords substantial deference to the Secretary's construction of an OSHA standard if it is ambiguous and the Secretary's interpretation of it is reasonable. *See Martin v. OSHRC*, 499 U.S. 144, 156 (1991). The Secretary's interpretation need not be the only reasonable interpretation for it to be sustained. *See Fluor Constructors, Inc. v. OSHRC*, 861 F.2d 936, 940 (6th Cir. 1988).

But, where "an alternative reading is compelled by the regulation's plain language or by other indications of the Secretary's intent at the time of the regulation's promulgation," this court need not defer to the Secretary's interpretation. *See Gardebring v. Jenkins*, 485 U.S. 415, 430 (1988). When an agency promulgates regulations, it is bound by those regulations, and it may not attempt to subvert the rulemaking process through interpretation unsupported by the regulation's language. *See Fluor*, 861 F.2d at 939-40.

ii) Silica Standard

Because overexposure to silica can cause silicosis with permanent lung damage and disability, *see Urie v. Thompson*, 337 U.S. 163, 180 (1949), workplace exposure to respirable silica is regulated. *See* 29 C.F.R. § 1910.1000(c). In 1971, the Secretary adopted a workplace silica exposure standard as an "established Federal standard" under Section 6(a) of the OSH Act, 29 U.S.C. § 655(a). Section 6(a) exempted the Secretary from making detailed factual findings and regulatory announcements supporting and explaining the silica standard. *See AFL-CIO v. OSHA*, 965 F.2d 962, 972-73 (11th Cir. 1992). The silica exposure limit adopted by the Secretary derived from the Walsh-Healey Public Contracts Act, 41 U.S.C. §§ 35-45, which required compliance with exposure levels developed by the American Conference of Governmental Industrial Hygienists. Now codified at 29 C.F.R. § 1910.1000(c), the "crystalline quartz silica (respirable)" standard provides that "an employee's exposure to [respirable crystalline quartz silica] [, as] listed in Table Z-3, in any 8-hour work shift of a 40-hour week, shall not exceed the 8-hour time weighted average limit given for that substance in the table." Table Z-3 contains a mathematical formula for calculating the permissible exposure limit ("PEL") for various "Mineral Dusts," including "crystalline quartz silica (respirable)." PEL reflects the maximum amount of a contaminant in the air to which workers may be exposed over a given time period.

Because of its manufacturing activities, Ohio Cast is clearly regulated under § 1910.1000(c). Three calculations, based on a single sampling of respirable dust, determine whether a worker is overexposed to silica pursuant to § 1910.1000(c). First, the PEL formula for "crystalline quartz silica (respirable)," " $(10\text{mg}/\text{m}^3) \div (\% \text{ SiO}_2 + 2)$," is employed to calculate a PEL. *See* 29 C.F.R. § 1910.1000(c), Table Z-3. Second, actual exposure is calculated. And, third, PEL and actual exposure calculations are compared. When actual exposure exceeds PEL, an employer is in violation of § 1910.1000(c).

a) PEL Formula

As expressed in Table Z-3, the PELs for crystalline quartz silica and for inert (or nuisance) dust are interrelated. The PEL formula operates to regulate silica exposure by determining its concentration in respirable dust and setting variable limits on exposure to the respirable dust depending on its silica concentration. The numerator in the silica PEL formula, " $10\text{mg}/\text{m}^3$," represents the weight of the total respirable dust sample, and its denominator, " $\% \text{ SiO}_2 + 2$," represents the percentage of silica therein. Where " $\% \text{ SiO}_2$ " equals "0," representing dust with no quartz silica in it, the PEL formula yields a PEL of $5 \text{ mg}/\text{m}^3$ [$(10\text{mg}/\text{m}^3) \div (0 + 2)$]. A $5 \text{ mg}/\text{m}^3$ PEL is the fixed PEL listed in Table Z-3 for "inert or nuisance dust," which demonstrates that the PEL for silica works in harmony with the PEL for inert dust. *See id.* Where there is no silica detected in the air, the PEL yielded should logically be and is equal to that allowed for 100% inert dust. And, where " $\% \text{ SiO}_2$ " equals "100," representing dust that is pure quartz silica, the PEL formula yields a PEL of $.098 \text{ mg}/\text{m}^3$ [$(10\text{mg}/\text{m}^3) \div (100+2)$]. The only variable in the PEL formula is " $\% \text{ SiO}_2$," the percentage of the total respirable dust sample that is silica.

Thus, the PEL formula:

operate[s] in such a way as to create a sliding scale of PEL's depending on the percentage of the . . . total respirable fraction of the dust that is crystalline quartz silica. In this way, the PEL's are lowered as the percentage of silica in the dust becomes higher. The upper limit of the sliding scale is the PEL for inert or nuisance dust (containing no quartz); the lower limit is the PEL for pure quartz dust.

Secretary of Labor v. Bunge Corp., 12 O.S.H. Cas. (BNA) 1785, 1792 (Rev. Comm'n 1986).

The PEL formula, as explained above, is embraced by all parties, making it a reliable indicator of how the "crystalline quartz silica (respirable)" standard should be enforced. Applying the formula to the air sample collected from employee Hill, OSHA calculated Hill's PEL to be 1.47 mg/m³, and Ohio Cast calculated it to be 1.23 mg/m³. Different air samples led to the slight difference in the PEL calculations.

b) Actual Exposure Calculation

No method of calculating actual crystalline quartz silica exposure is contained in § 1910.1000(c). Since the silica standard was adopted in 1971, the Secretary has consistently calculated actual silica exposure by dividing the *total* weight in micrograms of the entire respirable dust sample [silica and non-silica] by the number of cubic meters of air which flowed across the sampling device during the sampling period. The Secretary claims that this method is dictated by the "crystalline quartz silica (respirable)" standard's PEL formula. The method is used in the OSHA Technical Manual and is outlined in the Table I-1:14 Sample Calculation for Silica Exposure. Ohio Cast, on the other hand, claims that only respirable silica dust weight, rather than total respirable dust weight, should be divided by the number of cubic meters of air which flowed across the sampling device during the sampling period to calculate actual exposure. Applying its actual exposure formula, OSHA calculated Hill's actual exposure to "crystalline quartz silica (respirable)" to be 2.60 mg/m³. The application of OSHA's formula to Ohio Cast's sampling results (which led to different PEL figures) would yield an exposure of 3.53 mg/m³. Applying its formula to both data collections, OSHA's and its own, Ohio Cast's calculation yielded actual exposure of 0.217 mg/m³ or 0.127 mg/m³, figures significantly less than those yielded using OSHA's formula.

Ohio Cast claims that the Secretary's method of measuring crystalline quartz silica exposure "is plainly at odds with the language of the standard itself." It accurately demonstrates that Table Z-3 regulates only specific, listed mineral substances, and that it was cited for violations under only the "crystalline quartz silica (respirable)" provision of the table. It argues that the Secretary, by using total weight of the respirable dust sample as the numerator in its actual exposure formula instead of only the weight of respirable silica in that sample, penalized it for Hill's exposure to not just "crystalline quartz silica (respirable)" but to all respirable dust collected, silica and non-silica combined.

Furthermore, Ohio Cast references a separate "inert or nuisance dust" provision in Table Z-3 to support its contention that inert, non-silica dust should not be a component of any actual "crystalline quartz silica (respirable)" exposure formula.

On the surface, Ohio Cast's contention that the plain meaning of the "crystalline quartz silica (respirable)" standard contained in Table Z-3 precludes consideration of non-silica dust in determining actual silica exposure is persuasive. The listed substance is unarguably "crystalline quartz silica (respirable)." And the existence of a separate provision for "inert or nuisance dust" suggests that respirable non-silica dust should be treated separately from respirable silica dust. Table Z-3, note "d" defines "inert or nuisance dust" as "[a]ll inert or nuisance dusts . . . not listed specifically by substance name." But the titles "crystalline quartz silica (respirable)" and "inert or nuisance dust" are not the only components of Table Z-3.

Other components of Table Z-3 suggest that the substance listed as "crystalline quartz silica (respirable)" has regulatory meaning beyond its plain meaning. These other components help define the meaning of "crystalline quartz silica (respirable)" within the regulatory scheme. First, the table contains an explanatory note explaining this silica standard: "Both *concentration* and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector . . ." *See* 29 C.F.R. § 1910-1000(c), Table Z-3, Note "e." Table Z-3 clearly anticipates that pure silica will be a *component* of the dust counting as exposure under the "crystalline quartz silica (respirable)" standard. Silica exposure will be calculated in relation to the total amount of respirable dust collected from the air. Evaluating silica as a component of total dust is reasonable given the reality of workplace exposure to contaminants.

As a conceptual matter, it seems unfair that non-silica dust is counted against an employer under a silica dust standard. If asked to create a regulatory scheme for crystalline quartz silica, this court might create one that set a PEL for silica exposure that was a function of solely silica dust. But this court has no power to second guess the Secretary. Our review is limited to whether the Secretary's interpretation of the regulation *as it exists* is reasonable. And, given the undisputed meaning of the PEL and its meaning within the framework of Table Z-3 as a whole, that interpretation is reasonable.

The "crystalline quartz silica (respirable)" and "inert or nuisance dust" standards are interrelated. *See supra* Part II.ii.a. Workers exposed to silica are usually exposed to a mixture of silica and nuisance dust. The silica PEL addresses this situation and sets the PEL for a mixture of silica and nuisance dust at a point between the PEL for pure silica and that for nuisance dust. The PEL for such a mixture reflects the percentage of silica in the dust. The interrelation of the silica and inert dust standards are not the only ones accounted for in Table Z-3. PEL formulas for "coal" and "amorphous" dust are also calculated as a function of total dust sampled. *See* § 1910.1000(c), Table Z-3.

The only variable in the PEL formula is "% SiO₂," the percentage of the total respirable dust sample that is silica. Because silica concentration within the total dust sampled is the determinative factor in calculating the PEL, the "crystalline quartz silica

(respirable)" standard regulates employers according to pure silica exposure. It regulates an employer for non-silica, inert dust exposure only to the extent that the employer is already regulated under Table Z-3. An air sample containing 0% respirable silica always yields a PEL of 5 mg/m^3 , the fixed PEL for inert dust in Table Z-3. An air sample containing 100% silica always yields a PEL of $.098 \text{ mg/m}^3$. The percentage of respirable silica dust alone determines assignment of a PEL on a sliding scale between 5 mg/m^3 and $.098 \text{ mg/m}^3$, the silica-determined PEL to which actual exposure will be compared. As OSHRC explained, "the [crystalline quartz silica] standard, therefore, regulates pure respirable silica (the listed 'substance') because its concentration in the dust is the determinative factor in calculating the PEL."

Additionally, Table Z-3 contains the mathematical formula used to calculate a PEL for "crystalline quartz silica (respirable)" exposure, a formula endorsed by all parties that accounts for total respirable dust. Table Z-3's text must be read in combination with the table's PEL formula, since that formula provides specific mathematical guidance for figuring out how the "crystalline quartz silica (respirable)" standard is to be enforced. As OSHRC stated below:

Ohio Cast's reading of the standard fails to construe the substance list in the context of the standard as a whole, and ignores the mathematical operation of the formula.... While the § 1910.1000(c) reference to the regulated "substance," as applied to the silica, may be slightly less than direct, when read in conjunction with the PEL itself, the standard is not ambiguous and the Secretary's application fits the standard's plain meaning.

The PEL formula operates by determining silica concentration in respirable dust and setting variable limits on exposure to the respirable dust depending on that concentration. The computed PEL must be compared to employee exposure to the same substance from which it was calculated. The PEL calculation is a function of the total respirable dust collected, not just silica dust. The PEL formula, $(10 \text{ mg/m}^3) \div (\% \text{ SiO}_2 + 2)$, has a numerator representing the *total* weight of the respirable dust sample, while the denominator represents the percentage of silica therein. A calculated PEL represents *total* respirable dust per meter cubed. Thus, any formula used to determine actual exposure would also need to yield a result representing *total* respirable dust per meter cubed. Otherwise, that actual exposure figure would be mathematically incompatible with its benchmark PEL, and any comparison between those actual exposure and PEL figures would be meaningless.

Comparability between an actual exposure calculation and its benchmark PEL is advanced by the data collection process. Data collected to determine actual exposure comes from the same air sampling as data collected to calculate the PEL to which it is to be compared. For instance, when Snitzer placed an air collection device on worker Hill's shoulder, the air that was collected from that device was used to compute both the PEL and actual silica exposure levels for Hill's workspace. This process ensured that the total respirable dust in the physical area being tested for actual exposure was comprised of the

exact proportion of respirable silica accounted for in the PEL. Thus, the same air was tested for OSHA's PEL and actual exposure calculations.

By accepting the PEL formula's meaning, Ohio Cast implicitly accepts the Secretary's methodology for calculating actual crystalline quartz silica exposure. To retain comparability between actual exposure and PEL figures under Ohio Cast's proposed formula for determining actual exposure (dividing only respirable silica dust weight by total air volume of the complete dust sample), however, the PEL formula would also have to be calculated to reflect pure silica air. But, given the PEL formula, a pure silica-based PEL would remove the very need for the PEL formula. A pure silica-based PEL would be calculated by inserting 100% in the denominator of the PEL formula. This would result in a constant PEL of .098 mg/m³ [(10mg/m³) ÷ (100+ 2)], meaning that the PEL formula would serve no purpose. If a fixed PEL was intended to be applied to all employers in all situations, the "crystalline quartz silica (respirable)" PEL formula would not have been mathematically created to yield varying exposure limits. It would simply have listed .098 mg/m³ as the fixed PEL. Instead, the PEL formula is mathematically crafted to yield a sliding scale of PELs based on silica composition within a total respirable dust sample.

Given the clear mathematical meaning and effect of the PEL formula, the Secretary's method of calculating actual worker exposure to "crystalline quartz silica (respirable)" is reasonable.

c) PEL versus Actual Exposure

Next, we compare the computed PEL for silica at Ohio Cast's facility with actual exposure calculated at that facility. The comparison demonstrates that actual exposure exceeded PEL regardless of which party's sampling data is utilized. OSHA computed the PEL to be 1.47 mg/m³, and Ohio Cast calculated it to be 1.23 mg/m³. Actual exposure, using the Secretary's PEL-guided method of calculating actual exposure, would be either 2.60 mg/m³ or 3.53 mg/m³, figures that exceed both potential PELs. Ohio Cast concedes that, using the Secretary's methodology, its employee's exposure to respirable silica exceeded the legal limit.

iii) Notice

Ohio Cast also argues that, even if the Secretary's interpretation of the silica standard was reasonable, it did not have fair notice of the Secretary's formula for calculating actual respirable silica exposure.

"Like other statutes and regulations which allow monetary penalties against those who violate them, an occupational safety and health standard must give an employer fair warning of the conduct it prohibits or requires" *Fluor*, 861 F.2d at 941 (quoting *Diamond Roofing Co. v. OSHRC*, 528 F.2d 645, 649 (5th Cir. 1976)). "While an employer is entitled to fair warning of conduct which an occupational health and safety standard prohibits or requires, this determination is made with reference to what an employer familiar with the industry could reasonably be expected to know." *Martin v.*

American Cyanamid Co., 5 F.3d 140, 146 (6th Cir. 1993). Factors that the court weighs in evaluating adequate notice include: 1) artful vs. inartful drafting of a regulation; 2) common understanding and commercial practice; and 3) confirmation of industry practice by a pattern of administrative enforcement. *See Diebold, Inc. v. Marshall*, 585 F.2d 1327, 1337 (6th Cir. 1978).

Since Ohio Cast was exposed to monetary penalties for overexposing its employees to silica, it was entitled to fair notice of OSHA's method of calculating actual respirable silica exposure. The question is whether Ohio Cast had fair notice that overexposure would be calculated according to the Secretary's formula. Ohio Cast claims that it did not. We, however, find that Ohio Cast did have fair notice.

As previously discussed, the silica standard's PEL formula regulates silica exposure in only one manner. The PEL formula provided in Table Z-3 calculates PEL based on a measurement of all respirable dust, and the PEL and actual exposure figures must be functionally the same to be compared. Actual exposure must be calculated as a measurement of all respirable dust. Furthermore, unrebutted evidence demonstrated that the Secretary enforced the silica standard in a consistent manner since its adoption in 1971. And a 1995 journal article, curiously cited by Ohio Cast in its brief as evidence in its favor, stated that the "industrial hygiene community . . . recognizes the . . . enforcement use of the OSHA PEL . . ." Phillip Williams, Matthew Parker & Paul Middendorf, *Respirable Free Silica: A Comparison of the Occupational Exposure Limits*, 56 Am. Indus. Hygiene Ass'n J. 1129, 1229 (1995).

As a manufacturer admittedly aware of the silica standards contained in § 1910.1000(c), Ohio Cast, because of the mathematical guidance of the PEL formula, consistent OSHA enforcement of the silica standard, and statements made in professional literature prior to OSHA's 1996 inspection, had fair notice that actual respirable silica dust was to be calculated in relation to the total amount of respirable dust collected.

Additionally, Ohio cast had actual notice of OSHA's method of calculating actual exposure. Ohio Cast's private consultant and expert, William Nixon, previously worked as an OSHA inspector and, in that capacity, he calculated respirable "crystalline quartz silica (respirable)" exposure. The record contains copies of citations issued by then-OSHA-inspector Nixon for respirable silica overexposure. The formula that Nixon used to determine actual silica exposure was the same method adopted by the Secretary in this case. Nixon works as an industrial hygiene consultant for Ohio Cast and, in that capacity, he now pleads ignorant to knowing about OSHA's method of calculating "crystalline quartz silica (respirable)" exposure. Because of Nixon's first-hand knowledge of OSHA's calculation method, his hired role as a monitor during OSHA's inspection, and his role as an expert in this case, his knowledge of OSHA's methodology is imputed to Ohio Cast.

iv) Citations

Finally, Ohio Cast argues that because the Secretary's interpretation of the "crystalline quartz silica (respirable)" standard was unreasonable and that it did not have fair notice of

the standard's enforcement, this court should reverse the decision of OSHRC, vacating silica citations received as a result of the Hill sampling. Having held, however, that the Secretary's interpretation was reasonable and that Ohio Cast had ample notice of the Secretary's method of enforcing the silica standard, we determine that the fines levied against Ohio Cast for violation of the "crystalline quartz silica (respirable)" standard contained in 29 C.F.R. § 1910.1000(c) were proper.

AFFIRMED.