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MSHA V. UNION OIL (CALIFORNIA)
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FEDERAL MINE SAFETY & HEALTH REVIEW COMMISSION
WASHINGTON, D.C.
March 31, 1989

SECRETARY OF LABOR,
MINE SAFETY AND HEALTH
ADMINISTRATION (MSHA)

v. Docket No. WEST 86-1-M

UNION OIL COMPANY OF
CALIFORNIA

BEFORE: Ford, Chairman; Backley, Doyle, Lastowka and Nelson, Commissioners

DECISION

BEFORE: Chairman; Backley, Doyle and Nelson, Commissioners:

In this civil penalty proceeding arising under the Federal Mine Safety and Health Act of 1977, 30 U.S.C. $ 801 et. seq. (1982) ("Mine Act" or "Act"), we are asked to decide whether a violation of 30 C.F.R. $$ 57.5001/.5005 involving overexposure to vanadium fume was of such nature as could significantly and substantially contribute to the cause and effect of a mine health hazard. 1/ A hearing on the merits was held

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1/ 30 C.F.R. $ 57.5001 states in part:

Exposure limits for airborne contaminants.

Except as permitted by $ 57.5005 --

(a) Except as provided in paragraph (b), the exposure to airborne contaminants shall not exceed, on the basis of a time weighted average, the threshold limit values adopted

by the American Conference of Governmental Industrial Hygienists, as set forth and explained in the 1973 edition of the Conference's publication, entitled "TLV's Threshold Limit Values for Chemical Substances in Workroom Air Adopted by ACGIH for 1973," pages 1 through 54, which are hereby incorporated by reference and made

before Commission Administrative Law Judge John A. Carlson. Following Judge Carlson's death, the case was reassigned for decision to Commission Administrative Law Judge Michael A. Lasher, Jr., who, without objection from the parties, decided the case on the record developed before Judge Carlson. Judge Lasher determined that Union Oil Company of California ("Unocal") violated sections 57.5001/.5005 but that the violation was not of a significant and substantial nature. He assessed a civil penalty of $75.00 for the violation. 9 FMSHRC 282 (February 1987)(ALJ). We granted the Secretary's petition for discretionary review challenging the judge's finding that the violation was not significant and substantial, and we heard oral argument. For the

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a part hereof. This publication may be obtained from the American Conference of Governmental Industrial Hygienists by writing to the Secretary-Treasurer, P.0. Box 1937, Cincinnati, Ohio 45201, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration. Excursions above the listed thresholds shall not be of a greater magnitude than is characterized as permissible by the Conference.

* * *

(c) Employees shall be withdrawn from areas where there is present an airborne contaminant given a "C" designation by the Conference and the concentration exceeds the threshold limit value listed for that contaminant.

30 C.F.R. $ 57.5005 states in part:

Control of exposure to airborne contaminants.

Control of employee exposure to harmful airborne contaminants shall be, insofar as feasible, by prevention of contamination, removal by exhaust ventilation, or by dilution with uncontaminated air. However, where accepted engineering control measures have not been developed or when necessary by the nature of work involved (for example, while establishing controls or occasional entry into hazardous atmospheres to perform

> maintenance or investigation), employees may work for reasonable periods of time in concentrations of airborne contaminants exceeding permissible levels if they are protected by appropriate respiratory protective equipment. ...

The airborne contaminant at issue in this case is vanadium fume. Definitions of vanadium and vanadium pentoxide, a toxic form of vanadium, are provided below; the Threshold Limit Value for vanadium is also discussed below.

reasons that follow, we affirm.

I.

Unocal operates the Parachute Creek Mine, an underground oil shale mine, located near Parachute, Colorado. On May 14, 1985, during an inspection of the mine, Inspector Michael T. Dennehy of the Department of Labor's Mine Safety and Health Administration ("MSHA") learned that hard surface arc welding was being performed at the mine's secondary crusher and that the welders were using welding rods containing vanadium. 2/ The inspector decided to sample the welders for exposure to vanadium fume. Vanadium in the form of either dust or fume is one of the airborne contaminants subject to sections 57.5001/.5005. The Threshold Limit Value ("TLV") for vanadium fume, as set forth in a 1973 publication of the American Conference of Governmental Industrial Hygienists' incorporated by reference in section 57-5001, is .05 milligrams of vanadium per cubic meter of air (mg/m). 3/

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2/ Vanadium, a metallic element, is described as follows:

> A gray or white, malleable, ductible, polyvalent metallic element in group V of the periodic system. It is resistant to air, sea water, alkalies, and reducing acids except hydroflouric acid. lt occurs widely but mainly in small quantities in combination in minerals (such as vanadinite, patronite, carnotite, and roscoelite), in the ashes of many plants, in coals, in petroleums, and in asphalts. Usually obtained in the form of ferrovanadium or other alloys, or in almost pure metallic form containing small amounts of oxygen, carbon, or nitrogen by the reduction of ores, slags, or vanadium pentoxide (V205). Used chiefly in vanadium steel.

Bureau of Mines, U.S. Department of the Interior, Dictionary of Mining, Mineral, and Related Terms 1195 (1968) ("DMMRT").

3/ The publication incorporated in section 57.5001, Threshold Limit Values for Chemical Substances in Workroom Air Adopted by the American Conference of Governmental Industrial Hygienists (ACGIH)) for 1973 ("ACGIH TLVs"), provides the following TLVs for vanadium:

Substance	ppm a)	mg/M3 b)
Vanadium (V205, as V	---	0.5

Dust		
C Fume	---	0.05

a) Parts of vapor or gas per million parts of contaminated air by volume at 25oC and 760 mm. Hg.

On May 15, 1985, having obtained proper sampling equipment, Dennehy went to the crusher area, where four welders were working, and equipped each welder with a sampling cassette and pump. At issue in this proceeding is sample number MD-1 (Exh. P-2). This sample was from one of the employees engaged in welding, and was obtained on the basis of the employee's having worn the pump and filter during the entire shift from 7:24 a.m. to 2:45 p.m. (with one 30-minute interruption while the inspector took a short-term sample). Tr. 24, 67. During the first part of the sampling period, the exhaust fan at the crusher system was turned off. The fan was restarted during the afternoon of the sampling day, and the judge found that, had it been operating, the welder would not have been overexposed to vanadium fume. 9 FMSHRC at 285. During the testing period the employee was not wearing personal protective equipment to protect him from exposure to welding fumes.

After collecting the sampling equipment at the end of the day shift, the inspector took the samples to an MSHA field office and they were then sent to the MSHA Technological Center in Denver, Colorado, for

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pressure.

b) Approximate milligrams of substance per cubic meter of air.

ACGIH TLVs at 31.

"V205" in this TLV refers to vanadium pentoxide (hereafter referred to as "V205"), a toxic oxidized compound of vanadium. V205 is described as follows:

> Yellow to red; orthorhombic; ... toxic; melting point, 690oC; decomposes at 1,750oC before reaching a boiling point; slightly soluble in water; soluble in acids and alkalies; and insoluble in absolute alcohol. Used in ceramics and as a catalyst. ... Also used as a glass colorant....

DMMRT 1196. Although the specific toxic substance with which the vanadium TLV is concerned is V205, the TLV is expressed in terms of vanadium either as a dust or fume. 9 FMSHRC at 285; Tr. 100-02, 140-41, 168, 208-10. See also Secretary's Brief on Review at 2-3 & n.2. When MSHA samples for exposure to vanadium under this TLV, the sample result is described in terms of a concentration of vanadium.

Id.

The "C" designation for vanadium fume in the ACGIH TLVs refers to a "Ceiling limit," which is a level of exposure that is not to be exceeded. A C limit is different from a "Time-Weighted Average" limit ("TWA"), which contemplates the possibility of temporary incursions beyond the limit. See section 57.5001(c)(n.1 supra); see also ACGIH TLV 3-4.

With respect to the arc welding procedure involved in this case, heat applied to a metal welding rod containing vanadium vaporizes the vanadium and produces vanadium fume. Vanadium fume contains vanadium and V205. 9 FMSHRC 287-89; Tr. 99-100. See also DMMRT 698 (definition of "metallurgical fume").

analysis. The subsequent report of results indicated that the sample in question contained 47.4 microns of vanadium. From this number, the inspector calculated that the concentration of vanadium fume to which the welder had been exposed was .0678 mg/m3.

Based on these test results, the inspector determined that the exposure of the sampled welder was above the allowable TLV for vanadium fume, and he issued to Unocal a citation, pursuant to section 104(a) of the Mine Act, 30 U.S.C. $ 814(a), alleging a violation of sections 57.5001/.5005. The citation states in relevant part:

> The welder was exposed to .0678 mg/m3 of Vanadium fume whereas Vanadium fume has a ceiling limit of .05 mg/m3 and should not be exceeded. Personal respiratory protection was not being worn by the employee while he was welding....

Subsequently, the inspector modified the citation by designating the violation as involving a significant and substantial contribution to a mine health hazard. 4/ Unocal contested both the citation alleging a violation of section 57.5001/57.5005 and the associated significant and substantial finding. In particular, Unocal argued that MSHA's vanadium fume sampling and analysis procedures were defective and that, there- fore, the Secretary had not proven the violation.

In his decision, Judge Lasher concluded that the operator had violated sections 57.5001/.5005 by exceeding the TLV for vanadium fume during the cited welding operation. 9 FMSHRC at 285-94. Preliminarily, the judge noted that the form of vanadium at which section 57.5001 is directed under the incorporated ACGIH TLVs is V205 although the TLV is expressed, and sampled for, in terms of vanadium. 9 FMSHRC at 285-86. The judge further noted that the "violation created" by section 57.5001 in this respect is "for exceeding the TLVs for Vanadium fume or Vanadium dust." Id. The judge found that the application of heat to the vanadium welding rods during welding vaporizes the vanadium and that, if the vaporous vanadium is mixed with air, V205 results. 9 FMSHRC at 287.

4/ The "significant and substantial" finding is drawn from section 104(d)(1) of the Mine Act, which provides in relevant 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... he shall include such finding in any citation given to the operator under this chapter....

30 U.S.C. $ 814(d(1).

Based on the testimony of MSHA's witness Richard L. Duran, an MSHA industrial hygienist, the judge found, inter alia. that the presence of vanadium in vanadium fume necessarily implies the presence of vanadium pentoxide in the fume; that the oxide is heavier than the element; that the vanadium fume TLV of .05 mg/m3 is equivalent to a V205 reading of two and one-half times such level; and that the sample value of .0678 mg/m3 in this case would indicate an exposure to V205 at two and one- half times that amount. 9 FMSHRC at 286-87; Tr. 102, 168. 5/

The judge related in detail how Inspector Dennehy had tested for and obtained the vanadium fume sample. 9 FMSHRC at 286-87. The judge accepted the inspector's calculation of a .0678 mg/m3 exposure value for vanadium fume, some 35 percent in excess of the TLV ceiling level of .05 m8/m3 for the fume. 9 FMSHRC at 287-88. The Judge found that the inspector had used the correct testing equipment and procedures and rejected an extensive Unocal challenge that the inspector's fume samples were contaminated with vanadium dust. 9 FMSHRC at 287-94. Given these findings, the judge concluded that an overexposure violation had been established. 9 FMSHRC at 294.

Having found a violation of sections 57.5001/.5005, the judge addressed the issue of whether the violation was significant and substantial. Citing the general Commission test for determining a significant and substantial violation as set forth in Cement Division, National Gypsum Co., 3 FMSHRC 822, 825 (April 1981), Mathies Coal Co., 6 FMSHRC 1 (1984), the judge found that the violation of sections 57.5001/.5005 contributed to a "measure of danger" to health. 9 FMSHRC at 295. The judge defined the crucial issue as "whether the Secretary established that there existed a reasonable likelihood that the hazard contributed to would result in an injury (illness)." Id.

The judge then summarized Duran's testimony to the effect that overexposure to vanadium "could" create serious health hazards; that bronchial irritation, possible pneumonia or asthma could occur; that an overexposed employee could become sensitized after repeated doses; and that exposure to a level of .0678 mg/m3 could cause a cough, sore throat, breathing difficulty and other flu-like symptoms. 9 FMSHRC at 296; Tr. 105-111. The judge described Duran's testimony as to the likelihood of illness or injury as being of a "speculative complexion." 9 FMSHRC at 296.

The contrary testimony of Unocal's expert witness, Paul Ferguson, a Ph.D in toxicology, was summarized by the judge as

concluding that "an .0678 exposure to vanadium fume would not cause an injury resulting in

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5/ At oral argument in this matter, counsel for the Secretary stated that any constant correlation of two and one-half times for the respective values of vanadium and V205 in vanadium fume could not be made "on the basis of what we have in the record," and that the "Secretary was willing to rest, in general, upon the factual premise that the expression of the measurement of vanadium is going to be less than the expression of the measurement as vanadium pentoxide." Tr. Or. Arg. 5, 8-9.

lost work days; that there was not a reasonable likelihood that such an exposure would result in an illness; and that there was not a reasonable likelihood that any resulting illness would be of a reasonably serious nature." 9 FMSHRC at 296; Tr. 215-17. The judge accepted Ferguson's testimony that ".1 milligrams per cubic meter is the lowest level" at which any symptoms such as coughing or slight irritation appear, and the ".05 limit includes a safety factor that to the best of our knowledge, would provide no symptoms." Id. Crediting Ferguson's testimony, the judge stated:

> Dr. Ferguson s opinion that there was not a reasonable likelihood of an injury (illness) occurring at the level of exposure detected by Inspector Dennehy is, in view of its positive and convincing tenor and supportive rationale, accepted.

9 FMSHRC at 297.

The judge also concluded that the presumption of a significant and substantial health violation announced by the Commission with respect to violations of the standard covering respirable dust in coal mines in Consolidation Coal Co., 8 FMSHRC 890 (June 1986), aff'd, 824 F.2d 1071 (D.C. Cir. 1987) ("Consol" decision), did not apply to the vanadium overexposure violation involved in this case. Id. Accordingly, the judge determined that the violation was not of a significant and substantial nature. Id.

Unocal did not seek review of the judge's determination that a violation occurred, but the Secretary sought and was granted review of the judge's significant and substantial findings. The Secretary asserts before us that a violation of sections 57.5001/.5005 is presumptively significant and substantial and that the judge failed to apply properly the Commission's decision in Consol, supra. Closely related to this argument is the Secretary's contention that by placing a C limit on the vanadium fume TLV, the Secretary has made a regulatory determination that violative exposures above that limit are, per se, of a significant and substantial nature. The Secretary also argues that, in any event, the evidence of record does not support the judge's finding that the violation was not of a significant and substantial nature. We disagree.

II.

We first discuss the proper test for determining whether the violation at issue was of a significant and substantial nature. In

National Gypsum, supra, the Commission announced its general test for determination of significant and substantial violations:

> [A] violation is of such 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.

3 FMSHRC at 825. Consonant with the Mine Act's significant and substantial phraseology and the Act's overall enforcement scheme, we also stated:

> [A] violation "significantly and substantially" contributes to the cause and effect of a hazard if the violation could be a major cause of a danger to safety or health. In other words, the contribution to cause and effect must be significant and substantial.

3 FMSHRC at 827 (footnote omitted). See also U.S. Steel Mining Co., 6 FMSHRC 1834, 1836 (August 1984); Consolidation Coal Co., 6 FMSHRC 34, 37 (January 1984); Mathies Coal Co., 6 FMSHRC 1, 3-4 (January 1984). Thus, the violation must be a ma]or cause of a danger to safety or health.

In Mathies Coal Co., supra, we further discussed the elements that establish, under National Gypsum, whether a violation of a mandatory safety standard is significant and substantial:

> [T]he Secretary ... must prove: (1) the underlying violation of a mandatory safety standard; (2) a discrete safety hazard--that is, a measure of danger to safety--contributed to by the violation; (3) a reasonable likelihood that the hazard contributed to will result in an injury; and (4) a reasonable likelihood that the injury in question will be of a reasonably serious nature.

6 FMSHRC at 3-4 (footnote omitted). In Consol, supra, we applied the Mathies framework to violations of mandatory health standards:

> Adapting this test to a violation of a mandatory health standard ... results in the following formulation of the necessary elements to support a significant and substantial finding: (1) the underlying violation of a mandatory health standard; (2) a discrete health hazard--a measure of danger to health--contributed to by the violation; (3) a reasonable likelihood that the health hazard contributed to will result in an illness; and (4) a reasonable likelihood that the illness in question will be of a reasonably serious nature.

8 FMSHRC at 897.

In employing this test in Consol with respect to a violation of section 70.100(a), the mandatory standard addressing respirable dust in coal mines, we recognized that proof of the third element -- a reasonable likelihood that the health hazard contributed to will result in an illness -- would be somewhat elusive as to the development of insidious, progressive lung disease as a consequence of a single overexposure. 8 FMSHRC at 898-99. However, taking into account the

Mine Act's "fundamental purpose" in preventing pneumoconiosis and related lung diseases caused by overexposure to respirable dust in coal mines, we held that in all cases where a violation of 30 C.F.R. 70.100(a) is proved, "a [rebuttable] presumption that the violation is significant and substantial is appropriate." 8 FMSHRC at 899. This holding was based upon the overwhelming evidence in the record of the debilitating health hazard associated with overexposure to respirable dust, upon extensive reference to the pertinent legislative history, and upon Congress' stated goal in limiting miners' exposure to respirable dust in coal mine atmospheres. 8 FMSHRC at 895-99. The United States Court of Appeals for the District of Columbia Circuit agreed that once "the Commission had determined on the basis of medical evidence that any violation of the respirable dust standard should be considered significant and substantial, it would be meaningless to require that the same findings be made in each individual case in which a violation occurs" and affirmed the decision. 824 F.2d at 1084.

The Secretary argues that a Consol.type presumption is appropriate here and that the C limit applicable to vanadium fume requires the same legal result. This specific argument was not made at the hearing level and, except for good cause shown, no assignment of error by a party may rely upon any question of fact or law upon which the judge has not been afforded an opportunity to pass. 30 U.S.C. $ 823(d)(2)(A) (iii). The Secretary has not shown any cause why this argument was not made to the judge. Furthermore, our holding in Consol was made in the specific context of respirable dust in coal mines. As discussed in Consol (8 FMSHRC at 895-99), the presumption that violations of the respirable dust standard are of a significant and substantial nature was established based on the pertinent legislative history and on the evidence adduced in that case.

In contrast, the legislative history is silent as to vanadium fume. Nor is there evidence in the record of this case regarding equivalent effects of overexposure to vanadium fume. MSHA's industrial hygienist, Duran, stated that impairment from overexposure to vanadium fume is transitory. Tr. 107. Ferguson's testimony that there is no disease associated with overexposure to vanadium fume (unlike overexposure to respirable dust in coal mines) was not rebutted by the Secretary. Tr. 214. Further, it is undisputed that the results of exposure are not cumulative, but are reversible upon removal from exposure. (The parties stipulated that overexposure to vanadium fume does not result in permanently disabling illness or injury. Tr. 156.)

In sum, we do not find a requisite basis in either the present record or the legislative history to hold that when the Secretary proves a violation of sections 57.5001/.5005 based upon overexposure to vanadium fume, a presumption arises that the violation is of a significant and substantial nature. 6/

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6/ We emphasize that our conclusions with respect to a presumption are based on the record developed in this case. We do not intimate that the Secretary may not, in the future, be able to adduce proof sufficient to establish a presumption that a violation with respect to overexposure

The Secretary also argues that the assignment of the C limit to vanadium fume constitutes a regulatory determination that any exposure over the .05 mg/m3 limit creates a reasonable likelihood of illness that is not subject to challenge. As with her argument with respect to a presumption, this argument was not made at the hearing level and the Secretary has shown no good cause why it was not made.

Therefore, as the judge concluded, the appropriate test in this case for determining whether the violation is of a significant and substantial nature is the analytical framework set out in National Gypsum and Mathies, and subsequently extended to violations of mandatory health standards under Consol.

III.

The primary question on review, accordingly, is whether the judge correctly applied the Mathies/Consol elements of proof. There is no dispute on review with the judge's finding that the violation occurred (the first element) and that a measure of danger to health was posed by the violation (the second element). The third element, a reasonable likelihood that the health hazard contributed to will result in an illness, was resolved by the judge adversely to the Secretary. 9 FMSHRC at 296-97. We conclude that substantial evidence supports that determination.

It bears re-emphasis that the Secretary has the burden of proof as to the significant and substantial nature of the violation in issue. The Secretary's case at hearing rested upon the testimony of Duran. Unocal relied upon the testimony of Ferguson. Judge Lasher did not have the opportunity to observe personally the demeanor of these witnesses, but his decision summarizes and evaluates their testimony. As the judge noted, Duran, when testifying regarding possible illness caused by an exposure to vanadium fume of .0678 mg/m3, consistently referred to symptoms of illness that "could" or "might" occur. 9 FMSHRC at 296; Tr. 102-11. Thus, Duran testified that bronchial irritation, as well as possibly pneumonia or asthma, "could" occur as a result of overexposure to vanadium. Tr. 106. Another "possible" effect of vanadium over-exposure, depending on the individual, could be "sensitization" -- meaning that after being exposed on one occasion, an individual might experience more severe symptoms with the next exposure at the same or even lower concentration. Tr. 106-11. Duran indicated that the sampled incursion of 35 percent over the TLV would be an exposure of a "moderate" level. Tr. 106-10. Duran further indicated that, while symptoms would vary from person to person, an employee exposed to

vanadium at a certain level "might" develop symptoms. Tr. 110. He testified that an employee exposed to .0678 milligrams per cubic meter of vanadium "could" develop a cough, sore throat and have trouble breathing and could also develop symptoms similar to those encountered with the flu. Tr. 110-11.

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to vanadium fume or to any other particular airborne contaminant with a C limit is significant and substantial. Our point is that no such basis for a presumption has been demonstrated in this case.

We agree with the judge (9 FMSHRC at 296) that Duran did not consistently testify that any of the symptoms to which he referred were reasonably likely to occur at the sampled overexposure level of .0678 mg/m . Like the judge, we find that Duran's testimony is "speculative" and that it does not ineluctably lead to an inference that a reasonable likelihood of illness would be associated with the overexposure at issue.

The Secretary would have us reverse the judge's factual findings largely on the basis that neither Unocal's expert, Ferguson, nor the judge himself, comprehended the distinction between vanadium and V205 and the consideration that any concentration of vanadium in vanadium fume necessarily implies an even greater concentration of V205 in the fume. The Secretary vigorously asserts on review that the .0678 mg/m3 sample of vanadium at issue implied a concentration of V205 above those levels of V205 noted in scientific and medical literature as likely to produce symptoms of illness.

However, both the witness, Ferguson, and the judge understood the distinction between vanadium and V205 and the general quantitative correlation between the element and its oxide. See 9 FMSHRC at 285-86; Tr. 206-17, 223-27. While it is true that Ferguson did not explain fully the specific level of exposure to V205 implied by the .0678 mg/m3 sample of vanadium obtained in this case (see, e.g., Tr. 223-27), nevertheless, he clearly stated his opinion that this particular sample level of vanadium did not reflect a level of exposure reasonably likely to result in an illness. Tr. 215-16. Further, as the Secretary's counsel's statements at oral argument before us indicated (see n.5 supra), the precise correlation between vanadium and V205 in vanadium fume is simply not clear on the existing trial record -- either from the exhibits accepted into evidence at the hearing or from the testimony of any of the witnesses. Despite a measure of uncertainty associated with this consideration, it was the Secretary, not Unocal, who bore the burden of establishing through probative evidence the significant and substantial nature of the violation. Based on our review of the evidence properly before us, we are satisfied that neither Duran's largely speculative testimony alone nor his testimony considered together with what may be regarded as any ambiguity or incompleteness in Ferguson's testimony amounts to the level of proof necessary to make out the Secretary's case in this respect.

On review, the Secretary also argues that a 1967 study conducted by Zenz and Berg, a brief, excerpted summary of which was received into evidence as Exhibit R.3, demonstrates that the exposure to

vanadium fume encountered in this case was reasonably likely to result in an illness. 7/ Essentially, that summary of the Zenz-Berg study indicates

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7/ Exhibit R-3 states in relevant part:

> Zenz and Berg, in studying the effects of exposure to respirable V205 dust in five human volunteers, found severe upper respiratory tract irritation in the form of persistent productive cough at an

that two subjects in a controlled experiment, following an eight-hour exposure to vanadium dust at a level of 0.1 mg/m3, developed delayed cough and increased mucus. Left unestablished by this excerpt of a summary of the study or any other evidence of record is a showing of the asserted relationship between that scientific experiment involving, in relevant part, two subjects, and the violation at issue -- which involved exposure to vanadium fume, not dust, for an unspecified amount of time during the sampling period. We also note that Inspector Dennehy, who conducted the vanadium exposure testing, testified that no symptoms of illness were observed or complained of on the day of the overexposure (Tr. 71, 73-74), nor did the Secretary, at hearing, allege that any symptoms of illness subsequently developed. It was incumbent upon the Secretary to explain and establish any asserted relationship between the Zenz Berg results and the violation in question through expert testimony or other corroborating evidence, and this, we conclude, the Secretary failed to do. Accordingly, we are unable to find that the information contained in Exhibit R-3 is sufficient to establish the third element of proof of a significant and substantial violation.

Our decision affirming the judge's conclusion that the cited violation is not a significant and substantial contribution to a mine health hazard rests, as it must, upon the record developed in this case at trial. Having failed at the hearing to prove the significant and substantial nature of the violation, the Secretary, in her brief on review, presents detailed arguments and conclusions based upon scientific publications and studies, the contents of which were not admitted into evidence or otherwise incorporated into the record by the judge. 8/

At the hearing, the trial judge took official notice only of pages 1-54 of the 1973 ACGIH TLVs. Tr. 7. The only study reference received into evidence by the judge was the three-paragraph summary of the Zenz-

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> average concentration of 0.2 mg/m3 during a single eight-hour exposure. No systematic complaints were evident. Exposure of two previously unexposed volunteers at a level of 0.1 mg/m3 was still productive of a delayed cough and increased mucus.

8/ At the hearing, counsel for Unocal asked the judge to take official notice of the contents of the NIOSH criteria and nine other publications. Tr. 217. The judge properly refused, admitting the list only to show the publications that Ferguson had read. Tr. 217,

Exh. R-5. Official notice can be taken of the existence or truth of a fact or other extra.record information that is not the subject of testimony but is commonly known, or can safely be assumed, to be true. However, such notice cannot extend to the acceptance as fact of scientific publications and studies, the truth of whose contents is the subject of reasonable dispute by the opposing parties. See McCormick on Evidence, 3rd Ed. $$ 329, 330 (pp. 923-927, 1028-1032); Fed. R. Evid. 201. We note that the Secretary made no effort to have the studies themselves admitted into evidence, nor did she raise any issue in her petition for review with respect to the judge's refusal to take official notice of the contents of the studies.

Berg experiments discussed above. During his testimony, Duran cited "a Patty set of books on industrial health including toxicology" (Tr. 127), the ACGIH TLVs, 1980 TLV publications, and "a study by Zenz and Berg, I believe, in 1967" as material that he had "reviewed and read." (Tr. 151.) Duran did not discuss or evaluate the relevant substantive contents of these various materials. Based solely on these limited references to what Duran had read, the Secretary on review has premised much of her argument upon her counsel's interpretation of material found throughout the NIOSH Criteria for A Recommended Standard ... Occupational Exposure to Vanadium (1977) and the other sources mentioned in passing by Duran. See, e.g., S. Br. at 3, 4, 9, 16, 17; and S. Reply Br. 5-7, 9-13, 15-16.

At oral argument, counsel for Unocal has argued that the Commission should not base its decision upon materials whose content was not included in the record or accept opposing counsel's interpretations and evaluations of scientific information and toxicological studies that were not presented to the judge through expert witnesses subject to cross-examination. Unocal asserts that such materials are outside the expertise of either counsel or the Commission to evaluate adequately and independently without the assistance of such trial testimony. Tr. Oral Arg. 23.29. We concur.

As we have noted with respect to the Secretary's presumption and C limit arguments, the Mine Act expressly provides that "[e]xcept for good cause shown, no assignment of error by any party shall rely on a question of fact or law upon which the administrative law judge had not been afforded an opportunity to pass." 30 U.S.C. $ 823(d)(2)(A)(iii). Similarly, section 113(d)(2)(C) of the Mine Act, 30 U.S.C. $ 826(d)(2)(C), states in relevant part that the record on review of a judge's decision consists of "the record upon which the decision of the judge was based...." The Commission has made clear that these provisions "evince Congress' view that the adjudication process is best served if the administrative law judge is first given the opportunity to admit and examine all the evidence before making his decision." Climax Molybdenum Co., 1 FMSHRC 1499, 1500, (October 1979). In short, it is the obligation of parties to prove their case before the judge, not on review by reference to detailed material not presented to the judge and not subject to the rigors of cross-examination. This rule of procedure under the Mine Act accords with settled principles of administrative and general law limiting the record on review to the record developed before the trier of fact. See, e.g., Melong v. Micronesian Claims Comm'n, 643 F.2d 10, 12 n.5 (D.C. Cir. 1980).

Accordingly, we decline to consider the copious scientific literature presented by the Secretary for the first time in this case on

review. As we have emphasized, our conclusion is based solely on the record developed before the judge. In light of our determination that substantial evidence supports the judge's finding that the Secretary failed to establish the third Mathies/Consol criterion, we conclude that the judge properly determined that the violation was not of a significant and substantial nature. We do not reach the fourth criterion as to whether an illness would have been of a reasonably serious nature.

IV.

For the foregoing reasons, the decision of the Administrative Law Judge is affirmed.

Ford B. Ford, Chairman

Richard V. Backley, Commissioner

Joyce A. Doyle, Commissioner

L. Clair Nelson, Commissioner

Commissioner Lastowka, concurring:

l agree with the majority's ultimate conclusion that substantial evidence supports the administrative law judge's finding that the violation at issue was not of a significant and substantial nature. I disagree, however, with their affirmation of the judge's finding that the Secretary failed to establish the third element of the test for significant and substantial health violations as set forth in Consolidation Coal Co., 8 FMSHRC 89O (June 1986), aff'd, Consolidation Coal Co. v. FMSHRC, 824 F.2d 1071 (D.C. Cir. 1987), i.e.. that "there was not a reasonable likelihood of an injury (illness) occurring at the level of exposure detected." 9 FMSHRC at 297 (ALJ). I believe that the record establishes that the pivotal evidence relied on by the judge and the majority in support of their finding is flawed and that a proper reading of the record establishes that the overexposure to vanadium pentoxide at issue was reasonably likely to result in an illness.

Nevertheless, l concur in the conclusion that the violation was not significant and substantial on the separate ground that the Secretary failed to establish t.he fourth element of the Consolidation Coal Co. test, i.e., the Secretary failed to prove that any illness caused or contributed to by the overexposure to vanadium pentoxide in the present case would be of a reasonably serious nature.

It is not disputed that a miner was exposed to a level of vanadium pentoxide in excess of the limit set in the applicable mandatory standard. To establish that this violation was of a significant and substantial nature, however, three additional elements must be proved: a discrete health hazard contributed to by the violation; a reasonable likelihood that the health hazard contributed to will result in an illness; and a reasonable likelihood that the illness in question will be of a reasonably serious nature. Consolidation Coal Co:, supra. As the majority notes, the judge found and it is not disputed on review, that: the Secretary proved that the violation posed a discrete danger to health. Majority opinion at 10. Thus, the next inquiry is whether a reasonable likelihood that the hazard contributed to would result in an illness was established.

The judge found that a reasonable likelihood of resulting illness was not established and the majority agrees. The basis for their conclusion is that the testimony of the Secretary's chief witness, Duran, is "speculative" (9 FMSHRC at 296; Majority op. at 11) and "does not ineluctably lead to an inference that a reasonable likelihood of illness would be associated with the exposure at issue." Majority op. at 11. In contrast, they accept

the testimony of Unocal's chief witness Ferguson, credited by the judge, as supportive of the finding of no reasonable likelihood. 9 FMSHRC at 297; Majority op. at 7, 10.

My colleagues reject the Secretary's arguments on review that a fundamental premise of Ferguson's testimony concerning the exposure level at issue and the likely consequences thereof was plainly flawed by a failure to consistently distinguish between vanadium ("V") and vanadium pentoxide ("V2O5"). Despite their characterization of Ferguson's testimony as "ambigu[ous]" and "incomplete[]" (Majority op. at 11), they nevertheless conclude that both Ferguson and the judge "understood" the distinction between vanadium and vanadium

pentoxide and their "general quantitative correlation". Majority op. at 11. They further decline the Secretary's invitation to consider various scientific studies and reports referenced by the Secretary in support of her position, but not entered into the record below. They state:

> [I]t is the obligation of parties to prove their case before the Judge, not on review by reference to detailed material not presented to the judge and not subject to the rigors of cross-examination.... Accordingly, we decline to consider the copious scientific literature presented by the Secretary for the first time in this case on review. As we have emphasized our conclusion is based solely on the record developed before the judge.

Majority op. at 13 (emphasis in original).

I must respectfully disagree with my colleagues' rationale for upholding the administrative law judge's finding of no reasonable likelihood of an illness. First, I believe that it is apparent on the face of the record' as the Secretary asserts, that Ferguson made a fundamental misstatement in contradiction of other parts of his own testimony, and that this mistaken testimony forms the basis for the finding challenged by the Secretary. Second, despite the majority's protest, review of copious scientific literature outside the record is not necessary in order to determine that a reasonable likelihood of an illness was established by the Secretary. Quite to the contrary that there is a reasonable likelihood of an illness resulting from the exposure level at issue is supported by the evidence of record, particularly Ferguson's own testimony.

I agree with the majority that the judge properly found "that the form of vanadium at which section 57-5001 is directed..is V2O5 [vanadium pentoxide] although the TLV [threshold limit value] is expressed, and sampled for in terms of vanadium [V]. 9 FMSHRC at 285-86." Majority op. at 5-6. As the majority further notes, the judge found based on the record that for the sample at issue there would have been two and one-half times as much vanadium pentoxide as vanadium. 9 FMSHRC at 287; Majority op. at 6; Tr. at 102. It is this relationship between vanadium and vanadium pentoxide that Ferguson apparently did not account for in the crucial part of his testimony relied on by the judge and excused by the majority.

In light of the 2.5 to 1 relationship testified to by Duran and found as a fact by the judge, the air sample at issue

indicating an exposure level of 0.0678 mg vanadium (V)/ms indicates a corresponding level of 0.1695 mg vanadium pentoxide (V2O5)/m3. (The parties apparently have rounded this 0.1695 figure down to 0.1 mg (Sec. Br. at 17; Unocal Br. at 1) and I will hereafter do the same. In this regard, I note that Unocal attached to its brief on review portions of the NIOSH Criteria For A Recommended Standard...Occupational Exposure To Vanadium (1977). Unocal states that this document "is clearly the type of scientific document of which the Commission may take official notice." Unocal Br. at 4 n.3. Accordingly, I note that this document indicates that an exposure level of .06 mg vanadium/ms equals an exposure of 0.1 mg vanadium pentoxide/m3. See NIOSH Criteria Document at 73, Attachment 3 to Unocal's brief).

Both Duran and Ferguson testified at the hearing as to the landmark study by Zenz and Berg entitled "Human Responses to Controlled Vanadium Pentoxide Exposure", 14 Arch Environ Health 709 (1967). ln fact, not only did Ferguson expressly list this study as one of the references supporting his testimony (Exh. R-5), but Unocal introduced into evidence at the hearing a summary of the study. Exh. R-3. This summary of the Zenz-Berg study states:

> Zenz and Berg, in studying the effects of exposure to respirable V2O5 dust in live human volunteers, found severe upper respiratory tract irritation in the form of persistent cough at an average concentration of 0.2 mg/m3 during a single eight-hour exposure. No systemic complaints were evident. Exposure of two previously unexposed volunteers at a level of O.l mg/m3 was still productive of a delayed cough and increased mucus. The authors concluded that the recommended TLV of 0.5 mg/3 should be revised.....In light of the above reports, especially the findings of Zenz and Berg, a TLV of 0.05 mg/ms for respirable V2O5 is recommended.

Exh. R-3 at 426 (emphasis added). Thus, Unocal's Exh. R-3 indicates that the single exposure to vanadium pentoxide at issue would cause a delayed cough and mucus production.

The next question that arises is whether such a human response to exposure to vanadium pentoxide constitutes an "illness". On this specific question, the evidence in this record is in the affirmative. Dr. Ferguson himself testified as follows:

> Based on the scientific literature, .1 milligrams per cubic meter is the lowest level where we see symptoms. They're not debilitating symptoms, but an individual will have a slight irritation and have some coughing. That can be defined as an illness. We don't want to al]ow our workers to be exposed to levels -- how minor do cause symptoms. There are no specific scientific literature that tested men and women at .05. That lowest level is really a .l in a controlled experimental condition by Zenz and Berg is what the TLV is based on and they have that as a safety factor.

Tr. 237-38; see also Tr. 110-11, 209-13. Here it is important to stress that the 0.1 exposure level in the Zenz-Berg study referenced by Ferguson Involves vanadium pentoxide exposure. As discussed

previously, the 0.0678 vanadium exposure level in this case, when expressed in terms of vanadium pentoxide, exceeds the 0.1 level identified in Zenz-Berg as producing adverse health effects. Thus, although Ferguson later testified that no illness would result from the 0.0678 vanadium exposure in this case (Tr. 216), it is apparent that Ferguson mistakenly believed that this exposure level was less than the 0.1 vanadium pentoxide exposure level documented in Zenz-Berg when, in fact, it exceeded the Zenz-Berg level

Given Ferguson's testimony that the human response to vanadium pentoxide exposure at a 0.1 level "can be defined as an illness". (Tr. 237), and Duran's testimony that at this level illness was likely to be the result (Tr. 111, 160),

the judge's finding of no reasonable likelihood of illness, resting as it does on Ferguson's flawed testimony, is without adequate foundation as is the majority's affirmance of this finding.

Nevertheless, it is important for me to stress the limits of my own conclusion in this case. The question of what constitutes an "illness" may seem relatively straightforward, but it is not. The Secretary's mine safety standards define an "occupational illness" as "an illness or disease ... which may have resulted from work at a mine or for which an award of compensation is made" (30 C.F.R. 50.2(f)), but the standards contain no special definition of "illness". But see 30 C.F.R. 50.20-6(b)(7)(i-vii) (listing some examples of occupational illnesses). Further, there often is dispute even within the medical profession as to whether a particular condition or human response is merely a symptom of a possible illness or an illness itself.

Apart from the direct impact on the affected individual, whether a condition is an "illness" has important ramifications under the Mine Act particularly concerning compliance with the reporting requirements imposed by the Secretary in 30 C.F.R. Part 50, "Notification, Investigation, Reports and Records of Accidents, Injuries, Illnesses, Employment, and Coal Production in Mines". In this regard, l note the Secretary's ongoing inquiry into the need for improving illness, injury and accident reporting under both the Mine Safety Act and the Occupational Safety and Health Act of 1970, 29 U.S.C. 651 et seq. See, e.g., 10 BNA Mine Safety and Health Reporter at 97, 244-45 (July 22 and September 16, 1988). Among the concerns of this effort is the need for clarifying precisely what constitutes an "occupational illness". See "The Keystone National Policy Dialogue On Work-Related Illness and Injury Recordkeeping", January 31, 1989, The Keystone Center, Keystone, Colorado, at 67-71.

This ongoing effort to improve the reporting of illnesses and injuries is indicative of the complexity of the challenge of properly categorizing and reporting illnesses and cautions against making broadly applicable conclusions on the basis of a record as limited as the one before us in the present case. Nevertheless, because the expert testimony in this case characterized the human response to the overexposure to vanadium pentoxide at issue as an "illness", I have no basis for drawing any other conclusion. For the above reasons, l must disagree with the majority's affirmance of the judge's finding that the third element of the test for significant and substantial violations was not established.

Proceeding to the fourth and final element of the test, i.e., whether the illness caused or contributed to by the violation was of a reasonably serious nature, I find insufficient evidence addressing whether the coughing and mucus formation caused by the level of overexposure in this case indicates an illness of a reasonably serious nature. Most of the Secretary's evidence was focused on demonstrating the potential serious consequences of either long-term exposure or brief exposures to very high concentrations of vanadium or vanadium pentoxide. Little effort was directed at establishing whether the coughing and mucus formation likely to result from a single overexposure to a level of 0.0678 mg vanadium/m3 are considered indicative of an illness of a reasonably serious nature. See Tr. 111. Nor was there any evidence that the involved miner had

suffered or was likely to suffer continued overexposure to vanadium or vanadium pentoxide. Thus, I find an insufficient basis in this record for concluding that the Secretary established the final element of a significant and substantial violation.

Accordingly, l concur in the majority's affirmance of the judge's vacation of the significant and substantial finding.

James A. Lastowka, Commissioner

~308
Distribution

Thomas C. Means, Esq.
R. Timothy McCrum, Esq.
Crowell & Moring
1001 Pennsylvania Ave., N.W.
Washington, D.C. 20004

Linda Leasure, Esq.
Dennis Clark, Esq.
Office of the Solicitor
U.S. Department of Labor
4015 Wilson Blvd.
Arlington, VA 22203

Charles 0. Strathman, Esq.
Unocal Corporation
1201 West 5th Street
P.0. Box 7600
Los Angeles, California 90051

Administrative Law Judge Michael Lasher
Federal Mine Safety and Health Review Commission
280 Colonnade Center
1244 Speer Blvd.
Denver, Colorado 80204