NIOSH Comments to DOL

POSTHEARING COMMENTS FROM THE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
ON THE
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION'S
REOPENING OF THE RULEMAKING RECORD FOR THE
PROPOSED RULE ON OCCUPATIONAL EXPOSURE TO CADMIUM

Docket No. H-057a
29 CFR Part 1910

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Institute for Occupational Safety and Health

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16. Abstract (Limit: 200 words) This testimony concerns the reopening of the rulemaking record on cadmium (7440439) by OSHA in an effort to allow public comment on new toxicologic data regarding solubility, bioavailability, toxicity, carcinogenicity, and potency of cadmium-sulfide (1306236) relative to other cadmium compounds. NIOSH agrees that cadmium-sulfide has been shown to be tumorigenic in rats by intratracheal installation; that cadmium-sulfide is carcinogenic in rats following intraperitoneal injection; and that short term studies of cadmium-sulfide pulmonary bioavailability demonstrate that long term bioavailability exists for this compound, even though it is lower than the bioavailabilities for cadmium-oxide (1306190) and cadmium-sulfate (10124364). NIOSH agrees that further studies on the carcinogenicity and bioavailability of cadmium-sulfide are warranted, but that the data available at this time do not offer a clear basis for treating this compound differently than any other cadmium compound from a regulatory standpoint.

17. Document Analysis a. Descriptors

b. Identifiers/Open-Ended Terms NIOSH-Publication, NIOSH-Author, NIOSH-Testimony, Niemeier-R-W, Cadmium-compounds, Cadmium-poisoning, Carcinogens, Tumorigenesis, Sulfides

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Docket Office
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Room N2625
Occupational Safety and Health
Administration
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

Dear Sir/Madam:

On September 18, 1991, the Occupational Safety and Health Administration (OSHA) reopened its rulemaking record on cadmium [56 FR 47348] for the purpose of allowing public comment on new toxicologic data by Glaser et al. (Ex. L-140-44) and Konig et al. (Ex. L-140-27B) regarding the solubility (including photodecomposition), bioavailability, toxicity, carcinogenicity, and potency of cadmium sulfide (CdS) relative to other cadmium compounds. OSHA has also contracted with Drs. G. Oberdörster (Ex. 141), who is a co-author of the Glaser et al. study, and U. Heinrich (Ex. 142), who is a co-author of the Konig et al. study, to assess all the available information on CdS including solubility, bioavailability, toxicity, carcinogenicity, and potency relative to other cadmium compounds. Both scientists conclude that the available evidence, including these new studies, suggest that CdS is carcinogenic and should be regulated the same as other cadmium (Cd) compounds. NIOSH concurs with their assessment and continues to support its earlier conclusion [NIOSH 1990a; 1990b; 1990c; 1990d] that cadmium is a potential occupational carcinogen and that exposures should be reduced to the lowest extent feasible.

In our evaluation of the new studies, NIOSH agrees with the following evidence cited by Oberdörster and Heinrich for the carcinogenicity of CdS:

1) CdS has been shown to be tumorigenic in rats by intratracheal installation;

2) CdS has been shown to be carcinogenic in rats by intraperitoneal injection; and

3) short-term studies of CdS pulmonary bioavailability demonstrate that CdS does have some long-term bioavailability, albeit lower than the bioavailabilities of cadmium sulfate ($CdSO_4$) or cadmium oxide (CdO).

It is probable that the lower pulmonary bioavailability of CdS in rats translates into a lower carcinogenic potency of CdS in rats, but due to the

confounding presence of $CdSO_4$ in the chronic bioassay of CdS for both new studies, this cannot be accurately assessed. The chronic bioassay data do not rule out a simple additive relationship between CdS and $CdSO_4$, which would imply that CdS has a carcinogenic potency similar to that of $CdSO_4$. Also, the clearance of inhaled particles from human lungs is slower than the clearance of particles from rat lungs, so that the bioavailability of CdS in human beings may be greater than in rats.

The new data indicate that inhaled CdS is carcinogenic, although CdS may be a less potent carcinogen than other forms of cadmium. However, the degree to which CdS is less potent as a carcinogen cannot be adequately assessed at this time. It is also possible that, because of photodecomposition of CdS, exposures to "CdS" in the workplace may actually be exposures to a mixture of cadmium compounds that are more potent carcinogenically than CdS alone.

Further studies on the carcinogenicity and bioavailability of CdS are clearly warranted, but the data available at this time do not offer a clear basis for treating CdS differently from a regulatory perspective than other Cd compounds.

Please call me at FTS 684-8302 if you have any questions.

Sincerely yours,

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NIOSH/DSDTT:LReed:dm:TaftSB-52:Cinti:OH:11/1/91:cadmium.pc2

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