

Dragon, Karen E. (CDC/NIOSH/EID)

From: Bill Perry [
Sent: Thursday, November 06, 2008 9:20 PM
To: NIOSH Docket Office (CDC)
Cc: Perry.Bill@dol.gov
Subject: ~~153~~ CIB Skin Notation Strategy
Attachments: Perry Comments on NIOSH Skin Notation.pdf

Attached please find comments on the Proposed NIOSH Current Intelligence Bulletin: A Strategy for Assigning New NIOSH Skin Notations for Chemicals, NIOSH Docket ~~153~~ Thank you.

Bill

Submitted via E-Mail to:

National Institute for Occupational
Safety and Health (NIOSH)
NIOSH Docket Office
Robert A. Taft Laboratories
4676 Columbia Parkway
Cincinnati, OH 45226

Submitted from:

William G. Perry, CIH
Deputy Director
Directorate of Standards and Guidance
Occupational Safety and Health Administration (OSHA)
200 Constitution Ave., N.W.
Washington, D.C. 20210

**Comments on NIOSH's Draft *Current Intelligence Bulletin (CIB): A Strategy for
Assigning the New NIOSH Skin Notations for Chemicals*
NIOSH Docket 109**

We appreciate the opportunity to comment on NIOSH's draft CIB concerning the assignment of skin notations for chemicals. Aside from me, these comments include input from Dr. Val Schaeffer and Maureen Ruskin of the Directorate of Standards and Guidance Office of Chemical Hazards (Metals), and from Paul Briggandi, consultant to OSHA. General comments aimed at the questions in the Charge to Peer Reviewers are presented first, followed by some specific suggestions. Please be aware that these comments should not be construed to represent any determination or official position of the Occupational Safety and Health Administration, and reflect only the scientific opinions of persons who contributed to these comments.

General Comments

Development of a new approach to assigning skin notations to hazardous substances is long overdue. Under the current system, reflected in OSHA's listing of permissible exposure limits (29 CFR 1910.1000, Table Z-1) and the Threshold Limit Values (TLVs) of the American Conference of Governmental Industrial Hygienists (ACGIH), substances are assigned a "Skin" notation where there is evidence that dermal exposure can contribute significantly to overall exposure via dermal absorption. Substances that exhibit direct dermal toxicity or sensitization are not assigned a "Skin" notation absent evidence of significant dermal absorption. (However, the ACGIH does assign a "SEN" notation to substances that cause dermal or respiratory sensitization through dermal exposure.) It is also the case that the basis for the existing system is not well understood by practitioners since it omits consideration of direct dermal toxicity, and is potentially confusing. Although the existing approach of assigning skin notations

is useful to evaluate the need for personal protective clothing where there is potential for dermal exposure in the workplace, we believe the proposed NIOSH approach represents a substantial improvement of the current system that will provide occupational health professionals with better hazard information on which to base their risk assessment and risk management decisions. Adoption of the proposed NIOSH approach should make clear to users that appropriate PPE may be necessary where employees are at risk of experiencing direct dermal toxicity even where evidence does not suggest that dermal exposure is likely to increase overall dose or body burden.

The proposed classes of skin notations appropriately distinguish between direct dermal toxicity, systemic toxicity associated with dermal absorption, and skin or respiratory sensitization associated with dermal contact. In particular, we agree that the SK-SEN notation should be used where there is sufficient evidence that dermal contact causes either allergic contact dermatitis or sensitization of the respiratory system or mucous membranes. This is consistent with the approach taken by the ACGIH for assigning "SEN" notations that are accompanied by a "Skin" notation (see, for example, page 76 of the 2008 ACGIH TLV and BEI booklet). Restricting use of the SK-SEN notation only to where there is evidence of allergic contact dermatitis might lead to confusion where there is a disparity between the NIOSH and ACGIH skin designations.

In general, the proposed NIOSH approach is consistent with the hazard determination approach taken in the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). Both approaches rely on the same kinds of scientific evidence and use similar default LD₅₀ values for assigning hazard statements/skin notations. However, classification of hazards associated with dermal contact of chemicals under both the proposed NIOSH system and the GHS necessarily rely on the use of professional judgment to evaluate and weigh evidence and make a hazard determination. For this reason, NIOSH-assigned skin notations may, in some specific instances, differ from hazard statements seen on labels and material safety data sheets prepared in accordance with the GHS, simply reflecting differences in scientific judgment. To ensure that users of the GHS and NIOSH systems understand this, it would be helpful for NIOSH to discuss a bit in Appendix G.2 how such apparent discrepancies might arise. The only area where it appears that NIOSH may have deviated from the GHS classification criteria to the NIOSH Skin Notation was in lines 7-11 on page 79 (Appendix F). NIOSH used the numerical cutoff value of 1000 mg/kg for repeated-dose dermal toxicity data. The GHS guidance value used to classify a chemical as a Target Organ – Single Exposure Category 1 is 1000 mg/kg. However, the data NIOSH cited was repeated dose data so the corresponding GHS guidance value for Specific Target Organ - Repeat Exposure Category 1 would be 20 mg/kg. However, NIOSH's conclusion with respect to the hazard classification appears to still be consistent with GHS. Finally, we have some suggested editorial changes to Table G.2 to clarify the correspondence between the GHS and NIOSH skin notation system. The suggested edits are incorporated in a revised Table G.2 that appears at the end of this review. NIOSH may also want to consider adding the GHS classification scheme for Specific Target Organ Toxicity for Repeated Exposures to show how that corresponds to the NIOSH system.

Specific Comments

1. Adverse Systemic Health Effects for SK-SYS - The document should clarify in section 2.2 (pg 7-8) that adverse respiratory, immune function, and other systemic effects that are the result of immediate or delayed immune hypersensitivity reactions are not assigned the SYS notation. As discussed in section 2.4, these effects are assigned a SEN notation.
2. Table 2.2 Paradigm for SYS notation - This table on page 13 needs some further discussion and clarification. If we are interpreting it properly, the table indicates that a chemical with (1) acceptable quality evidence of systemic toxicity from dermal exposure (e.g. animal study with NOAEL < 1000 mg/kg) and (2) quality evidence that there is insufficient dermal absorption to effectively contribute to the body burden (e.g. SI ratio < 0.1) is automatically assigned a SYS notation. On the other hand, the table indicates that the reverse situation in which a chemical with (a) quality evidence that there is sufficient dermal absorption to effectively contribute to the body burden and (b) acceptable quality evidence of no systemic toxicity from dermal exposure is automatically assigned a SK-STRIKEOUT. This seems to be a bit overly prescriptive and perhaps contradictory to the criteria in section 2.1, which argues for a weight of evidence approach when available data are inconsistent. It might be more prudent if table 2.2 clarify that a case-by-case judgment of the evidence is needed to determine a skin notation assignment in the two situations described above.
3. SK-DIR(IRR) versus SK-DIR(COR) - Section 2.3 (pg 14-16) should make clear that a skin irritant is assigned SK-DIR(COR) when the appropriate corrosivity tests are positive and SK-DIR(IRR) when the corrosivity tests are negative (see appendix A-2). A skin irritant that is corrosive would not receive both SK-DIR(IRR) and SK-DIR(COR) notations as we read the draft CIB.
4. SK-STRIKEOUT Notation - This notation is assigned when sufficient data were evaluated for a chemical and the evidence does not support a SYS, DIR, or SEN assignment. However, section 2.5 (pg 21-22) or appendix E.2 should clarify whether 'sufficient data' refer to the quality of the individual data sets or to the completeness of the data across health endpoints, dose levels, and exposure durations or to all of the above.
5. Dermal Absorption Cut-off Value - Appendix A.1 indicates that an estimated or predicted 10 percent absorption of the chemical applied to the skin is to be used as the cut-off for dermal penetration that contributes to the systemic dose. However, the appendix should make clear that the observed percentage of test chemical absorbed is critically dependent in almost any test protocol on the dose applied and vehicle used.
6. Dermal Absorption Algorithm - Appendix B incorporates previous suggestions on the dermal absorption algorithm provided by OSHA in early 2004 and is much improved. Section B.1.2 discusses the calculation of skin dose from a chemical in an aqueous liquid. NIOSH may also want to discuss the calculation of skin dose from exposure to an undiluted 'neat liquid' and skin exposure to solid

particles since these chemical forms are fairly common in the occupational setting.

7. Selecting and Prioritizing Candidate Chemicals – Appendix D lists several information sources that will be used to select candidate chemicals for classification. NIOSH may wish to consider a group of chemicals for which in vitro test data has recently become available as a result of a 2004 EPA test rule. These substances were identified as being of particular interest to OSHA. A summary of the dermal test results for this set of chemicals is available at http://inside.mines.edu/Outreach/cont_ed/oeesc/P72.pdf.

If NIOSH has questions or needs clarification of any of these comments, please contact William Perry at (202) 693-2284 or at Perry.Bill@dol.gov.

Suggested Revised Table G.2

Health Hazard	GHS Assignment (mg/kg body weight)	NIOSH Assignment (mg/kg body weight)
Acute systemic toxicity (Lethality)	<p>Dermal Category 1: Symbol: Skull and Crossbones Signal word: Danger Hazard Statement: Fatal in contact with skin (Criteria: $LD_{50} \leq 50$)</p> <p align="center">OR</p> <p>Dermal Category 2: Symbol: Skull and Crossbones Signal word: Danger Hazard Statement: Fatal in contact with skin (Criteria: $50 < LD_{50} \leq 200$)</p>	<p>SK: SYS (FATAL) (Criteria: $LD_{50} \leq 200$)</p>
	<p>Category 3: Symbol: Skull and Crossbones Signal word: Danger Hazard Statement: Toxic in contact with skin (Criteria: $200 < LD_{50} \leq 1000$)</p> <p align="center">OR</p> <p>Category 4: Symbol: Exclamation mark Signal word: Warning Hazard Statement: Harmful in contact with skin (Criteria: $1000 < LD_{50} \leq 2000$)</p>	<p>SK: SYS (Criteria: $200 < LD_{50} \leq 2000$)</p>
	<p>Category 5: Symbol: No symbol Signal word: Warning Hazard Statement: May be harmful in contact with skin (Criteria: $2000 < LD_{50} \leq 5000$)</p>	<p>No equivalent assignment</p>
Direct effects of the skin	<p>Skin Corrosion Category 1: Symbol: Corrosion Signal word: Danger Hazard Statement: Causes severe skin burns and eye damage</p>	<p>SK: DIR (COR)</p>
	<p>Skin Irritation Category 2: Symbol: Exclamation mark Signal word: Warning Hazard Statement: Causes skin irritation</p>	<p>SK: DIR (IRR)</p>
	<p>Skin Irritation Category 3: Symbol: No symbol Signal word: Warning Hazard Statement: May be harmful in contact with skin</p>	<p>SK: DIR</p>
Skin Sensitization	<p>Skin Sensitization Category 1: Symbol: Exclamation mark Signal word: Warning Hazard Statement: May cause an allergic skin reaction</p>	<p>SK: SEN</p>