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DATE: April 9, 2003

SUBJECT: COMMENTS AND RECOMMENDATIONS REGARDING THE DRAFT RISK CHARACTERIZATION DOCUMENT FOR METHYL ISOTHIOCYANATE

Thank you for the opportunity to review the most recent draft revised risk characterization document (RCD) for methyl isothiocyanate (MITC) prepared by the Department of Pesticide Regulation (DPR) and dated October 29, 2002. The Office of Environmental Health Hazard Assessment (OEHHA) reviews risk assessments prepared by DPR under the general authority of the Health and Safety Code, Section 59004, and also under the Food and Agricultural Code (FAC), Section 13129, in which OEHHA has the authority to provide advice, consultation, and recommendations to DPR concerning the risks to human health associated with exposure to pesticide active ingredients.

There is considerable history involving DPR and OEHHA in evaluating the health risks associated with exposure to MITC. OEHHA has reviewed a previous version of the draft RCD for MITC (1997) and has also reviewed two revisions of DPR's draft toxic air contaminant document (TAC) for MITC (March 2000 and August 2001). OEHHA has also prepared findings under the authority of FAC, Sections 14022 and 14023 regarding MITC as a TAC.

OEHHA finds the current version of the draft revised RCD for MITC to be very well written and it addresses the important health related issues associated with this active ingredient. We note that most of our previous comments on MITC exposure and risk as provided in our comments on earlier versions of the RCD and TAC document have been considered and incorporated into the document. Particularly noteworthy are the expanded discussions of the

"Cantara Incident" and of the human health complaints in Earlimart. We also note the inclusion of the risk assessment for chronic exposure to MITC, the adoption of a new critical subchronic inhalation study and some discussion of benchmark dose methodology as it would apply to the subchronic study.

OEHHA still has some concerns that are not addressed by the changes incorporated into the draft revised RCD. These concerns include the following:

Risk Assessment

1. The eye irritation endpoint used for evaluating acute human exposures to MITC is identified from a human volunteer study (Russell and Rush, 1996) where only the eyes were exposed (using goggles) to the material. In an actual exposure situation, in addition to the eyes, the nose and mouth would be simultaneously exposed, which may effectively lower the no-observed-adverse-effect level (NOAEL) for this endpoint. Uncertainty exists as to what degree the NOAEL would be affected. We recommend that the uncertainties inherent in using this study for exposure and risk assessment be discussed in greater detail in the RCD, particularly as they relate to the identification of a NOAEL.

2. The risk assessment for acute inhalation exposure to MITC is based on a study involving human volunteers with their eyes exposed to air concentrations of MITC in a laboratory setting (see comment number one). In practice, people are most frequently exposed to airborne MITC following agricultural metam sodium applications. Under such conditions, inhalation exposure is not limited to MITC but also may include other degradation products such as carbon disulfide, hydrogen sulfide and methyl isocyanate (MIC). Uncertainty exists as to the degree of contribution of these products to the overall potential toxicity of MITC. We recommend that this uncertainty be discussed in greater detail in the RCD.

3. Many exposures to MITC have exceeded the acute respiratory irritation level. Exposure to respiratory irritants can result in the development of prolonged adverse effects such as reactive airways dysfunction syndrome. In this condition, subsequent exposures to far lower levels of the same or another irritant gas will then trigger respiratory distress symptoms. This may be a hazard for MITC or combined MITC/MIC exposures and should be discussed in greater detail in the RCD.

4. Although the toxicology of the MITC breakdown product MIC is clearly and adequately described in the draft revised RCD, risk of exposure to this compound is not characterized in the document. Characterization of the risk from MIC exposure is necessary to fully and adequately evaluate risks from MITC. Accordingly, OEHHA recommends developing

exposure estimates for this compound and calculating MOEs to evaluate the risk of exposure to MIC from the breakdown of MITC.

Exposure Assessment

5. Portions of the exposure assessment appear to be inconsistent with the draft revised RCD. It is unclear in the exposure assessment whether measured air concentrations or air concentrations back calculated from estimated absorbed doses of MITC were used to calculate MOEs. On page 17 of the exposure assessment it is stated, "the risk assessor simply calculated MITC air concentrations from the absorbed dosages contained in previous versions of the exposure document." … "For this current revision, previously determined MITC absorbed dosages are retained in this document so as to save staff time for both the risk and exposure assessors. Otherwise, the assessors have to spend more time revising the exposure and risk characterization documents." In the main portion of the draft revised RCD, however, MITC "exposure levels" are described as "highest air concentrations," "average air concentrations," etc., and appear to be derived directly from measured air levels. These two descriptions of the source of MITC air concentrations appear to be inconsistent with each other. This apparent discrepancy between the exposure assessment document and the RCD should be clarified. In general we recommend that environmental monitoring data be used when available rather than modeled or calculated air concentrations based on assumptions.

6. The exposure assessment does not address the main toxicity problem documented in the RCD, that is, exposure of eyes to irritating vapors. Correspondingly, the RCD does not address population exposures that might result in this adverse health effect. More information on the size of the affected area(s), the number of people exposed and the duration of these exposures will be required for any discussions of further actions. In addition, a discussion of the uncertainty and variability in exposures and effects might be appropriate. Because the RCD estimates that excessive exposures to MITC vapor can occur resulting in acute irritative effects, more extensive air sampling would help to refine the exposure assessment.

If you have any questions regarding our comments or recommendations, please call me at (510) 622-3200 or Dr. David W. Rice at (916) 324-1277.

cc: See next page

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