OCCUPATIONAL HEALTH HAZARD RISK ASSESSMENT PROJECT FOR CALIFORNIA:

Identification of Chemicals of Concern, Possible Risk Assessment Methods, and Examples of Health Protective Occupational Air Concentrations

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Note to Reader

The chemicals of concern reviewed in this report were chosen based on the December 2006 version of the Proposition 65 list. During 2007, two additional chemicals potentially relevant to the workplace have been listed under Proposition 65 and several risk assessments have been completed by the Office of Environmental Health Hazard Assessment (OEHHA) or are in draft form. These updates are not included in this report.

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Executive Summary

The Office of Environmental Health Hazard Assessment (OEHHA) prepared this document as part of the Occupational Health Hazard Risk Assessment Project, under a contract with the Hazard Evaluation System and Information Service (HESIS) of the California Department of Public Health (CDPH) (formerly the California Department of Health Services). The overall goal of the project was to identify chemicals that may pose risks of chronic disease and health damage to workers and to quantify the health risks from exposure to selected workplace chemicals identified as causing cancer, reproductive and/or developmental toxicity. This information is intended to assist HESIS in more effectively recommending protective occupational standards as part of its legislative mandate.

The specific aims of the project were to:

- Identify chemicals relevant to an occupational setting (hereafter referred to as "workplace chemicals") that are listed as causing cancer, reproductive and/or developmental toxicity under Proposition 65 (Health and Safety Code Section 25249.5 *et seq.*), officially known as the Safe Drinking Water and Toxic Enforcement Act of 1986.

- Identify workplace chemicals that may pose a risk to workers because of a lack of an occupational exposure limit or because the occupational exposure limit is based on a less protective endpoint (*e.g.*, irritation instead of cancer).

- Calculate air concentrations associated with specified levels of cancer risk for selected workplace chemicals listed as causing cancer under Proposition 65.

- Calculate air concentrations relevant to an occupational exposure scenario and protective for reproductive and/or developmental toxicity for selected workplace chemicals listed as causing reproductive and/or developmental toxicity under Proposition 65.

- Describe the methodologies used to calculate air concentrations for selected workplace chemicals.

- Discuss scientific issues related to occupational quantitative dose-response assessments.

- Make recommendations to HESIS on providing consistent protection for California workers and community residents from health risks associated with exposure to carcinogens, reproductive toxicants and developmental toxicants.

The major results of the project are highlighted below.

- The Proposition 65 list (Title 22, California Code of Regulations, Section 12000), dated December 2006, was screened for "workplace chemicals" by identifying industrial chemicals with evidence of current use, and excluding certain classes of compounds (*e.g.*, drugs, pesticides, banned chemicals).

- Forty-four workplace chemicals that are listed as known to the state to cause cancer under Proposition 65 do not have a permissible exposure limit (PEL) established in California.

- Sixty-two workplace chemicals listed as known to cause cancer under Proposition 65 have PELs but are not regulated specifically as occupational carcinogens in California. Screening level assessments of the cancer risk were carried out assuming worker exposure via inhalation at the current PEL for 38 of these carcinogens. Seven of the 38 chemicals had cancer risks at the PEL of less than 1 in 1,000, a level often considered significant in occupational settings. Cancer risks of more than 100 in 1,000 were estimated for six of the 38 chemicals assuming exposure at the PEL. For the remaining chemicals, cancer risks at the PEL were between 1 and 100 in 1,000. To further evaluate potential cancer concerns for workers, more detailed risk assessments are recommended which would include examination of available data on actual worker exposure.

- Five workplace chemicals listed as known to cause reproductive and/or developmental toxicity do not have a PEL established in California.

- Fourteen workplace chemicals listed as known to cause reproductive and/or developmental toxicity have a PEL in California that does not explicitly account for those effects. The extent to which these PELs are protective for reproductive and/or developmental health risks is unclear and should be assessed further.

- About 60% of the workplace chemicals identified as of concern in this report are used as chemical or dye intermediates. Intermediates are typically used in closed systems with relatively limited potential for worker exposure. However, exposure can still occur with closed systems (*e.g.*, from fugitive emissions and during repair and maintenance), and about half of these intermediates have other industrial uses that may pose a higher exposure concern.

- About 20% of the workplace chemicals of concern are used as solvents, which generally pose higher concern for worker exposure.

- About 40% of the workplace chemicals of concern have been identified as being skin absorbable and could pose cancer, reproductive and/or developmental risks via the dermal route in addition to the inhalation route of exposure.

- About 60% of the workplace chemicals of concern are high production volume chemicals (>1 million pounds produced in and/or imported into the U.S., based on data from 2002).

The report also provides a number of specific recommendations to HESIS for the derivation of health protective occupational air concentrations using a risk-based approach.