



Department of Pesticide Regulation



Brian R. Leahy
Director

MEMORANDUM

Edmund G. Brown Jr.
Governor

TO: Shelley DuTeaux, Ph.D., MPH
Chief
Human Health Assessment Branch

FROM: Eric S. C. Kwok, Ph.D., DABT
Senior Toxicologist
Exposure Assessment Section
(916)324-7842

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SUBJECT: HUMAN HEALTH ASSESSMENT BRANCH POLICY ON THE ESTIMATION OF SHORT-TERM, INTERMEDIATE-TERM (SEASONAL), AND LONG-TERM (ANNUAL OR LIFETIME) EXPOSURES

The purpose of this memorandum is to update and clarify WHS policy memo HSM-01014 (Andrews, 2001), which supersedes a previously established memo HSM-980009 (Sanders, 1998). There are two primary changes that this memo seeks to clarify: 1) the organizational change of the originating branch, and 2) an update to the terminology.

Organization Change:

The Exposure Assessment Section (EAS) was originally part of the Worker Health and Safety (WHS) Branch. In 2014, the Section was relocated to the Medical Toxicology Branch, which was subsequently renamed the Human Health Assessment (HHA) Branch. This reorganization requires that EAS policies be reestablished under the HHA Branch.

Terminology Change:

Originally, HSM-980009 defined subchronic and chronic exposure durations. In superseding HSM-980009, HSM-01014 made it clear that “subchronic” and “chronic” exposure durations were no longer appropriate terms for human health exposure assessment and that there was a certain arbitrariness when amortizing human exposures over time periods that were more appropriate for experimental animal toxicity studies. The memo established that an actual temporal exposure pattern for humans would be used for developing the needed exposure interval.

To avoid confusion with the terminology employed for the study durations in toxicology and elsewhere, this updated policy establishes that the terms “acute”, “subchronic”, and “chronic” will no longer be used in the human exposure assessments conducted by EAS. The



corresponding exposure intervals will instead be described as **short-term, intermediate-term (seasonal), and long-term (annual and lifetime)**.

Once the exposure interval and the corresponding exposure magnitude (i.e., dose) have been estimated, the risk assessor will determine whether there is a possible unacceptable risk by comparing the exposure magnitude (e.g., short-term absorbed daily dose [STADD]) to the point-of-departure (PoDs) (e.g., acute PoD) selected from a toxicological or epidemiological study conducted over a duration similar to the human exposure interval. The new terms describing exposure intervals are defined below.

Short-Term Exposure

Exposures lasting seven days or less are considered to be short-term exposures. To target the highest realistic daily exposure, an upper-bound estimate (e.g., 95th percentile estimate of exposure or environmental concentration) is used to represent the short-term exposure (Beauvais *et al.*, 2007). The estimate of short-term exposure is termed Short-Term Absorbed Daily Dose (STADD).

Intermediate-Term (Seasonal) Exposure

Periods of frequent exposure lasting greater than seven days (i.e., greater than one week) to one year, whether exposure is constant or intermittent during the period, are considered intermediate-term exposures. If the exposure assessor determines that intermediate-term exposures do occur, the assessment will indicate the length of the exposure period(s), whether the exposure is constant or intermittent, and the estimated average daily exposure over the interval. In general, it is assumed that the average daily exposure is received on every day of an intermediate-term period. However, if the exposure is intermittent or sporadic during the period, the exposure may be amortized over the total period. The estimate of intermediate or seasonal exposure is termed Seasonal Average Daily Dose (SADD).

Long-Term (Annual or Lifetime) Exposure

Exposure assessments will provide long-term exposure estimates if activity pattern of the target population suggests the occurrence of long-term exposure (i.e., greater than one year). Two

types of long-term exposure estimates will be developed: annual and lifetime exposure estimates. Unless specifically indicated in the exposure assessment, annual exposure will be calculated as the sum of monthly exposure values amortized over a year. Lifetime exposure will be calculated as the sum of all annual exposures amortized over the person's lifetime (e.g., 40 years of work in 75 years lifetime assumed for agricultural handlers). The estimates of annual and long exposures are termed Annual Average Daily Dosage (AADD) and Lifetime Average Daily Dosage (LADD), respectively.

References

- Andrews, C. 2001. HSM-01014: Worker Health and Safety Branch Policy on the Estimation of Short-Term, Intermediate-Term, Annual and Lifetime Exposures Memorandum to Patterson, Gary Medical Toxicology Branch, from Andrews, Chuck Chief, Worker Health and Safety Branch, dated October 4. <http://www.cdpr.ca.gov/docs/whs/memo/hsm01014>.
- Beauvais, S., Powell, S., and Zhao, W. 2007. HS-1826 Surrogate Handler Exposure Estimates for Use In Assessments by the California Department of Pesticide Regulation. . California Environmental Protection Agency. Department of Pesticide Regulation. Worker Health and Safety Branch. 1001 I Street, Box 4015. Sacramento, California 95812.
- Sanders, J. S. 1998. HSM- 980009: Definition of exposure constituting chronic and subchronic. Memorandum to Patterson, Gary Medical Toxicology Branch, from Sanders, John S., Chief, Worker Health and Safety Branch, dated March 10. Sanders, John S. <http://www.cdpr.ca.gov/docs/whs/memo/hsm98009.pdf>.