

## MEMORANDUM

**TO:** Winston H. Hickox  
Agency Secretary  
California Environmental Protection Agency

**FROM:** Joan E. Denton, Ph.D.  
Director

**DATE:** August 29, 2003

**SUBJECT:** ADOPTION OF THE REVISED TOXICITY EQUIVALENCY FACTORS  
(TEF<sub>WHO-97</sub>) FOR PCDDs, PCDFs, AND DIOXIN-LIKE PCBs

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In accordance with Health and Safety Code, Section 44300 *et seq.* (The Air Toxics Hot Spots Information and Assessment Act, AB 2588, Connelly as amended by SB 1731, Calderon), the Office of Environmental Health Hazard Assessment (OEHHA) hereby adopts the WHO<sub>97</sub> Toxicity Equivalency Factors (TEF<sub>WHO-97</sub>) for polychlorinated dibenzo-*p*-dioxins (PCDDs) and dibenzofurans (PCDFs), and for dioxin-like polychlorinated biphenyls (PCBs) which were derived by the World Health Organization in 1997.

OEHHA is mandated to develop risk assessment guidelines to be used by state and local agencies in implementing the Air Toxics Hot Spots program. Development of these guidelines is proceeding in stages. There are four technical support documents, which have been adopted. These describe the scientific basis for acute reference exposure levels (REL), cancer potency factors, chronic RELs, and exposure assessments.

The technical support document, *Air Toxics Hot Spots Program Risk Assessment Guidelines. Part II: Technical Support Document for Describing Available Cancer Potency Factors* was adopted on April 13, 1999. Included were cancer potencies for chlorinated dioxins and dibenzofurans and for polychlorinated biphenyls, and Appendix A entitled *Toxicity Equivalency Factors for Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans*. The report describing the newly adopted factors is a replacement for Appendix A. These new TEFs should be used in cancer risk assessments for dioxin-like compounds prepared for the Air Toxics Hot Spots program. In analyses of historical data that lack measurements of individual PCB

Winston H. Hickox  
August 29, 2003  
Page 2

congeners, it may be necessary to use the existing procedure for cancer risks associated with PCB mixtures.

The third technical support document, *Air Toxics Hot Spots Program Risk Assessment Guidelines. Part III. The Determination of Chronic Reference Exposure Levels for Airborne Toxicants*, was adopted on February 23, 2000. Included was a chronic REL for chlorinated dioxins and dibenzofurans. These new TEFs should be used in risk assessments for the determination of dioxin-like non-cancer chronic health effects in the Air Toxics Hot Spots Program. In analyses of historical data that lack measurements of individual PCB congeners, or where the congeners identified are primarily the non-coplanar type which are not dioxin-like in their action, it may be necessary to use instead the existing procedure for assessment of non-cancer risks associated with PCB mixtures.

The Scientific Review Panel reviewed and endorsed the equivalency factors at its June 20, 2003 meeting. The supporting documentation will be available on our Web site.

Attachment

**Attachment**

**WHO/97 Toxic equivalency factors (TEFs)**

<b>Congener</b>	<b>TEF<sub>WHO-97</sub></b>
<b>PCDDs</b>	
2,3,7,8-TCDD	1
1,2,3,7,8-PeCDD	1
1,2,3,4,7,8-HxCDD	0.1
1,2,3,7,8,9-HxCDD	0.1
1,2,3,6,7,8-HxCDD	0.1
1,2,3,4,6,7,8-HpCDD	0.01
1,2,3,4,6,7,8,9-OCDD	0.0001
<b>PCDFs</b>	
2,3,7,8-TCDF	0.1
1,2,3,7,8-PeCDF	0.05
2,3,4,7,8-PeCDF	0.5
1,2,3,4,7,8-HxCDF	0.1
1,2,3,7,8,9-HxCDF	0.1
1,2,3,6,7,8-HxCDF	0.1
2,3,4,6,7,8-HxCDF	0.1
1,2,3,4,6,7,8-HpCDF	0.01
1,2,3,4,7,8,9-HpCDF	0.01
1,2,3,4,6,7,8,9-OCDF	0.0001
<b>PCBs (IUPAC #, Structure)</b>	
77 3,3',4,4'-TCB	0.0001
81 3,4,4',5-TCB	0.0001
105 2,3,3',4,4'-PeCB	0.0001
114 2,3,4,4',5-PeCB	0.0005
118 2,3',4,4',5-PeCB	0.0001
123 2',3,4,4',5-PeCB	0.0001
126 3,3',4,4',5-PeCB	0.1
156 2,3,3',4,4',5-HxCB	0.0005
157 2,3,3',4,4',5'-HxCB	0.0005
167 2,3',4,4',5,5'-HxCB	0.00001
169 3,3',4,4',5,5'-HxCB	0.01
189 2,3,3',4,4',5,5'-HpCB	0.0001

(Source : van Leeuwen, 1997)

OEHHA  
August, 2003