FACT SHEET

Hexavalent Chromium Oral Reference Dose

CAS Number: 18540-29-9

This fact sheet provides a summary of the Development Support Document (DSD) created by the TCEQ Toxicology Division (TD) for the development of a Reference Dose (RfD) for oral exposure to this chemical. For more detailed information, please see the DSD or contact the TD by phone (1-877-992-8370) or e-mail (tox@tceq.texas.gov).

What is hexavalent chromium?

Chromium is a metallic element with oxidation states ranging from chromium(-II) to chromium(+VI). The trivalent (III) and hexavalent (VI) forms are most predominant (Agency for Toxic Substances and Disease Registry).

How is hexavalent chromium released into the environment?

Chromium occurs in the environment from both natural and man-made sources. Hexavalent chromium compounds, for example, are widely used as corrosion inhibitors, in the manufacture of pigments, in metal finishing and chrome plating, in stainless steel production, in leather tanning, and have been used in wood preservation. Estimated releases of chromium, not specifically in the hexavalent form, to soils from domestic manufacturing and processing facilities accounted for about 80% of the estimated total environmental releases from facilities required to report to the Toxic Release Inventory in 2009, whereas releases to the air and surface water accounted for about 6.6% and 1%, respectively (Agency for Toxic Substances and Disease Registry).

How can oral exposure to hexavalent chromium affect my health?

The most sensitive targets of hexavalent chromium toxicity identified in repeat-dose laboratory animal studies include the blood, liver, and gastrointestinal tract. More specifically, the TCEQ (and the U.S. Environmental Protection Agency) have identified the incidence of diffuse epithelial hyperplasia of the duodenum in female mice as the critical effect of oral exposure to hexavalent chromium for derivation of an RfD. Long-term, high-dose exposure has also been shown to cause increased intestinal tumorigenesis in mice via compensatory crypt enterocyte hyperplasia induced by chronic villous toxicity as a required (but not always sufficient) key event in the mode of action.

Why did the TCEQ derive an RfD for hexavalent chromium?

The TCEQ derives various regulatory toxicity factors (e.g., ESLs, ReVs, RfDs) to protect human health and welfare. The RfD for hexavalent chromium has been derived to protect the general public against potential long-term (and short-term) adverse health effects due to oral exposure (i.e., to be protective of both non-carcinogenic and carcinogenic effects). The general public includes children, the elderly, pregnant women and people with preexisting health conditions. If you would

like to know more about the specific RfD developed, what the value is and its health basis, please see the DSD.