Maryland Department of the Environment

FACTS ABOUT: CHROMIUM

CHROMIUM CHARACTERISTICS AND USES

Chromium is a naturally occurring element found in rocks, animals, plants, and soil. Historically, chromium has been mined in several locations in Maryland. The Baltimore Chrome Works facility, a major processor of chromium ore, was built in the mid-19th century and remained in operation until 1985. Chromium ore processing residue (COPR) was used as fill on sites in the Baltimore area.

Chromium can be a liquid, solid, or gas, and it can exist in several different chemical forms. The most common forms are chromium(0), chromium(III), and chromium(VI), also called hexavalent chromium. No taste or odor is associated with chromium compounds. The metal, chromium(0) form is used for making steel. Chromium(VI) and chromium(III) are used for chrome plating, dyes and pigments, leather tanning, and wood preserving. Some major industrial sources of hexavalent chromium are chromate pigments in paints, dyes, inks and plastics, particles released during smelting of ferro-chromium ore, chromates added as anticorrosive agents, chrome plating using solutions of chromic acid, fumes from welding stainless steel or non-ferrous chromium alloys and impurities in Portland cement.

Chromium can enter the environment from naturally occurring sources or from releases to the air, soil and water from the manufacture, use, and disposal of chromium-based products. Chromium does not usually remain in the atmosphere but is deposited onto soil and water. Once in soil or water, chromium can easily change from one form to another depending upon the conditions present. Exposure to chromium occurs through: inhalation of chromium in particle form; chromium dissolved in drinking water; exposure in certain occupational settings such as welding; and eating foods containing chromium(III).

POTENTIAL HEALTH EFFECTS OF CHROMIUM EXPOSURE

Health risks from chromium depend on the form of chromium to which someone is exposed, as well as the amount of chromium, how long the exposure lasts, and other factors such as individual health history.

Chromium(VI) is regarded as the most toxic form of chromium. Most organizations, including the U.S. Environmental Protection Agency (EPA), the U.S. Department of Health and Human Services, and the World Health Organization, generally accept it as a human carcinogen. There is strong evidence that chromium(VI) causes lung cancer in humans. There is also evidence for a relationship between chromium(VI) exposure in workers and cancer of the nose and nasal sinuses, though the evidence is less strong than it is for lung cancer.

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Studies of workers have shown that chromium exposure, typically at high levels, can have effects on the respiratory system and skin, as well as other effects. Gastrointestinal system, blood, male reproductive system and developmental effects have been seen in laboratory animals exposed to chromium(VI), but it has not been established whether similar risks exist to humans from environmental exposure.

HOW CAN FAMILIES REDUCE THE RISK OF EXPOSURE TO CHROMIUM?

Children should avoid playing in soils near sites where chromium may have been discarded. Chromium is a component of tobacco smoke; avoid smoking in enclosed spaces such as the car to limit exposure to children and other family members. Avoid excessive use of dietary supplements containing chromium.

Chromium can be measured in blood, urine, and hair. However, since a measured level of chromium in the body cannot be used to predict individual health risks such testing should first be discussed with your health care provider. If either you or your health care provider has general questions about health risks related to chromium or other concerns related to the issue of chromium, please contact your local health department or the Maryland Department of the Environment.

Healthcare providers who specialize in environmental and occupational medicine can provide additional clinical information or guidance. The Association of Occupational and Environmental Clinics (AOEC) directory of these providers can be accessed on its website or by calling 888-347-2632. AOEC resources for children, including the Pediatric Environmental Health Specialty Units, listed on its web site.

Sources:

- Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services (2012). ToxFAQs for Chromium. Available at: http://www.atsdr.cdc.gov
- ATSDR, U.S. Department of Health and Human Services (2012). Toxicological Profile for Chromium. Available at: http://www.atsdr.cdc.gov

Contacts:

Environmental Health Questions:

- Environmental Health, Science Services Administration, Maryland Department of the Environment, 410-537-3851
- Baltimore City Health Department, 1001 E. Fayette St., Baltimore MD 21202 410-396-4398

Cleanup Standards:

- Land Restoration Program, Land Management Administration, Maryland Department of the Environment, 410-537-3493

Hazardous Waste Enforcement:

- Solid Waste Program, Land Management Administration, Maryland Department of the Environment, 410-537-3315