

## Hexavalent Chromium Update

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### PURPOSE

This Bulletin provides information on minimizing and avoiding exposure to hexavalent chromium from welding or torch-cutting operations at Department of Energy (DOE) facilities and updates bulletin 2006-01 (April 2006) to include an online video link on welding fumes and control techniques.

### BACKGROUND

Hexavalent chromium (Cr(VI)) compounds contain chromium in its +6 valence state. Cr(VI) compounds are present in stainless steel and certain paints. Also, before 1994, powders containing Cr(VI) compounds were often added as rust inhibitors to recirculation-type industrial cooling water systems. The manufacture, use, servicing, and decommissioning of products or facilities that contain Cr(VI) compounds may result in occupational exposures or releases to the air, water, or soil through emissions, effluents, or waste disposal.

DOE records show that since 2004, there have been seven welding incidents resulting in overexposures to Cr(VI). In addition, legacy contamination in recirculation-type cooling systems may cause occupational exposures at DOE sites if the heels of partially dissolved and trapped solutions of Cr(VI) compounds are found inside piping, valves, heat exchangers, and pumps during decommissioning, dismantling, and disposition (D&D) activities that involve cutting or burning. D&D activities may also generate chromium-containing hazardous wastes, as defined in 40 CFR 261, which require special handling and worker training. Furthermore, releases of reportable quantities of chromium-containing wastes or compounds require reporting to government agencies in accordance with 40 CFR 302.

### WHAT ARE THE HAZARDS?

All Cr(VI) compounds are potential human carcinogens. Exposure to certain of these compounds is known to increase the risk of lung cancer. Other adverse health effects from Cr(VI) exposures include nasal and sinus cancers, kidney and liver damage, nasal and dermal irritation and ulceration, and eye irritation and damage. Occupational exposures occur mainly among workers who handle chromate-containing pigments, spray paints, or coatings, operate chrome plating baths, or weld or cut metals that contain chromium such as stainless steel.

### CHANGES TO THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARD FOR CR(VI)

On February 28, 2006, OSHA lowered its permissible exposure limit (PEL) for Cr(VI) from 52 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) of air as an 8-hour, time-weighted average to  $5 \mu\text{g}/\text{m}^3$  because it has determined that the risk for lung cancer in workers exposed to Cr(VI) increases at levels below the original PEL. Because 10 CFR 851, *Worker Safety and Health Protection*, requires DOE contractors to comply with all OSHA safety and health standards, the effectiveness of engineered controls and use of adequate respiratory protection should be re-evaluated in light of the new Cr(VI) PEL.

Effective February 28, 2006, the OSHA permissible exposure limit for Cr(VI) is  $5 \mu\text{g}/\text{m}^3$  air

### MINIMIZING EXPOSURES DURING WELDING, TORCH CUTTING, OR BURNING OF CR(VI)-CONTAINING MATERIALS

- Sample and monitor the breathing air zone for contaminants.
- Wear appropriate respiratory protection.
- Use an approved airline respirator rather than an air-purifying fume respirator to provide the best protection, particularly in an enclosed space where local ventilation is impractical.
- Use special care when welding or cutting in a confined space and provide additional exhaust ventilation as necessary.
- Use local exhaust ventilation and fume-extraction equipment to clear the breathing zone of particles and fumes.
- Ensure that exhaust-capture nozzles are placed properly and not too far from the work piece.
- Use a helmet and position the head to minimize exposure to fumes in the breathing zone.
- Read Material Safety Data Sheets (MSDSs) for all materials used in welding or cutting and heed all Cr(VI) warnings.
- Avoid torch cutting and burning of equipment having deposits suspected of containing Cr(VI).
- Select materials that do not contain chromium.


### ADDITIONAL SOURCES OF INFORMATION

- Your Safety and Health Office
  - Information on the web:
    - <http://www.osha.gov/SLTC/hexavalentchromium/>
    - <http://www.cdc.gov/niosh/topics/hexchrom/>
- Video: <http://www.cdc.gov/elcosh/abstracts/a000001-a000100/a000076.html>

### SUMMARY

- Exposures to Cr(VI) compounds can be avoided.
- Exposure to Cr(VI) compounds may lead to lung cancer.
- Update site safety practices to meet the new PEL for Cr(VI).

If you have any questions, please contact Dr. Bill McArthur by telephone at 301-903-9674 or by e-mail at [bill.mcarthur@hq.doe.gov](mailto:bill.mcarthur@hq.doe.gov).



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## PREVENT EVENTS

### Learning from Industry Experience

**PREVENT EVENTS is intended for use by personnel during morning meetings, pre-job briefings, and work unit meetings to communicate key industry experience.**

#### Management:

1. What training have we provided our workers on working with hexavalent chromium-containing materials?
2. Do we have written procedures for handling materials that contain Cr(VI) and chromium-containing wastes at our facilities?
3. Have we made available to our workforce the proper respiratory, welding and cutting, exhaust extraction, and monitoring equipment?
4. What have we done to meet the more stringent OSHA PEL during tasks such as welding and cutting of materials that contain Cr(VI) compounds?
5. Do we have legacy water recirculation-type cooling systems that may contain residual solutions of Cr(VI)-containing compounds and that will undergo D&D?

#### Supervisors and Workers:

1. What type of respiratory gear and clothing should we wear?
2. Will someone be monitoring the air space where we will be working?
3. Will there be local exhaust ventilation?
4. Are we using fume-extraction welding or cutting equipment?
5. Should an airline respirator be used instead of an air-purifying fume respirator?

