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# An Overview of the Revised Hexavalent Chromium Standard

A presentation to the Safety & Environmental Committee  
of the Macon Economic Development Commission on  
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# Outline for presentation

- Opening remarks
  - About Lauterbach & Associates, LLC
  - The work we do
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- Objectives for the presentation
- Introduction
  - What is hexavalent chromium
  - Why has OSHA changed the rules
- Dealing with hexavalent chromium in the workplace
- Resources and references

# Opening remarks – 1

- **Lauterbach & Associates, LLC**
  - **Founded 10/1/2004 with two business objectives**
    - Scientific & regulatory affairs support for tobacco companies and their suppliers, including special focus on reduced risk tobacco products
    - Chemistry & toxicology support for companies in the Middle Georgia area
  - **Client-base has included organizations in the USA, Canada, Europe, and the Far East**
  - **Our corporate memberships**
    - US Technical Advisory Group (TAG) to ISO Technical Committee 126 on tobacco & tobacco products
    - CORESTA (Centre de Coopération pour les Recherches Scientifiques Relatives au Tabac)
    - Greater Macon Chamber of Commerce

# Opening remarks – 2

- **Lauterbach & Associates, LLC (con't)**
  - During the past three years, our personnel have been author or co-author on
    - Four articles in the peer-review scientific literature
    - Seventeen presentations at scientific meetings
    - Five additional presentations and workshops on the business of small chemical business
  - Scientists at Lauterbach & Associates hold certifications in toxicology and chemistry
    - Diplomate of the American Board of Toxicology
    - Certified Professional Chemist
    - Chartered Chemist (U.K.)
    - Chartered Scientist (U.K.)

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# Disclaimer

- This presentation is for information only
- We are not attorneys and competent legal advice should be obtained from an attorney on how federal, state, and local regulations may affect your organization
- We are not industrial hygienists, and competent advice should be obtained from a Certified Industrial Hygienist (CIH) on monitoring workplaces for hexavalent chromium and implementing engineering controls and use of personal protective devices

# Objectives for this presentation

- Provide an overview of the OSHA hexavalent chromium regulations
- Distinguish these regulations from the typical OSHA workplace regulations such as:
  - Hazard communication
  - Eye, hearing, hand, and foot protection
  - Lockout/tagout and machinery guarding
  - Walking-Working Surfaces
- Provide resources that can help your organization meet the OSHA hexavalent chromium regulations

# Introduction

- What is hexavalent chromium [Cr(VI)]?



- But that is not in my facility, is it?

# Hexavalent chromium [Cr(VI)]

- Unless you make it, package it, sell it, and/or use it as an ingredient, it is not likely you will find Cr(VI) compounds as single entities in your workplace (unless you have a laboratory that uses them)
- It may be there as part of a formulated material you use or as a part of a coating on equipment you bring into your plant
- It may not be there at all until you or your contractors start to perform “hot” work processes on stainless steel or other chromium containing materials

# Industrial uses of hexavalent chromium

- In many cases, Cr(VI) compounds will be found in formulated materials used as
  - Pigments for paints, inks, colorants for plastics and other polymers
  - Anti-corrosion coatings
  - Chrome-plating baths
  - Textile dyes and leather tanning formulations
  - Corrosion inhibitors in cooling tower water
- Need to check MSDS for Cr(VI) compounds
- Use of these materials may lead to human exposure to Cr(VI) at levels that may exceed OSHA limits

# Hexavalent chromium toxicity

- Toxic properties of hexavalent chromium have been known for decades
  - Acute – skin, eyes, ingestion
  - Chronic – lung cancer
  - Chronic – dermatitis, chemically induced asthma and bronchitis, perforation of nasal septum
  - Before rule change PEL was  $52 \mu\text{g}/\text{m}^3$
- Why did OSHA lower the PEL?
  - Litigation
  - Continuing unfavorable epidemiology supported by *in vivo* and *in vitro* toxicological studies
  - Better ways of measuring Cr(VI) in the workplace

# OSHA rationale for new PEL

- OSHA estimate of Cr(VI) lung cancer risk

**Table VII-1: Expected Excess Lung Cancer Deaths per 1000 Workers**

| <i>Cr(VI) Concentration, ug/m<sup>3</sup></i> | <i>20-year Exposure</i> | <i>45-year Exposure</i> |
|---|-------------------------|-------------------------|
| Previous PEL:                                 |                         |                         |
| 52  | 43 - 198                | 101 - 351               |
| 20  | 17 - 83                 | 41 - 164                |
| 10  | 9 - 43                  | 21 - 86                 |
| New PEL:                                      |                         |                         |
| 5.0   | 4.3 - 22                | 10 - 45                 |
| 1.0   | 0.85 - 4.4              | 2.1 - 9.1               |
| 0.5   | 0.43 - 2.2              | 1.1 - 4.6               |
| 0.25  | 0.21 - 1.1              | 0.53 - 2.3              |

10224 Federal Register / Vol. 71, No. 39 / Tuesday, February 28, 2006 / Rules and Regulations

# Important numbers for Cr(VI)

- If you are using/generating Cr(VI) you must monitor your workplace for airborne Cr(VI)
- Permissible exposure limit (PEL)
  - PEL = 5  $\mu\text{g}/\text{m}^3$  time-weighted average (TWA)
  - If initial monitoring is above PEL, need to monitor every three (3) months
- Action level (AL)
  - AL = 2.5  $\mu\text{g}/\text{m}^3$  TWA
  - If initial testing shows you are above the AL, need to monitor every six (6) months
- Exemption if Cr(VI) less than 0.5  $\mu\text{g}/\text{m}^3$  TWA under any conditions of use

# Monitoring for Cr(VI)

- Generally done under supervision of CIH
  - Reviews workplace and decides on sampling scheme in conjunction with client
  - Provides sampling equipment and technicians
  - Has samples analyzed (OSHA Method ID-215) preferably by AIHA accredited laboratory and makes sure analyses done correctly
  - Receives and reviews data, writes report including advice to client on meeting Cr(VI) regulations
- Probably best left to the experts
  - Complexity and cost of equipment and analyses
  - “Hot” work processes may also generate other toxicants (e.g., paint pyrolysis products)

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# Other aspects of Cr(VI) regulations

- Regulated areas where Cr(VI) work done
- Engineering controls and improved work practices before respirators
- Protective work clothing and equipment
- Hygiene areas and practices
- Housekeeping
- Medical surveillance
- Communication of Cr(VI) hazards to employees
- Record keeping

# Resources and references – 1

- OSHA “Small Entity Compliance Guide for the Hexavalent Chromium Standards”  
([www.osha.gov/Publications/OSHA\\_small\\_entity\\_comp.pdf](http://www.osha.gov/Publications/OSHA_small_entity_comp.pdf))
- Slide show “What the Hex is with Chromium?”  
by Bernie Cox (CIH) of AM Health & Safety  
([www.amhealthandsafety.com/Powerpoint/What%20the%20Hex%20is%20with%20Chromium.ppt](http://www.amhealthandsafety.com/Powerpoint/What%20the%20Hex%20is%20with%20Chromium.ppt))
- Web-based training materials from 3M  
[www.3M.com/HexChrome](http://www.3M.com/HexChrome)  
[http://solutions.3m.com/wps/portal/3M/en\\_US/OH-ESHexChrom/Hexavalent\\_Chromium/](http://solutions.3m.com/wps/portal/3M/en_US/OH-ESHexChrom/Hexavalent_Chromium/)

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## Resources and references – 2

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