

Current & Upcoming Regulations for Metal Finishing

Department of Defense – SERDP/ESTCP

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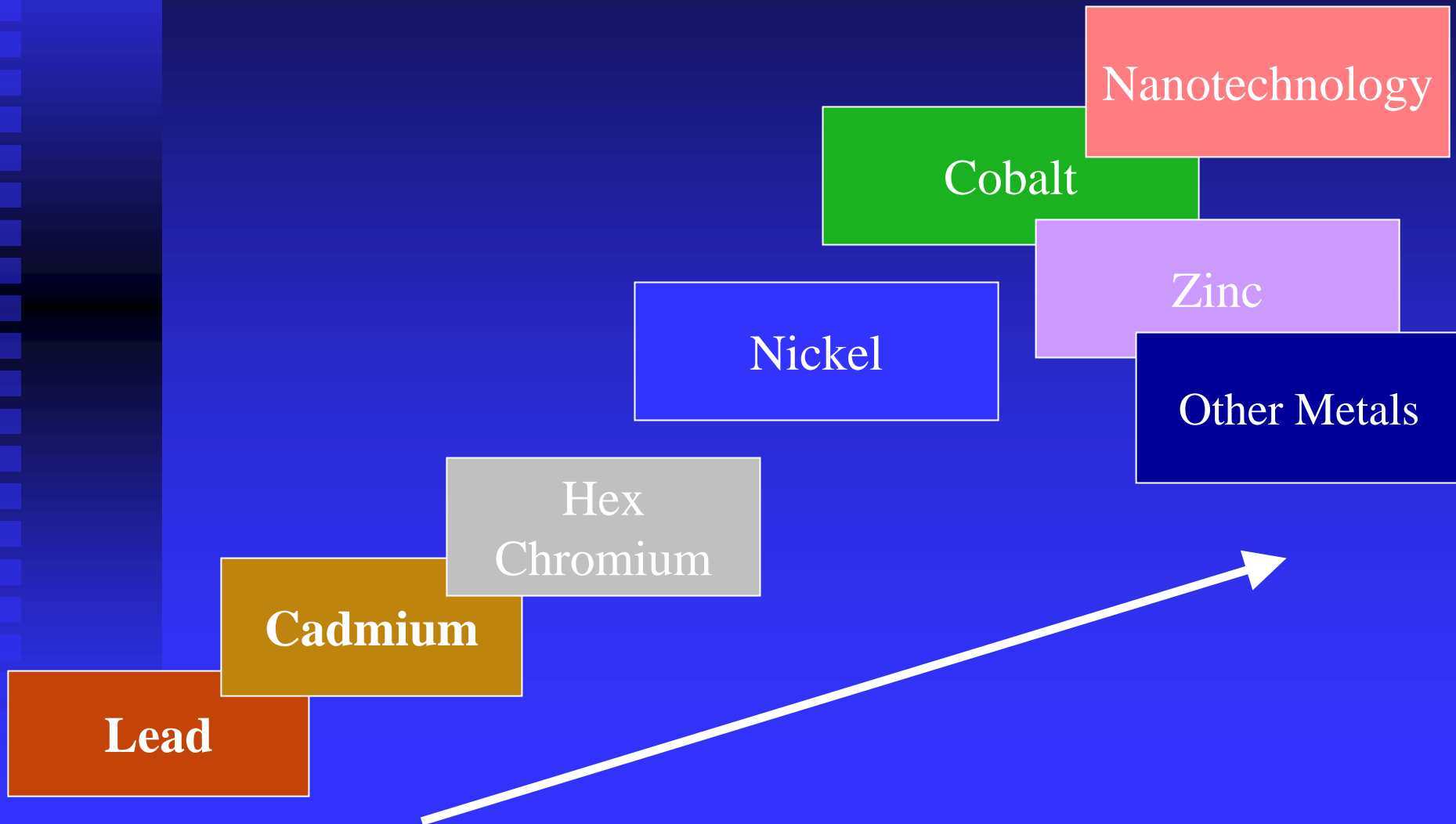
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Backdrop on Metal Finishing Regulatory Trends

- *New Framework is International & Dynamic*
- *US leader in Environmental Policy 1970-1995*
- *Europe leader in Environmental Policy 1995-now*

Regulatory Trends: Metals Under Scrutiny 1970's – 2010's



What's Happening?

- Tightening Controls on Conventional Processes
- Restrictions on Materials & Products
- New Hazard & Risk Classification Activity
- Drivers:
 - ◆ Maturation of Statutes
 - ◆ Legal Action
 - ◆ Emergence of Precautionary Approach

Recent Regulatory Activity

- Focus on Processes
 - ◆ Hexavalent Chromium (OSHA, EPA, California)
 - ◆ Nickel Compounds (NTP, EPA)
 - ◆ Alternative Technologies – thermal sprays (California)

- Focus on Products
 - ◆ Metals – States looking to integrate European approaches for metals (California, Massachusetts)
 - ◆ PFOS – key chemical ingredient in fume suppressants

- Complexity of the Regulatory Framework will Increase

New OSHA Chromium Exposure Limit

- *Final Rulemaking – published February 28, 2006*
 - ◆ *New PEL 5 $\mu\text{g}/\text{m}^3$*
 - ◆ Local exhaust ventilation – 4 year compliance (2010)
 - ◆ Respirators
 - ◆ November 2006 for operations of 20 or more employees
 - ◆ May 2007 for ops < 20 employees
 - ◆ Medical monitoring & surveillance of employees
 - ◆ Housekeeping requirements
 - ◆ Maintain clean surfaces
 - ◆ Spills and releases to be cleaned up promptly
- *Outlook – Litigation may move PEL to 0.25 $\mu\text{g}/\text{m}^3$*

Pending USEPA Air Emissions Rule for Plating & Polishing Operations

- *Proposed Rulemaking – early 2007*
 - ◆ Potential restrictions on smaller (“area”) sources of “hazardous air pollutants” under CAAA Title III
 - ◆ Chromium
 - ◆ Nickel
 - ◆ Cobalt
 - ◆ Chromium
 - ◆ Others
 - ◆ Technology-based controls (GACT) vs. MACT
 - ◆ Industry-EPA study on emission factors for nickel
- *Outlook – Chromium review / Nickel may get new scrutiny*

California – Selected Activity on Chromium

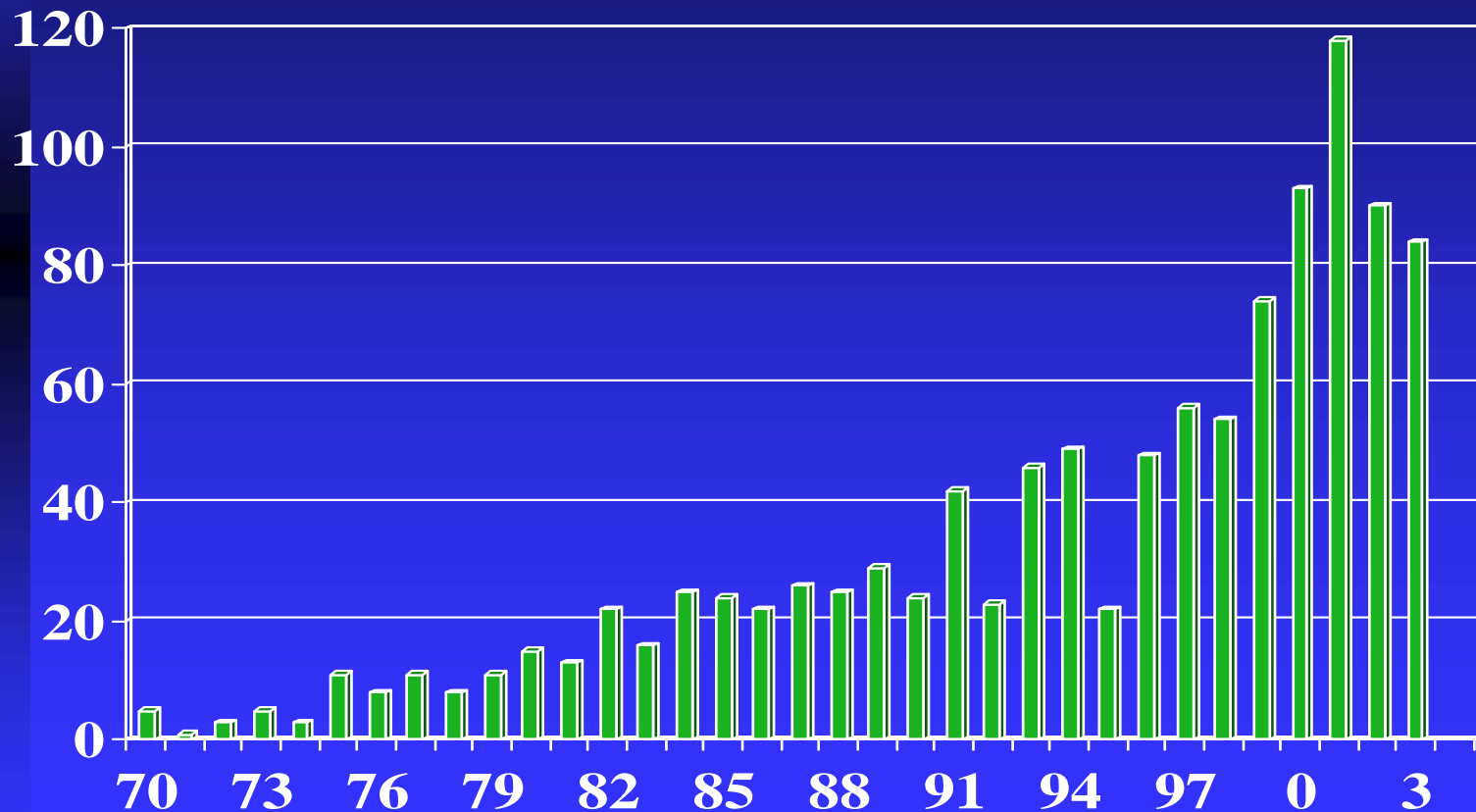
- *Air Emission Proposal Now Under Review – May 2006*
 - ◆ Tightens the most stringent air emissions requirements for chromium in the U.S. (CARB / ATCM 1469)
 - ◆ Assesses proximity to sensitive receptors
 - ◆ Add-on controls required over low threshold level
 - ◆ Potential excess cancer risk of 1 ng/m³ is 1 in 146 million

Outlook – Currently being challenged

- *Thermal Spray Rule – 2004*
 - ◆ Chromium and nickel concerns / control technologies
- *Drinking Water – Public Health Goal for Hexavalent Chromium*

EU Environmental Legislation Has Exploded

Number of Items of Legislation Adopted, 1970-2003



European Regulatory Trends for Finishing

- Pressures on Products involving Metals and Chemicals
 - ◆ Europe driving global standard-setting under EPR
 - ◆ End of Life Vehicle Directive
 - ◆ WEEE / RoHS Directive
 - ◆ REACH Chemicals Directive
 - ◆ Integrated Product Policy (IPP) Directive
 - ◆ Lead, Mercury, Cadmium, Hexavalent Chromium
 - ◆ PFOS concerns
- Influence: Global supply chain & coatings customer base
- Critical Trend: Even with EU military exemptions, de facto materials de-selection policies will drive technology

Hazard & Risk Classification Trends: Chromium, Nickel and Cobalt

United States

- ◆ Chromium Risk Assessment for OSHA
 - ◆ Informed significant rulemaking decision
- ◆ Nickel Risk Assessment for USEPA – IRIS Publication
 - ◆ Pushed back to 2007
 - ◆ Industry 2-year animal cancer study
- ◆ Cobalt Sulfate listed as likely carcinogen
 - ◆ NTP February 2005

European Union

- ◆ “Global” Nickel Risk Assessment – Final 2005
 - ◆ Moving to regulatory action
- ◆ Nickel Air Emissions Monitoring – 4th Daughter Directive

Hazard & Risk Classification Trends

European Regulations That May be Affected by Nickel Risk Assessment

- Directive 76/769/EEC Restrictions on marketing/use of dangerous substances
- Euro Coinage
- Consumer protection
- Directive 98/86/EC water quality standards
- Food contact materials, additives, and supplements
- Directive 90/385/EEC implantable medical devices
- Directive 88/378/EEC toy safety
- Directive 89/106/EEC construction products
- Emissions to water
- Directive 96/61/EC
- Directive 76/464/EEC
- Directive 2000/60/EC
- Directive 80/68/EEC
- Emissions to air
- Directive 98/24/EC protection of workers
- Directive 2000/76/EC incineration of waste
- Waste management
- Directive 91/689/EEC and Regulation EEC No. 259/93 haz waste

Regulatory Change & Technology

Emergence of Alternatives

- New “wet” / “wet” to “dry” processes
 - ◆ HVOF & Others
- Changing material from finished metals to non-metals
 - ◆ Composites
- New metal alloys
 - ◆ Base material replacements
- Nanotechnology development
 - ◆ Characteristics showing promise for future

Regulation of Nanotechnology: Long Term Outlook

- Early Stage of Review - coatings are in the discussion
 - ◆ Nanotechnology's potential effects on human health and the environment – over 200 nanotech products for consumers now
 - ◆ Issues include voluntary reporting from industry on nanotech products
 - ◆ Question: Is there a regulatory paradigm for nanotechnology?
 - ◆ Status – insufficient scientific / regulatory vocabulary to describe nanotechnologies, much less regulate
- Experts calling for life cycle approach to address potential harm

Where Will Current Trends Lead?

