OSHA’s Approach to Employee Exposure to Nanomaterials: An Area Office Perspective

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OSHA’s Roles and Responsibilities

- Agency Mission – “assure safe and healthful working conditions for working men and women”
  - Safety and Health Standards
  - Enforcement of Standards
  - State assistance
  - Provide training, outreach, and education
OSHA’s Interest in Nanomaterials

• Various studies suggest some nanomaterials may be toxic to workers
  – Effects may be dependent on size, crystalline structure, solubility, shape, chemical form, other characteristics
  – Not necessarily relatable to macro-scale material of same chemical composition
  – Many unknowns remain
OSHA’s Approach to Nanotechnology

• Utilize existing framework
• Work through National Nanotechnology Initiative (NNI)
• Form collaborations with Federal agencies, NGOs, Industry, Labor organizations
OSHA’s Objective

- Protect workers
- Promote safe, sustainable stewardship of nanotechnology
- Promote collaboration between Federal Partners, Industry and Labor
- Educate and raise awareness of the hazards
Framework of Existing Requirements

• Standards Applicable to nanomaterials
  – Hazard Communication
  – Hazardous Waste and Emergency Operations
  – Personal Protective Equipment
  – Respiratory Protection
  – Laboratory Standard
  – Substance-specific standards

• General Duty Clause
General Duty Clause

• Employer failed to keep the workplace free of a hazard to which employees of that employer were exposed.
• The hazard was recognized
• The hazard was causing or was likely to cause death or serious physical harm
• There is feasible and useful methods to correct the hazard.
General Duty Clause

• Cannot cite “Controlling Employer” for exposing employees of other employers.
• Cannot cite the lack of a specific abatement method.
• The hazard must be reasonably foreseeable.
Hazard Recognition

- Employer Recognition
- Industry Recognition
- Common Sense Recognition
## Expected Exposure Scenarios

<table>
<thead>
<tr>
<th>Potential Recipient of Exposure</th>
<th>Research and Development</th>
<th>Manufacture</th>
<th>Processing/Distribution</th>
<th>Use</th>
<th>Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Worker</strong></td>
<td>Inhalation</td>
<td>Oral</td>
<td>Inhalation</td>
<td>Oral</td>
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<td>Dermal</td>
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<td><strong>Consumer</strong></td>
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<tr>
<td><strong>Public (non-consumer)</strong></td>
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<tr>
<td><strong>Environmental Release</strong></td>
<td>Water, Soil, Air</td>
<td>Water, Soil, Air</td>
<td>Water, Soil, Air</td>
<td>Water, Soil, Air</td>
<td>Water, Soil, Air</td>
</tr>
</tbody>
</table>

Establishing Employee Overexposure

- Compliance Officer Observation
- Monitoring
- Employer / Industry documents

The challenge:

- No monitoring protocols
- No approved methods for analyses
- Only two established TLVs
Some Other Challenges

- Lack of recognition by employers
- Lack of recognition by employees
- Lack of recognition by compliance staff
OSHA Nanomaterial-related Activities

• Guidance documents
  – Safe handling of nanomaterials in R&D settings
  – Safety and Health factsheet

• OSHA website
  http://www.osha.gov/dsg/nanotechnology/nanotech_healtheffects.html

• NIOSH website
  http://www.cdc.gov/niosh/topics/nanotech/strat_planB.html
Relevant Related Resources