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

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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

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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

Product Life Cycle Stage

Potential Recipient of Exposure	Research and Development	Manufacture	Processing/ Distribution	Use	Disposal
Worker	Inhalation Oral Dermal	Inhalation Oral Dermal	Inhalation Oral Dermal	Inhalation Oral Dermal	Inhalation Oral Dermal
Consumer			Inhalation Oral Dermal	Inhalation Oral Dermal	Inhalation Oral Dermal
Public (non-consumer)	Inhalation Oral Dermal	Inhalation Oral Dermal	Inhalation Oral Dermal	Inhalation Oral Dermal	Inhalation Oral Dermal
Environmental Release	Water, Soil, Air	Water, Soil, Air	Water, Soil, Air	Water, Soil, Air	Water, Soil, Air

Source:NSET Environmental, Health, and Safety Research Needs for Engineered Nanmoscale Materials, 2006

OSHA

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