



Nanotechnology: Insurance Industry Perspectives

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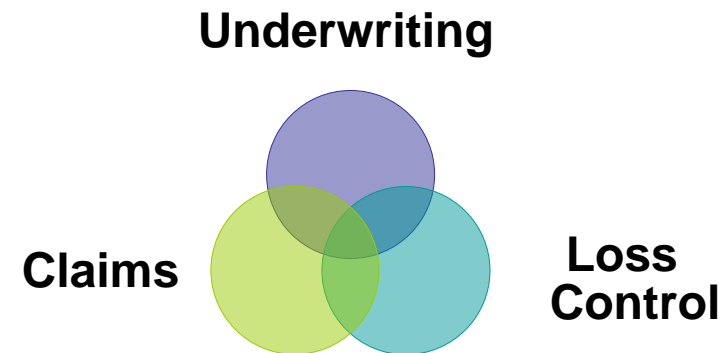
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Small Clips

- **No small matter**
- **THINK SMALL**
- Small wonder
- *No small task*
- **The next big thing is small**
- **Small is the new big**
- *Next small thing*
- **No small potatoes**
- **It's a small world**
- **Big things in small packages**
- **Small things**
- **Small beginnings**
- **Small is beautiful**
- *Small future*
- **Small is huge**

Emerging Issues Initiatives

- Many insurance companies have developed collaborative forward thinking EI strategy initiatives
- Emphasis on exposure identification
 - Large scale, latency potential
 - Estimate claimant pool
 - New opportunities
- Nanotechnology issues being monitored
 - Vigilance
 - Hazard assessment and control technology science development



Loss Control Services

- Risk engineering; provides risk and control information for underwriting purposes
 - Premium quotation
- Support designated client risk improvement programs as part of a service plan or for a fee
- Conduct training
- General safety or technical area specialist
 - Fire protection
 - Workers' compensation
 - Products liability
- Visit a wide variety of different sized occupancies
 - Electronics
 - Life sciences
 - Metal workers and plastics
 - Food industry

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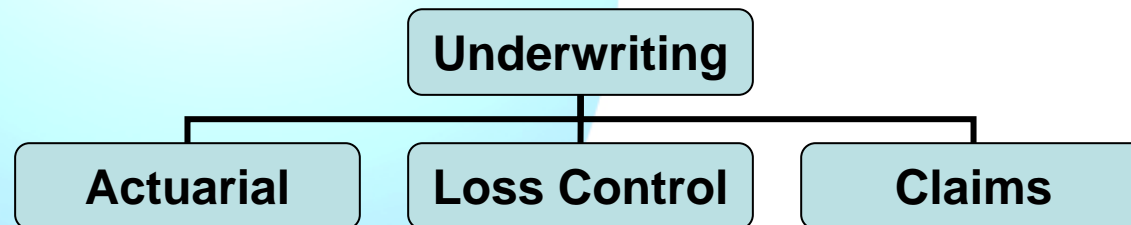
- Nanotechnology firms are part of the current commercial insurance customer base
 - National Science Foundation prediction of a 2015 \$1 trillion dollar global nano products economy
 - Insurance industry considered to be a technology development partner
 - Spreading risk
 - Loss Control efforts
- Positive loss reducing developments
 - Durability of construction and auto materials
 - Food contamination sensors
 - Pharmaceuticals
 - Pollution remediation

- Many unknown potential impacts
 - Leadership of NNI, NIOSH, institutions and researchers
 - Particularly grateful for NIOSH leadership and web site resources
 - Field of dreams
 - Action efforts desirable
 - “Best practice ” risk management
 - Interim measures
 - Final controls



Overview of Insurance Process

- Risk; possibility of the occurrence of an undesirable event
- Insurance manages risk by transferring and spreading it for a price
- Insurance underwriters set premiums and offer coverage
- Companies often purchase insurance through independent insurance brokers who represent more than one insurance company
- Three service entities support the insurance underwriting process
 - Actuarial assesses the risk of adverse events occurring, directly impacting insurance rates; too early for nanotechnology loss experience
 - Loss Control services
 - Claims responds to covered losses



Overview of Insurance Process

- Loss/claims history or assessment/perception of risk impacts company financial liability
 - Type of coverage; occurrence vs. claims made
 - Financial limits of coverage and defense
 - Reinsurance availability
 - Workers Compensation
 - Deductibles
 - Temporary or contract workers - potential liability issues

- Too many unknowns to fully assess nanotechnology risk
 - Evolutionary; build on what we know
 - Information sharing beneficial
 - Confidentiality issues
 - Focus on “reality” of nanotechnology today
 - Goal - avoidance of large scale catastrophic losses
 - Multitude of industry sectors in many geographic regions
 - Monitor NIOSH and research findings on exposures and “best practice” controls
 - Monitor any arising litigation

Insurance Coverage

Nanotechnology Here and Now

- **Workers' Compensation**
 - 2 million people within 10 years (National Science Foundation estimate)
- **Products Liability**
 - Pre-existing applications that switched to nanomaterials
 - New applications
 - >350 products
 - Nanotechnology Consumer Products Inventory; Woodrow Wilson Institute
- **Environmental Liability**
- **Fire**
 - Small particle size; explosive potential
 - High values in small amounts of materials

Regulatory and Standard Setting Efforts

- Regulatory efforts; time factor considerations
 - Prioritize and promote broader, consistent and faster implementation
 - Education
 - Hazard identification
 - Control measures
- Benchmark
 - Standard setting organizations
 - Industry associations; ex. Semiconductor Industry Association
 - Best practice information
- Claims may be filed even with regulatory compliance
 - Allegations of bodily injury or property damage
 - Real or perceived
 - Defense costs

Risk Management

- Risk Management is a key role within an organization that analyzes and controls risk
- Risk management practices include negotiation of desired insurance coverage and implementation of analysis and control measures to reduce potential losses
 - Medium to large companies employ their own risk management staff
 - Small to medium sized companies may lack risk management expertise
 - Risk managers prioritize safety expense and submit budget proposals to management
 - Succeed if substantiate need and funds available
 - Tools helpful; cost/benefit analysis, case studies, etc.

Nanotechnology and Risk Management

- Many nanotechnology companies are small R & Ds
 - Nanotechnology knowledge
 - May lack expertise in risk management and “best practice” controls
 - Barriers to prioritizing funding for “best practice” controls
 - Terminology and science knowledge
 - Incomplete MSDSs
 - Science under development
 - Complexity
 - Lack of regulations
 - Production expenses and competing needs

Nanotechnology Production; Balanced Growth

- Exposure controls for small scale operations
 - Simpler and less expensive to address than large operations
- Potential for rapid growth of nanotechnology production
- Emerging from R & D to pilot plants and production
 - Pressure for production must be balanced with risk management, including controls planning and budgeting
 - Expense issues
 - Retrofit more expensive

Balanced Growth

- Increased production brings other facility issues which could impact safety
 - Management commitment
 - Pressure on production systems
 - Space congestion
 - Training
 - Language issues
 - PPE programs
 - Housekeeping and storage
 - Maintenance
 - Quality control and testing
 - Other safety considerations

Great Challenge; Communication to Implementation

- Communication of risk information and “best practice” controls in simplest and most direct manner helpful
 - Precautionary principle
 - While many unknowns, starting point “best practices”
 - Recommended controls
 - Cost/benefit tools
 - Case studies
 - NIOSH Approaches to Safe Technology
 - Instructional and accessible
 - Direct and understandable
 - Other outreach; nanotechnology safety culture
 - Industry sector publications
 - Trade, professional and industry associations

Material Safety Data Sheets

- MSDSs
 - First piece of hazard communication information that arrives at a facility
 - MSDS quality variable
 - Proprietary issues
 - Hazard information and warnings
 - In house expertise
 - Legal review
- Ex. Review of 6 carbon nanotube MSDSs
 - Clearly listed “nanotube” nomenclature
 - Written up as graphite dust exposure
 - No exposure/control information specific to nanotechnology material

Material Safety Data Sheet and Labeling

- Need to differentiate nanomaterials
- Post examples

Closing Summary

- Insurance industry is a technology development partner.
 - Loss Control is a value added resource
- Insurance risk managers should be included in nanotechnology outreach efforts
 - Additional science, nomenclature and “best practices” education will be required
 - Industry, professional and trade associations and journals will be additional helpful venues
- Educational and program materials should be written in a direct and simple style that is easily understandable
 - Accessible
- Material Safety Data Sheets and labeling examples should be provided as part of outreach materials