ENVIRONMENTAL RISK ASSESSMENT

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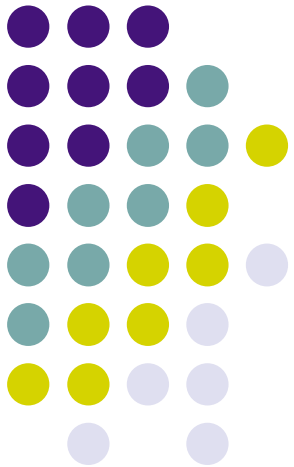


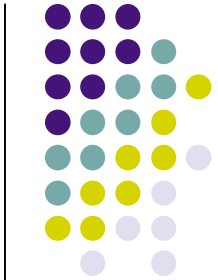
What is Environmental Risk Assessment?

- The process of evaluating if exposure to “contaminated” environmental media (soil, groundwater, surface water/sediment, air) by humans and/or ecological organisms has the potential to result in “adverse” health effects

- What is “contaminated environmental media”?

  - Chemicals of concern (COCs) are present at levels that are above naturally occurring background concentrations
  - COCs are present at concentrations that are above risk-based standards (acceptable standards based on conducting a risk assessment)

Types of Contaminants



- Organic COCs - Pesticides, herbicides, dioxins/furans, semi-volatile compounds, volatile compounds, chlorinated compounds; (Stockholm Convention Persistent Organic Pollutants - POPs))

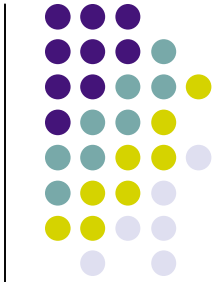
- Inorganic COCs - Heavy metals such as arsenic, cadmium, chromium, lead, mercury, etc.

- May be present in the environment may be due to an unintended release during any stage of the life cycle of a manufacturing process

Remediation of Hazardous Chemicals/Wastes

- In-situ Technologies – treatment in place (natural degradation/bioremediation/capping); with long-term monitoring
- Ex-situ Technologies – involves excavation/removal and off-site disposal and/or treatment (e.g. incineration)
- Potential high costs to responsible parties associated with these remedial technologies, i.e., affects company's profits and their corporate image

Consequences of the Use of Toxic/Hazardous Chemicals

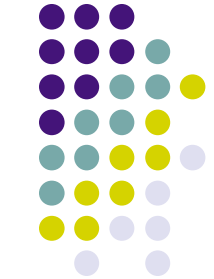


- Potential adverse effects to human health and ecological “receptors”
- Costly end-of-pipe treatments by manufacturers
- Potential environmental remediation costs if releases occur to the environment
- Generation and disposal of hazardous waste
- Potential litigation by those adversely affected

Alternatives to Use of Hazardous Chemicals

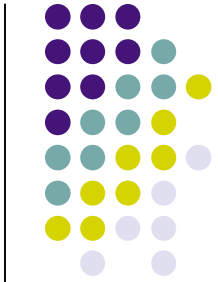
- Design chemical products that are less hazardous to human health and the environment using “natural”, bio-based ingredients (e.g. soy, bamboo, flax, detergent-like chemicals vs. solvents)
- Materials that are produced using sustainable agricultural practices and incorporate the Best Management Practices for source erosion and run-off control
- Use feedstocks derived from annually renewable resources or from abundant waste
- Design products that can be reused or recycled

Advantages of Using "Bio-Based" Materials



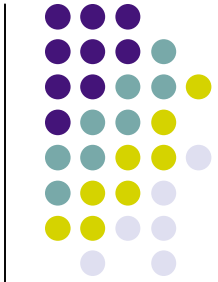
- Generation of safer products
- Reduced energy and resource use
- Improved competitiveness in the global marketplace
- Socially responsible
- Improved value to the shareholder

Forbo Flooring Systems Example



- In 1970s, flooring market shifted from asbestos-based Vinyl Asbestos Tile (VAT) to PVC-based Vinyl Composition Tile (VCT)
- Forbo switched floor tile composition to Marmoleum Composition Tile (MCT) made with bio-based material (linseed oil from flax, rosin from pine trees, wood and cork flour, jute)
- Marmoleum is 97% organic-based, 70%, by weight, bio-based and has lowest environmental footprint in the flooring industry
- Work with farmers to promote “best practices”, use less fertilizer and rotate their crops using no-till practices
- Forbo reclamation program to compost used linoleum into soil amendment

Forbo Example (Cont'd)



- In 2007, obtained consensus-based SMaRT Sustainable Product certification
- Requirement of SMaRT standard is successfully passing a LCA that evaluates the manufacturing process against 12 environmental impact categories
- Forbo's manufacturing process is "Field-to-Field"
- Has resulted in improved corporate image, increased profitability, and a more environmentally-conscious product

Overall Strategy for Prevention of Hazardous Materials

- "Clean Production" – focus on front-end solutions, such as redesigning products and processes to eliminate the use of toxic chemicals before they need to be managed.

- Use of bio-based/sustainable product manufacturing processes and achieving a "good grade" in the LCA profile of the process

- Development of a regulatory framework that moves toward more sustainable production of materials vs. "risk-based" regulations that address the impacts of using hazardous chemicals

"Implementing Green Chemistry. An Environmental Policy for Sustainability" Joe Thornton (2001)