CVEN 4474/5474
Hazardous & Industrial Waste Management

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Objectives for Today

- Introduce myself
- Cover course syllabus
  - Goals for course
  - Coursework
  - Grading
- 3 key concepts for the semester
- Historical background

Dr. Angela Bielefeldt

- Background
  - BS Civil Engineering Iowa State University
  - MS, PhD University of Washington
  - Work: CH2M Hill (water tmt),
    • Montgomery Watson - Superfund RI, RD
    • Retec- Superfund ITE for TCE-contam gas tmt
    • Sandia National Labs - Env. Restoration; LUST
  - Teaching at CU since F1996
- Research Interests in Hazardous Waste
Goals for Course
Focus: contaminated sites

• Identify current regulations
• Determine the fate & transport of chemicals in the environment
• Understand basics of toxicology
• Be able to conduct a Quantitative risk assessment
• Design site remediation methods
• Select optimal treatment methods
• Understand the "Big picture" of site remediation

“speak” hazW = acronyms!

Goals for Course
Preparation for content in FE and PE exams

• FE morning ~10% covered in this class
• EVEN FE (afternoon) ~30% covered in this class
• CVEN FE (afternoon) ~12% covered in this class

• CVEN PE
  – breadth (morning): ~10% solid/haz waste
  – depth environmental (afternoon): ~20% haz waste

• EVEN PE
  – 26% Section IV: Env Assessmts, Remed, Health
  – 15%; Section III. Indust., Haz; Radioactive Waste

Course Activities

• Read assigned material BEFORE class
  – LaGrega “Hazardous Waste Management”
  – My notes from web
  – Reading quiz or turn in reading notes for extra credit

• Homework
  – 6 total (varying size; 1 especially large!)
Course Activities (cont.)
• 2 team projects - oral and written report
  real proposed Superfund site
  – Risk assessment
  – Feasibility study of Remedial designs
• CVEN 5774: Book review and discussion
  – Silent Spring, Our Stolen Future, Living Downstream, ...
• Exams
  – Midterm & Final (comprehensive)

Grading
• 30% Homework, reading quiz, book rev.
• 15% Midterm
• 16% Group Risk Assessment Project
• 16% Group Remedial Design Project
• 23% Final
⇒ 90% A, 80% B, 70% C…unless curve
⇒ CVEN 4474 separate from CVEN 5474

Key Ideas for Class
• Uncertainty
  – What is safe?
  – Environmental variability, non-engrg factors
• Wealth of Information
  – On contaminants, toxicity, environmental concentrations, remedial technologies
  – Conflicting information possible
• Evolving
  – regulations, information & technology, public perceptions, environment
Significant Points in Hazardous Waste History

- 1940s explosion in chemical production
- 1962 Rachel Carson’s “Silent Spring”
- 1969 Stringfellow, CA, acid ponds overflow into town of Glen Avon
- 1970 US EPA created; EDF founded
- 1972 DDT banned; FIFRA regulation

History (cont.)

- 1976 TSCA – RCRA
- 1978 Love Canal
- 1980 CERCLA (Superfund)
- 1982 Times Beach, MO

History (cont.)

- 1984 Bhopal, India
- 1984 HSWA (RCRA amendments)
- 1986 EPCRA & TRI
- 1986 Chernobyl nuclear disaster
- 1986 SARA (Superfund amendments)
- 1989 Exxon Valdez Oil Spill
- 1990 Oil Pollution Act
History (cont.)

• 1990s
  – Continued public awareness of problems related to hazardous waste and contaminated sites
    • "A Civil Action"
    • "Erin Brockovich"
    • Radioactive waste problems: Hanford, Rocky Flats, WIPP, Shattuck

• 2000s
  – Endocrine disruptors
  – Soil vapor intrusion emerging concern in US
  – Global hazardous waste concerns
    • E-waste; mining; etc.
  – Life cycle and sustainability concerns