2012 Higher Education Chemical Safety
Best Practices & Lessons Learned

Developing an Effective Chemical Safety Committee

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Outline

- **Balancing Institutional Oversight**
- **Managing a Chemical Safety Committee**
- **Identifying Specific Chemical Criteria**

The Essential Nature of Chemicals

- **Most research would not be possible without the use of chemicals (theoretical chemists-heavy coffee drinkers)**
- **In some form or fashion, all could be potentially hazardous (Paracelsus, 16th century)**
- **Current health and safety programs typically focus on**
  - **Hazard communication (i.e. too general, collaborate /engage chem. faculty on specific training-dirty dozen)**
  - **Lab Standard (60hr work week + weekends) no cure-all**
  - **MSDS**
- **What about work with particularly toxic or dangerous chemicals?**

Institutional Oversight/Assurance

- **Can a system be developed wherein safety oversight is provided for a subset of particularly toxic or dangerous chemicals without grinding the organization to a halt?**

- **Such systems exist for other hazard categories**
  - **Radioactive material**
    - **Generally licensed source use typically not reviewed, but licensed material use is**
  - **rDNA**
    - **Exempt strains (III-F) not reviewed, non-exempt are**

Striking a Balance

- **Chemical use is so ubiquitous in research, reviews of all chemical use that could be potentially hazardous would be too onerous**
  - ***Imagine reviewing the use of every flammable (acetonitrile, dichloromethane, are you crazy)***

- **The ultimate goal is to reach concurrence on a subset of chemicals (by name or characteristic) that a peer group of experts feel would benefit from oversight safety review (i.e. consult faculty based on institutions specialty)**

The University of Texas Health Science Center at Houston

- One of 15 component institutions of the University of Texas System
  - Comprised of six schools
    - 4,485 students
    - 1,585 faculty
    - 3,785 staff
  - 4 million net assignable square feet
  - 1,600 research labs
  - $240 million in extramural research expenditures

UTHSC-H Safety Committees

- **1994**

- **Radiation Safety Committee**

- **rDNA Committee**

- **Biohazards Committee (included waste issues, chemical hazards, research facility issues, IAQ issues)**

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  - **Biological Safety Committee**
  - **Chemical Safety Committee**
  - **Safety Council**

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Chemical Safety Committee

- **Charge: Report to the EVP A&RA on matters related to the use of chemicals that may be hazardous in the research, clinical and educational activities of the institution**
  - **Hazardous chemicals are defined as substances which are potential physical or health hazards by exhibiting harmful characteristics such as toxicity, reactivity, or flammability.**
- **Membership: At least one faculty member from each school, along with others for specific specialties (e.g. nano scale work expertise) and several ex-officio members (e.g. administration, EH&S)**

Chemical Safety Committee

- **Operations:**
  - **Meets 6 times per year (~1hr)**
  - **Reviews about 3 to 4 protocols per meeting**
  - **Committee also regularly apprised of Chemical Safety Program operations (e.g., number of surveys and deficiencies, chemical exposure monitoring, IAQ etc.), including waste disposal/waste minimization (e.g., costs, quantities, special operations, etc.)**

Decision Criteria

- **So how do we decide which chemical protocols go to the CSC for review?**
- **Through a series of discussions , the membership of the committee reached agreement on the subset of chemicals (by list or characteristic) that would require committee approval**
- **Reflected in Chemical Hygiene Plan**

Decision Criteria

- **Catch point established at:**
  - **Grant submission stage**
    - **does this work include the use of designated acutely toxic or dangerous chemicals?"**
  - **Regular downloads of chemical purchases via Procurement to scan for key chemicals (soon to be automated), but *not purchasing approval***
  - **Operations and inventories reviewed as part of routine lab safety surveillance (and even during waste collection)**
  - **Through other committees(i.e. biosafety, animal care)**

Risk Management

- **Chemical Safety Committee was clear in its discussions: risk is inherent to research and discovery**

- **Applied an approach later described in the Columbia Shuttle Disaster Report (NASA Diaz Report)**
  - **Once a launch date was set, three dimensions to be managed**
    - **Time**
    - **Cost**
    - **Risk**

Risk Management

- **The time and cost dimensions were closely managed with reviews and approvals**
- **The risk dimension was not and finally reached a breaking point**
- **The Chemical Safety Committee was clear: we don’t wish to avoid risk, just wish to manage it with the same degree of attention as the other dimensions**

Agreed Upon Decision Criteria

- **Work with the following requires approval by the Chemical Safety Committee (CSC):**
  - **On the Master List?**
    - **This is a list of the chemicals commonly encountered that meet one of the criteria below**
- **Suspected or confirmed carcinogen as listed by the World Health Organization International Agency for Research on Cancer or the Department of Health and Human Services National Toxicological Program**
- **Highly Toxic as defined by the United States Department of Labor Occupational Safety and Health Administration in 29 CFR 1910.1200**

Agreed Upon Decision Criteria

- **Nanomaterial as defined by the United States Department of Labor Occupational Health and Safety Administration**
  - **Not permanently bound to a substrate**
  - **Handled destructively (aerosol generating)**

- **Explosive as defined by the United States Department of Transportation/Bureau of Alcohol, Tobacco and Firearms in 27 CFR 555.23**

- **Pyrophoric as defined by the United States Department of Labor Occupational Safety and Health Administration in 29 CFR 1910.1200**

Agreed Upon Decision Criteria

- **Poison gas as defined by the United States Department of Transportation in 49 CFR 173.115**

- **Antineoplastic as defined by the National Institute for Occupational Safety and Health Publication Number 2004-165**

- **Pesticide as defined by the United States Environmental Protection Agency in 40 CFR 150**

- **Select agent toxin as defined by Centers for Disease Control and Prevention/United States Department of Agriculture in 42 CFR 73**

Two Examples

- **Urethane**
  - **Commonly used at institution**
  - **Due to previous assessments, its IARC Group 2A carcinogen classification puts it on the master list**

- **Dimethyl mercury**
  - **Not commonly used, so not currently on the list**
  - **But its toxicity characteristic would trigger CSC protocol review**
  - **Would result in subsequent addition to list**

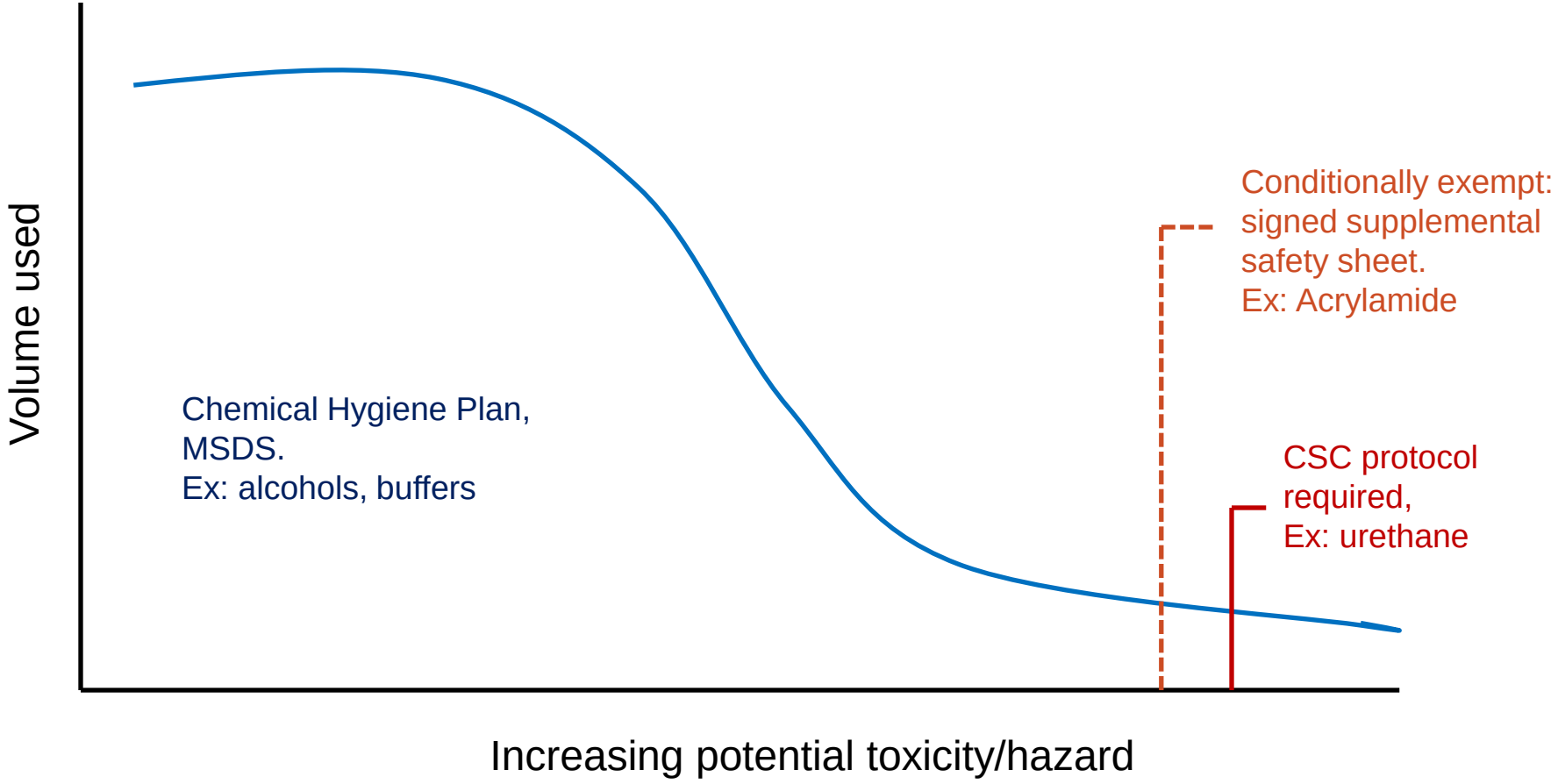
What the Chemical Safety Committee Wants to Know When Reviewing an Application

- **Chemical agent, amount, associated hazards, use location**
- **Description of protocol, specific manipulations to be performed, cradle to grave approach (SOP requests)**
- **Worker training status and experience**
- **Protective measures in place (PPE, Eng. Controls)**
- **Waste disposal considerations (waste minimization)**
- **Outcomes of 2 most recent lab safety inspections (from EH&S)**

With Program Maturity, “Conditionally Exempt” Status for Some Chemicals

- Because some commonly used chemicals were triggering protocol review, the committee has, from time to time, voted to remove them from the “protocol submission” requirement
- Instead, a one page safety sheet is provided (with signed acknowledgement) to the researcher
- Examples of “conditionally exempt” chemicals include
  - Acrylamide (neurotoxicity)
  - Tamoxifen (antineoplastic)
- A good example of the living nature of the system

Conceptual Approach to Enhanced Safety for Certain Chemicals at UTHSC-H



CSC Flowchart

Does the System Work?

- **In the realm of prevention, it's sometimes hard to tell directly ….**
- **But if it wasn't working, we would have:**
  - **Faculty complaints about unnecessary burdens**
  - **Injuries, property damage**
  - **Worker safety complaints to regulatory agencies**
  - **Regulatory non-compliance upon inspection**
- **To date, thankfully, we have <u>not</u> experienced these**
- **What we <u>do know</u> for certain is that the process provides a level of institutional assurance regarding the safe use of particularly toxic or hazardous chemicals, for the protection of all parties involved**

Summary

- **Chemicals are essential to research**
- **Baseline chemical safety controls exist, but additional attention and oversight for a subset of particularly toxic or dangerous chemicals is prudent**
- **Reaching consensus on the decisions points is both a science and an art, and necessarily requires researcher/faculty input - "*your list may vary*"**
- **Risk is inherent to research – we just need a consensus way to manage it – to reach that, researcher/faculty buy-in crucial**

I truly appreciate the opportunity to speak with you today

THANKS!

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