Hazard Assessments & Criticality Safety Evaluations

Bob Wilson

June 2010 NCSD workshop

Criticality Safety Evaluations

Purpose

- Risk Management
  - **Personnel Pretention dominant issue**
  - **Legal**
  - **Financial**
- Elements
  - **Analyze what can go wrong**
  - **Provide adequate controls to manage the risk**
  - **Provide path to recovery if upset occurs**

Is Hazard Assessment a current issue?

- Recent site NCS assessments
  - missing credible scenarios
  - Poorly documented HA
- Oak Ridge 2008 workshop concerns
  - Facility and Operations manager complaints
  - Scenarios missed or assumptions not documented
    - Personnel risk
    - Work stoppage

Understand what can go Wrong

Criteria

- ANS 8.1, #4.1.2 "…it **shall be determined** that the entire process will be subcritical under both normal and credible abnormal conditions."
- How do we determine the suite of credible abnormal conditions that must be subcritical?
  - Is personal experience and conversations with potential handlers enough?
  - Is a structured HA approach needed?

Understand what can go Wrong

Criteria

- ANS 8.19, #8.3 "The nuclear criticality safety evaluation shall be documented with **sufficient detail, clarity and lack of ambiguity to allow independent judgment of the results**…."
  - **Does this clear, unambiguous and detailed document need a structured or disciplined argument?**
  - **Do we know when we have said enough about scenarios deemed incredible?**

Analysis Basics

- **Where do the pipes go?**
  - **Facility and Proposed Operation well understood and well described**
  - **Facility and operation configuration controlled**
- **What can go wrong?**
  - **Develop accident scenarios**
  - **Determine which accident are credible and unacceptable**
- **Are the Barriers to the unacceptable adequate?**
  - **Develop administrative or engineered barriers for each scenario remaining**
  - **Evaluate each barrier for quality**
- **Will barriers go away?**
  - **Are requirements for training, maintenance, COOP, etc. necessary?**

Some Methods

	What-If	FMEA	HAZOP	Event Tree	Fault Tree
Process	Checklist				
Strength		Mechanical System			
Application			Procedure based or continuous operation		
Effort				Moderate	

Helpful Examples?

- NCSD white paper on Criticality Safety Evaluations
- NSET module 12
- Proposed NCSP data base
  - See Lori Scott
- Hopefully this workshop