Hazard Assessments & Criticality Safety Evaluations

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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

<table>
<thead>
<tr>
<th>Process</th>
<th>What-If</th>
<th>FMEA</th>
<th>HAZOP</th>
<th>Event Tree</th>
<th>Fault Tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength</td>
<td>Checklist</td>
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<tr>
<td>Application</td>
<td></td>
<td>Mechanical System</td>
<td>Procedure based or continuous operation</td>
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<td>Effort</td>
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<td>Moderate</td>
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Helpful Examples?

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