INSTITUTIONAL PROBLEMS AFFECTING CRITICALITY SAFETY PROGRAMS IN THE USDOE

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September 2011

Finding Systemic Weaknesses

- Multiple Program Assessments
  - Numerous sites
- Incident Reports from numerous sites
  - Collected over years
- Discussions at Professional Society meetings
  - Nuclear Criticality Safety Division
- Focused Workshop to agree on areas of weakness in Criticality Safety Programs

2008 Workshop

- Office of Environmental Management (EM) of the USDOE sponsored a gathering in Oak Ridge, Tennessee
- Delegates from each EM managed nuclear site were invited from Criticality Safety professionals and Nuclear Operations staff.
- Prepared presentations from the Operations, Criticality Safety, and Regulatory staffs were provided.

2008 Workshop - continued

- Following extended discussion, ten basic areas of concern were distilled from the presentations
- Workgroups were established for each area of concern and a plan of action was requested from each group
- Agreement to meet at subsequent workshops to discuss progress and proposed solutions

Inadequate Criticality Safety Evaluations

- Core complaint of Operations managers
  - Missed criticality scenarios
  - Poorly conceived controls
- Workgroup reviewed federal Orders and Standards for criticality safety evaluations
  - Primary Standard STD 3007-2007 "Guidelines for Preparing Criticality Safety Evaluations" judged adequate
  - Problem considered Implementation or Training issue

Inadequate Criticality Safety Evaluations - actions

- Training examples
  - ANS Nuclear Criticality Safety Division White Paper (WP) on Evaluations needed upgrading
    - WP revised, approved by Division, and posted November 2010
  - DOE Nuclear Criticality Safety Program training module on Evaluations needed upgrading
    - Module on web site upgraded and posted August 2010
- Scenario Development training
  - Session at summer 2010 ANS meeting on Hazard Identification practices
  - Full day 2010 Workshop on formal Hazard Identification methods

Fissile Mass Characterization

- Decontamination and Decommissioning Operations
  - Where is fissile material and in what amount?
- Core concern – no national program for in-situ non destructive analysis (NDA)
  - Policy and Standards
  - Training
  - Research and development
  - Oversight
- NCS staff unfamiliar with measurement failure modes

Fissile Mass Characterization continued

- Issue meshed with a DNFSB recommendation
- Workgroup White Paper provided to DOE group developing DNFSB response
- National Program proposed
  - Qualification of staff
  - Research and Development of equipment and methods
  - Development of requirements documents
  - Quality Assurance program
  - Federal Oversight
- Issue remains a work in progress

Regulatory Inconsistencies

- Many at initial workshop saw problems with the DOE regulatory system
- A Workgroup surveyed for specific issues which troubled criticality safety practices
  - Scope was the Nuclear Safety Order, 4 Standards, and four Guides
  - 21 core issues identified; e. g.
    - Disconnects between requirement for facility SAR and the Criticality Safety Evaluations
    - Criticality Safety risks and Facility risk Category
    - Approval for control of one parameter at Cabinet level

Regulatory Inconsistencies continued

- Solutions proposed at follow-on workshops
- Work with contractor groups (EFCOG) and the DOE regulatory branch
  - DOE Order 420.1 "Nuclear Safety"
  - DOE STD 3009 "Non Reactor Facility Safety Analysis"
  - DOE STD 1027 "Hazard Categorization"
- Improved order and standard in review

NCS Evaluation Library

- Many similar nuclear operations at other sites
  - Similar risk scenarios and control schemes
  - Each site seems to "reinvent the wheel"
- DOE web library of evaluations proposed
- DOE NCSP agreed to sponsor this library
  - Listing of titles and abstract first product
  - Up and running

Criticality Accident Alarm System for D&D

- Industry standard and dominant Practice for Alarm system assume fixed facility and stable operations
- D& D operations are in a changing facility and fissile material may be in unexpected location.
- Strategy to comply with regulations developed by a workgroup
- White paper issued.

Experiments and data needs to Enhance Mission work

- Little technical data developed for D&D
- 2002 survey of EM sites profitable
- 2008 workshop workgroup developed new survey of EM operations
  - 32 technical site needs identified
    - Integral experiments
    - Cross sections
    - NDA methods
    - CAAS evaluation methods
- Many integrated in NCSP planning

Learning from Experience

- Many DOE "lessons learned" and "root cause" programs
  - Not effectively applied to NCS occurrences
- "Root Cause" Workshop developed for NCS specialists
  - November 2010
  - Eight methods presented and tried on sample problems

DOE Contracting Practices

- Historic contracting
  - Large organizations with full infrastructure
  - Single NCS group
- Current contracting
  - Many small organizations on same site
  - Short term contracts
- Concerns
  - NCS staff distribution to these organizations unbalanced
  - NCS programs and limits and controls diverge
  - Short term contracts lack incentives for training or preventive maintenance
- White paper developed and provided to DOE contracting groups

Transportation Package Evaluations Inconsistent

- Previewed problem of different organizations using different approaches to evaluating transportation packages
- Survey showed issue to be trivial
- Workgroup disbanded.

Conclusion

- Mature safety programs need to identify weaknesses and work on improvements
- A broad based effort with operations, safety staff and regulators is helpful
- Not all problems have a neat solution but communication is a virtue.