

EXTERNAL EVENTS

*The
WILDCARD
of
EMERGENCY
MANAGEMENT*

EMI-SIG/SCAPA Software Quality Assurance Session

May 4, 2006

Clifford Glantz (PNNL)

cliff.glantz@pnl.gov

509.375.2166



Presentations

- *DOE Order 414.1C and DOE Guide 414.1-4: New DOE/EH SQA Requirements and the EH Central Registry Toolbox* – Debra Sparkman (DOE/EH)
- *Application of SQA Requirements and Standards to the Hanford Emergency Planning and Consequence Assessment Programs* – Larry Campbell (Fluor Hanford)
- *Going Beyond the EH Modeling Toolbox – The SCAPA Consequence Assessment Modeling Toolbox* – Cliff Glantz (PNNL)
- *NARAC SQA Activities* – Hoyt Walker (LLNL)

Highlights

- Admiral Krol's comments
- Debra reviewed the SQA Order and Guide
- Defined *safety software*. *Includes:*
 - Software for a nuclear facility that performs a safety function as part of a structure, system, or component
 - Software that is used to classify, design, or analyze nuclear facilities.

Sparkman Highlights (cont)

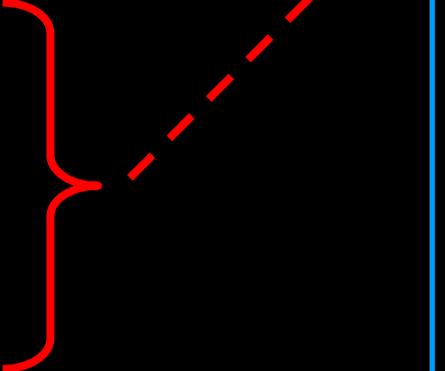
- Software that performs a **hazard control function** in support of nuclear facility or radiological safety management programs or technical safety requirements or other software that performs a **control function** necessary to provide adequate protection from nuclear facility or radiological hazards.
- *Indicates that consequence assessment models used for safety studies, hazards analysis, and emergency preparedness appear to be **safety software**.*

Sparkman Highlights (cont)

- SQA program for safety software must be based on NQA-1 or equivalent
- Reviewed the 10 work elements in the SQA program
- Discussed the Central Registry – EH's toolbox for safety software in widespread use across the complex.

Contents of the Toolboxes

Central Reg. Toolbox

- CFAST
 - MELCOR
 - GENII
 - MACCS2
 - ALOHA
 - EPI
 - IMBA *(coming)*
 - HOTSPOT *(nominated)*
- 

CAM Toolbox

- Central Reg. C.A. models
- HOTSPOT
- NARAC
- APGEMS
- 2DPUFF
- AlphaTrac
- RASCAL
- ARCON96
- CAP88
- HPAC/SCIPUFF...

The CAM Toolbox Will Provide:

- General information on the consequence assessment models that are available for various applications
- Instructions on how to access the models
- Guidance on when & how to use these models
- Links to technical documentation
- Description of the SQA that has been applied to the models
- Indication of whether the models meet SQA requirements for various applications.

Why Not Apply DOE O 414.1C to all Consequence Assessment Models?

- The average cost to bring the relatively simple Central Registry codes (e.g., GENII, EPICODE, ALOHA) into compliance with DOE O 414.1C is over \$300K per model.
- For more sophisticated models, this level of SQA would cost much more.



Gaining Some Wiggle Room...

Consequence assessment models used for:

- Safety analysis and hazards assessment are likely **covered** by the SQA Order.
- emergency response that do not provide a “*hazard control function*” are not covered. *Examples...*
- Need an approach to SQA based on (1) site- or contractor-specific requirements and (2) key elements of the graded approach presented in the DOE SQA Order and Guide
- Key SQA focus areas will be technical documentation, code documentation and change control, and verification & validation testing.

The SQA Balancing Act

- Use the right tool for the job
- We need to find an effective balance between requirements for SQA documentation/validation and technical sophistication
- If we have to use models that lack technical sophistication, we won't be able to effectively do our job.



Don't Let SQA Problems Make a Monkey Out of You...

Help!
The
Program
is Screwed
up



Campbell Highlights...

- SQA is based on Orders, Contract Requirements, Consensus Standards, Company Policies, and Experience.
- At Fluor Hanford:
 - Five SQA Levels (A-E)
 - EPHA and consequence assessment software are both Level B (because they determine emergency actions) but they are not of equal importance.
 - SQA levels are associated with risk and thus determine requirements

Campbell Highlights...

- Key elements of the Fluor Hanford program are:
 - Software identification and control (no rogue programs)
 - Determination of level and category (COTS, Custom design, special cases [e.g., NARAC])
 - Configuration/change control
 - Testing to ensure verification and validation of code/changes
 - Documentation via templates

Walker Highlights...

- Provided a brief introduction to NARAC
- Discussed the components of the NARAC SQA program
- Linked the NARAC SQA program to all 10 work elements in the DOE SQA Order and Guide
- Very effectively illustrated that a major consequence assessment modeling project can utilize the guidance in the SQA Order and Guide without addressing it to the extent required of **safety software**