



Emergency Management Issues Special Interest Group Annual Meeting

The SCAPA Consequence Assessment Modeling (CAM) Toolbox

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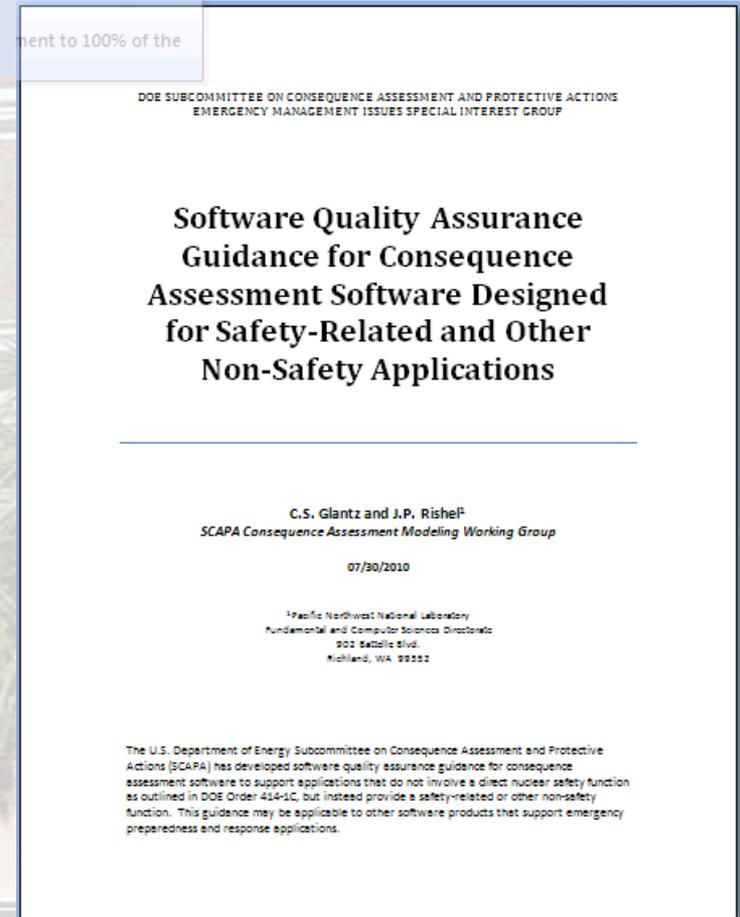
Pacific Northwest National Laboratory

May 2-5, 2011 Charleston Marriott • Charleston, South Carolina



SCAPA SQA Guidance

- The SCAPA SQA guidance is based on the SQA framework for safety software described in DOE Guide 414.1-4.
- For the development of new or the upgrading of existing safety-related and other non-safety consequence assessment software, SCAPA recommends minimum compliance levels for each of the ten SQA work activities described in DOE Guide 414.1-4.
- Publish in July 2010 and available on the SCAPA website.



What is the SCAPA CAM Toolbox?

- A website that provides a single location to access frequently-used CAM codes that adhere to SCAPA software quality assurance (SQA) guidelines.
- Models in the toolbox will have acceptable levels of:
 - technical & user documentation
 - configuration management
 - verification & validation testing
 - problem reporting and sharing

Benefits of the SCAPA CAM Toolbox

- Provide a “**one-stop shopping**” website with introductory material on the models and links to more detailed information on the model’s individual websites.
- Support the continued use of our “tried-and-true” legacy codes.
- Spearhead the drive toward adoption of consistent, reasonable SQA practices.

Populating the CAM Toolbox

1. Select models for **conditional acceptance into the toolbox.**
 - The starting set will focus on our most widely used models for **safety-related** consequence assessment applications: CAPARS (complete), APGEMS (underway), NARAC (gap analysis), RASCAL, HYSPLIT, RAMS/LPDM, and Puff-Plume.
 - A second set of models will be considered later.
2. Ask the model “developers” (e.g., NARAC) to **conduct a gap analysis** on their SQA program.

Populating the CAM Toolbox (cont'd)

3. Select CAMWG members review and **evaluate the gap analyses.**
4. Work with the model developers to formulate a plan to prioritize and **close SQA gaps.**
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SQA Work Activities Reviewed...A Graded Approach

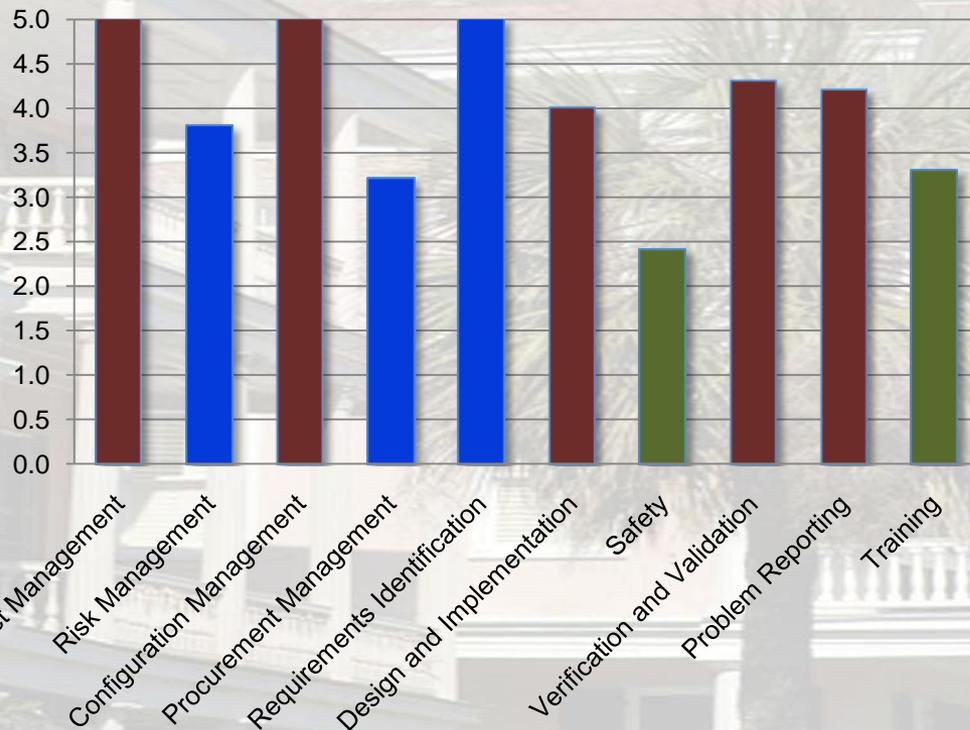
- 10 SQA work activities are reviewed using a graded approach:
 - High
 - Project Management
 - Configuration Management
 - Design and Implementation
 - Verification and Validation
 - Problem Reporting
 - Medium
 - Risk Management
 - Procurement Management
 - Requirements Identification
 - Low
 - Safety
 - Training

Example: CAPARS

- Review team included:
 - Michelle Wolfgram
 - Hoyt Walker
 - Erik Kabelá
 - Cliff Glantz
 - Jeremy Rishel
- CAPARS gap analysis and model documentation provided by John Ciolek. The gap analysis covered each of the 10 SQA work activities.
- Over a period of a few bumpy weeks, the team reviewed the documentation and provided feedback/scores on each work activity.

Example: CAPARS (cont'd)

- In general, the best scores were for the “high” priority SQA work activities.
- In all cases, either “partially meets” or “meets” each SQA work activity.



What Does the SCAPA CAM Toolbox Website Look Like?

- Development of the SCAPA Consequence Assessment Modeling Toolbox website is underway.
- The site, along with the 1st tier model SQA reviews, will be complete by fiscal year-end.
- The next few slides demonstrate the “look and feel” of the CAM Toolbox website...

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EMI SIG > Subcommittees & Working Groups > SCAPA > Modeling Toolbox

SCAPA CAM Toolbox

SCAPA SQA Guidance

Current Toolbox Models

Future Toolbox Models

Model Problems? / Questions?

Modeling Toolbox

The purpose of the SCAPA Consequence Assessment Modeling (CAM) Toolbox is to provide a collection of consequence assessment models that have met [SCAPA software quality assurance \(SQA\) guidelines](#) for safety-related and non-safety applications. These SCAPA SQA guidelines are less rigorous than DOE requirements for safety software, but they are appropriate for modeling applications where the results are not used to formulate initial protective action recommendations but are instead used to estimate the complex dispersion patterns of pollutants, guide the deployment of field monitoring teams to optimal sampling locations, and provide other initial consequence estimates. In these sorts of applications, decisions made based on modeling results cannot lead to an adverse impact on human health or safety (i.e., in-situ monitoring is conducted before any safety decisions are made).

The SCAPA SQA guidance incorporates the key elements found in the DOE guidance for safety software but does so using an appropriately graded approach that is readily implementable by DOE's emergency management community and its software suppliers. In particular SCAPA's SQA guidance focused on the following SQA work activities:

1. Software Project Management and Quality Planning
2. Software Risk Management
3. Software Configuration Management
4. Procurement and Supplier Management
5. Software Requirements Identification and Management
6. Software Design and Implementation
7. Software Safety
8. Verification and Validation
9. Problem Reporting and Corrective Action
10. Training of Personnel.

A graded approach SQA is intended to strike an acceptable balance between the need to model complex environmental and health

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Send a SCAPA Listserv Message

- CAM Toolbox Homepage
- Provides an intro to the toolbox
- Offers four other webpages:
 - Link to SCAPA SQA guidance
 - Current Toolbox models
 - Future toolbox models
 - Problem Reporting and Questions

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SCAPA CAM Toolbox

SCAPA SQA Guidance

Current Toolbox Models

CAPARS

APGEMS

NARAC

RASCAL

Puff-Plume

RAMS/LPDM

HYSPLIT

Future Toolbox Models

Model Problems? / Questions?

Current SCAPA SQA Toolbox Models

At the present time, the first series of models is being evaluated for inclusion in the SCAPA toolbox. These models are CAPARS, APGEMS, NARAC, RASCAL, Puff-plume, RAMS/LPDM, and HYSPLIT

The status of each model in the evaluation process is:

Model Name	Developer informed	Preparation of Developer SQA Gap Analysis	GAP Analysis and SQA Documentation Under Review by CAMWG	SCAPA Gap Analysis Review Document Prepared	SCAPA Toolbox Entry Published
CAPARS	COMPLETED	COMPLETED	COMPLETED	UNDERWAY	
APGEMS	COMPLETED	COMPLETED	UNDERWAY		
NARAC	COMPLETED	NEARLY DONE			
RASCAL	COMPLETED				
Puff-Plume	COMPLETED				
RAMS/LPDM	COMPLETED				
HYSPLIT	COMPLETED				

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Send a SCAPA Listserv Message

- Provides a status report on the current set of Toolbox models
- Offers left navigation page links to information and SQA gap analysis reviews for the models
- Also has clickable links in the Status Table

SCAPA CAM Toolbox

SCAPA SQA Guidance

Current Toolbox Models

Future Toolbox Models

Model Problems? / Questions?

Future SCAPA SQA Toolbox Models

A second round of models will be considered for the SCAPA SQA CAM Toolbox in FY12. The models to be under consideration in this cycle will be:

- ARCON 96;
- RSAC-7;
- HPAC;
- CHARM; and,
- DUSTAN.

[ARCON 96 is...](#)

[RSAC-7 is...](#)

[HPAC is...](#)

[CHARM is...](#)

[DUSTAN is...](#)

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- Provides information on the future set of candidate models

SCAPA CAM Toolbox
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CAPARS
APGEMS
NARAC
RASCAL
Puff-Plume
RAMS/LPDM
HYSPLIT
Future Toolbox Models
Model Problems? / Questions?

CAPARS

Computer-assisted Protective Action Recommendation System (CAPARS)

Developer and contacts
 AlphaTRAC, Inc.; 10385 Westmoor Dr. Suite 310
 Westminster, CO 80021-2597; (303) 428-5670
 email: info@alphatrac.com
<http://www.alphatrac.com/PlumeModelingSystem>

Overview

The Computer-assisted Protective Action Recommendation System (CAPARS) is an atmospheric dispersion modeling system used for real-time emergency response projections of plume impacts from radiological and chemical releases over complex terrains. It provides plume, weather, hazard, and related information with the accuracy and speed needed to support all levels of emergency management and response, including the urgent demands of first responders. CAPARS is designed to automate many of the tasks in the emergency consequence projection process. The automation reduces the potential for user input error, minimizes the time required to generate answers, and helps to reduce the stress imposed upon dose assessment personnel in the hectic environment of emergencies.

CAPARS is designed to meet the key decision support needs of emergency managers, incident commanders, field monitoring teams, and regulatory agencies. The system:

- Automates the emergency response consequence projection process
- Reduces user input error
- Minimizes the time required to obtain key decision-support estimates
- Automates meteorological data collection from multiple sites.



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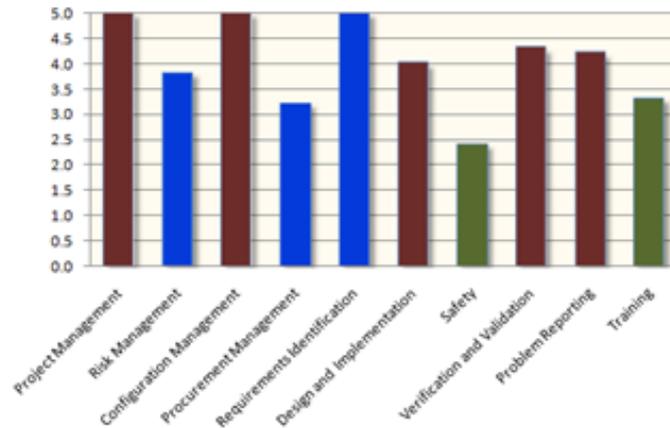
- Each model has its own webpage
- Information Provided includes contact information for model developers
- Overview of model capabilities and uses
- Review of the SQA gap analysis
- SQA score and associated information
- Links for more information

Software Quality Assurance Evaluation



#	SQA Work Activities	SQA Scores	Priority Rating
1	Project Management	5.0	H
2	Risk Management	3.8	M
3	Configuration Management	5.0	H
4	Procurement Management	3.2	M
5	Requirements Identification	5.0	M
6	Design and Implementation	4.0	H
7	Safety	2.4	L
8	Verification and Validation	4.3	H
9	Problem Reporting	4.2	H
10	Training	3.3	L

Average Score 4.0



Links

- [CAPARS Plume Prediction Document](#)
- <http://www.alphatrac.com/PlumeModelingSystem>

- SQA score presented using a 5-pt scale
- Results averaged from input by multiple reviewers
- Breakdown is provided by each SQA Activity
- Shown in tabular and graphical format
- Plans to close SQA gaps can also be shown
- Links provided for additional information.

Questions? Suggestions?

- **Contact:**

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