Department of Energy
Washington, DC 20585
March 18, 2004

MEMORANDUM TO: DISTRIBUTION

FROM: BEVERLY A. COOK
ASSISTANT SECRETARY
ENVIRONMENT, SAFETY AND HEALTH

SUBJECT: SOFTWARE QUALITY ASSURANCE TRAINING ANNOUNCEMENT

The Implementation Plan for Software Quality Assurance (SQA) in response to Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2002-1 requires personnel assigned to SQA positions achieve qualification per the requirements of the Technical Qualification Program by September 2004. In support of this commitment, the Office of Environment, Safety and Health (EH) reviewed training options for meeting the competency requirements of the Safety Software Quality Assurance Functional Area Qualification Standard (FAQS). EH identified a commercially available Software Quality Engineering course offered by the American Society for Quality (ASQ). This course was previously presented at the Lawrence Livermore National Laboratory and received favorable comments. In addition, some members of the Federal Technical Capability Panel from Environment Management and the National Nuclear Security Administration reviewed the course content and determined it to be appropriate for DOE.

The ASQ Software Quality Engineering course will be presented at the Department of Energy facilities in Germantown, Maryland, May 10-14. Attachment A provides the course description. Attachment B provides guidance as to which Safety Software Quality Assurance FAQS competencies would be satisfied by the ASQ Software Quality Engineering Course. Other courses including self-study courses may also be available, but should be evaluated against the competency requirements of the Safety Software Quality Assurance FAQS.

The number of participants for the May 10-14 session is limited to twenty-four. If you would like your Headquarters and field organizations to attend this SQA training, please provide EH with a list of prioritized attendees by April 8. Additional presentations of the ASQ Software Quality Engineering Course can be arranged based on demand.

Questions regarding this SQA training announcement should be directed to Chip Lagdon at (301) 903-4218 or e-mail Chip.Lagdon@eh.doe.gov, or Charlie Thayer our EH SQA training coordinator at (301) 903-5605 or e-mail Charlie.Thayer@eh.doe.gov.

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Attachment A

Software Quality Engineering Course Description

Location	Conference Room	Date
Germantown, MD	DOE GTN A-410	May 10-14, 2004

Description

The course is broad in scope and addresses all of the body of knowledge area of the American Society for Quality (ASQ) Certified Software Quality Engineer (CSQE). It provides a thorough introduction for those new to software quality, as well as an opportunity to fill in any "blank spots" for experienced personnel. Although not designed as a certification refresher, this course may help seasoned software quality professionals brush up on the key elements of CSQE.

Who Should Attend?

Software quality specialists, software quality engineers, software process engineers, and quality engineers wishing to obtain a basic understanding of software quality practices and principles. Knowledge of and/or work experience within the software quality assurance field is helpful but not required.

Learning Outcomes

- Define the skills and knowledge necessary to perform software quality engineering tasks
- Understand the software life cycle
- Determine how to evaluate software quality activities and process and determine whether they meet their intended purpose
- Choose applicable standards and meeting techniques
- List the four components of configuration management

Course Materials

Course materials are designed to provide reference materials that can be utilized by the attendees long after the completion of the course. These materials include:

- Student notes including copies of all presentation slides and annotated descriptive text
- Reference materials and web sites to aid in directing further study
- Example solutions for all interactive and team exercises
- A detailed index and glossary to make referencing the course material easier

ASQ Bodies of Knowledge Covered

Software Quality Engineer

Instructor

Linda Westfall, PE, CSQE, CQA

Attachment B
Safety Software Quality Assurance FAQS Competencies Satisfied by the American Society for Quality (ASQ) Software Quality Engineer Course

Safety Software Quality Assurance FAQS DOE-STD-1172-2003 Competency Requirement	Met	Partially Met	Not Met	American Society for Quality (ASQ) Software Quality Engineering Course
Competency 1. Shall demonstrate a working level knowledge of the types of safety system software and safety design and analysis software, including custom software and commercial off-the-shelf software (COTS). This includes instrumentation and control software and firmware (e.g., human-machine interface software, and programmable logic controller software), and computer calculation and database program software used in the design and accident analysis of nuclear facilities.			v	This competency is not met. The risk management portion of the course covers some of the general concepts and characteristics of safety software however there is no DOE nuclear facility specific safety related information. Most DOE safety software quality assurance personnel are familiar with types of safety software and safety design and analysis software.
Competency 2. Shall demonstrate a working level knowledge of the functional interfaces between safety system software components and the system-level design.	v			This competency is met by the ASQ Software Quality Engineering Course
Competency 3. Shall demonstrate a working level knowledge of the relationships between the problems being addressed by safety analysis and design codes, the design requirements for the codes, and the components of the codes.		v		This competency is partially met. The course identifies how features are translated to software functional requirements. How those functional requirements are solicited, defined, documented, controlled and traced through the software life cycle. It does not specifically address safety software applications. Course attendee interaction should supplement the course material.
Competency 4. Shall demonstrate a working level knowledge of the safety software life cycle processes described in IEEE 1074, *IEEE Standard for Developing Software Life Cycle Processes*.	v			This competency is met by the ASQ Software Quality Engineering Course
Competency 5. Shall demonstrate a working level knowledge of the safety software requirements specification concepts such as those	v			This competency is met by the ASQ Software Quality Engineering Course

Safety Software Quality Assurance FAQS DOE-STD-1172-2003 Competency Requirement	Met	Partially Met	Not Met	American Society for Quality (ASQ) Software Quality Engineering Course
described in ANSI/IEEE 830, *IEEE Guide to Software Requirements Specifications* and Section 3 of NUREG/CR-6263, *High Integrity Software for Nuclear Power Plants.*				
Competency 6. Shall demonstrate a familiarity level knowledge of the safety software design concepts as described in ANSI/IEEE 1016, *IEEE Recommended Practice for Software Design Descriptions* and Section 4 of NUREG/CR-6263, *High Integrity Software for Nuclear Power Plants.*	**v**			This competency is met by the ASQ Software Quality Engineering Course
Competency 7. Shall demonstrate a familiarity level knowledge of the safety software coding practices that ensure that software requirements specifications and design requirements are reflected in the source code.	**v**			This competency is met by the ASQ Software Engineering Course. The course does not contain detail information down to the coding (implementation) level. However it does provide information at the familiarity level.
Competency 8. Shall demonstrate a working level knowledge of the software verification and validation processes that ensure that the requirements specification, design, and coding of software adequately fulfill all intended safety functions. These processes are described in standards such as ANSI/IEEE 829, *IEEE Standard for Software Test Documentation*, ANSI/IEEE 1008, *IEEE Standard for Software Testing*, ANSI/IEEE 1012, *IEEE Standard for Software Verification and Validation Plans*, and Sections 6 – 8 of NUREG/CR-6263, *High Integrity Software for Nuclear Power Plants.*	**v**			This competency is met by the ASQ Software Quality Engineering Course
Competency 9. Shall demonstrate a working level knowledge of software safety analysis as described in documents such as IEEE 1228, *IEEE Standard for Software Safety Plans* and Section 9			**v**	This competency is not met. The risk management portion of the course covers some of the general concepts but there is little specific safety related information. Most DOE safety software quality assurance personnel are familiar with

Safety Software Quality Assurance FAQS DOE-STD-1172-2003 Competency Requirement	Met	Partially Met	Not Met	American Society for Quality (ASQ) Software Quality Engineering Course
of NUREG/CR-6263, *High Integrity Software for Nuclear Power Plants.*				system safety concepts that can be applied to software.
Competency 10. Shall demonstrate a working level knowledge of activities that ensure that safety software is properly maintained and continues to operate as intended as described in such documents as IEEE 1219, *IEEE Standard for Software Maintenance* and Section 10 of NUREG/CR-6263, *High Integrity Software for Nuclear Power Plants.*	**v**			This competency is met by the ASQ Software Quality Engineering Course
Competency 11. Shall demonstrate a working level knowledge of software configuration management processes that ensure the integrity of executable code during the entire life cycle of safety software as described in documents such as ANSI/IEEE 828, *Software Configuration Management Plans*, ANSI/IEEE 1042, *Guide to Software Configuration Management*, and Section 11 of NUREG/CR-6263, *High Integrity Software for Nuclear Power Plants.*	**v**			This competency is met by the ASQ Software Quality Engineering Course
Competency 12. Shall demonstrate a working level knowledge of the elements of a successful software quality assurance program.	**v**			This competency is met by the ASQ Software Quality Engineering Course