



# **Quality Assurance Improvement Plan and Software Quality Assurance Implementation Plan**

**February 23, 2004**

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**Defense Nuclear Facilities Safety Board  
Frank Russo  
Deputy Assistant Secretary  
For Corporate Performance Assessment**



# Accomplishments

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- Quality Assurance Improvement Plan
  - EM: 14 of 16 commitments completed
  - NNSA: 7 of 8 commitments completed
- SQA Implementation Plan
  - EH: 14 of 26 commitments completed





# QA Program Improvements

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- Established DOE Office of QA Programs
- Established EFCOG QA Group – tasks in development
- Quality Workshop conducted December 2003
- QA Directive revisions in progress





# QA Directive Status

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- QA Order 414.1B nearing issuance – awaiting Secretarial Office concurrences
- Suspect/Counterfeit Items Guide 414.1-3 draft ready for February release
- QA Guide 414.1-2A revision initiated with target release date April 2004





# **Software Quality Assurance Implementation Plan**

**February 23, 2004**

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**Defense Nuclear Facilities Safety Board  
Chip Lagdon  
Director  
Office of Quality Assurance Programs**



# Overview

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- Recent Accomplishments
- Toolbox Code Status
- Design Code Survey
- Assessment Schedules
- SQA Knowledge Portal
- SQA Directives Status
- Summary and Path Forward



# 2002-1 IP Accomplishments

Commitment	Description	Responsibility	Status
4.1.1	Define SOA roles and responsibility	EH	Completed
4.1.2	Develop SOA qualification standards for Federal personnel	Federal Technical Capability Panel	Completed
4.1.3	Identify Federal SOA positions	EM, NNSA	Completed
4.1.4	Qualify Federal personnel	EM, NNSA	Open (9/04)
4.1.5	Revise Functions, Responsibilities and Authorities Manual (FRAM)	EH	Completed
4.1.6	Revise FRA documents	EM, NNSA	Open (4/04)



## 2002-1 IP Accomplishments (Cont.)

Commitment	Description	Responsibility	Status
4.2.1.1	Identify safety analysis codes for "toolbox"	EH	Completed
4.2.1.2	Establish SQA criteria for toolbox codes	EH	Completed
4.2.1.3	Perform SQA gap analyses on toolbox codes	EH	Initial Report Completed
4.2.1.4	Develop safety analysis code guidance reports	EH	Completed
4.2.1.5	Perform design code survey	EH	Initial Report Completed





## 2002-1 IP Accomplishments (Cont.)

Commitment	Description	Responsibility	Status
4.2.2	Establish Central Registry for toolbox codes	EH	Completed
4.2.3.1 4.2.4.1	Develop SQA Criteria and Approach Document (CRAD)	EH	Completed
4.2.3.2 4.2.4.2	Establish site assessment schedule	EM, NNSA	Completed
4.2.3.3 4.2.4.3	Conduct site assessments	EM, NNSA	Open (per schedule)
4.3.1	Review industry or Federal SQA standards	EH	Completed
4.3.2.1	Establish schedule on SQA Directives	EH	Completed

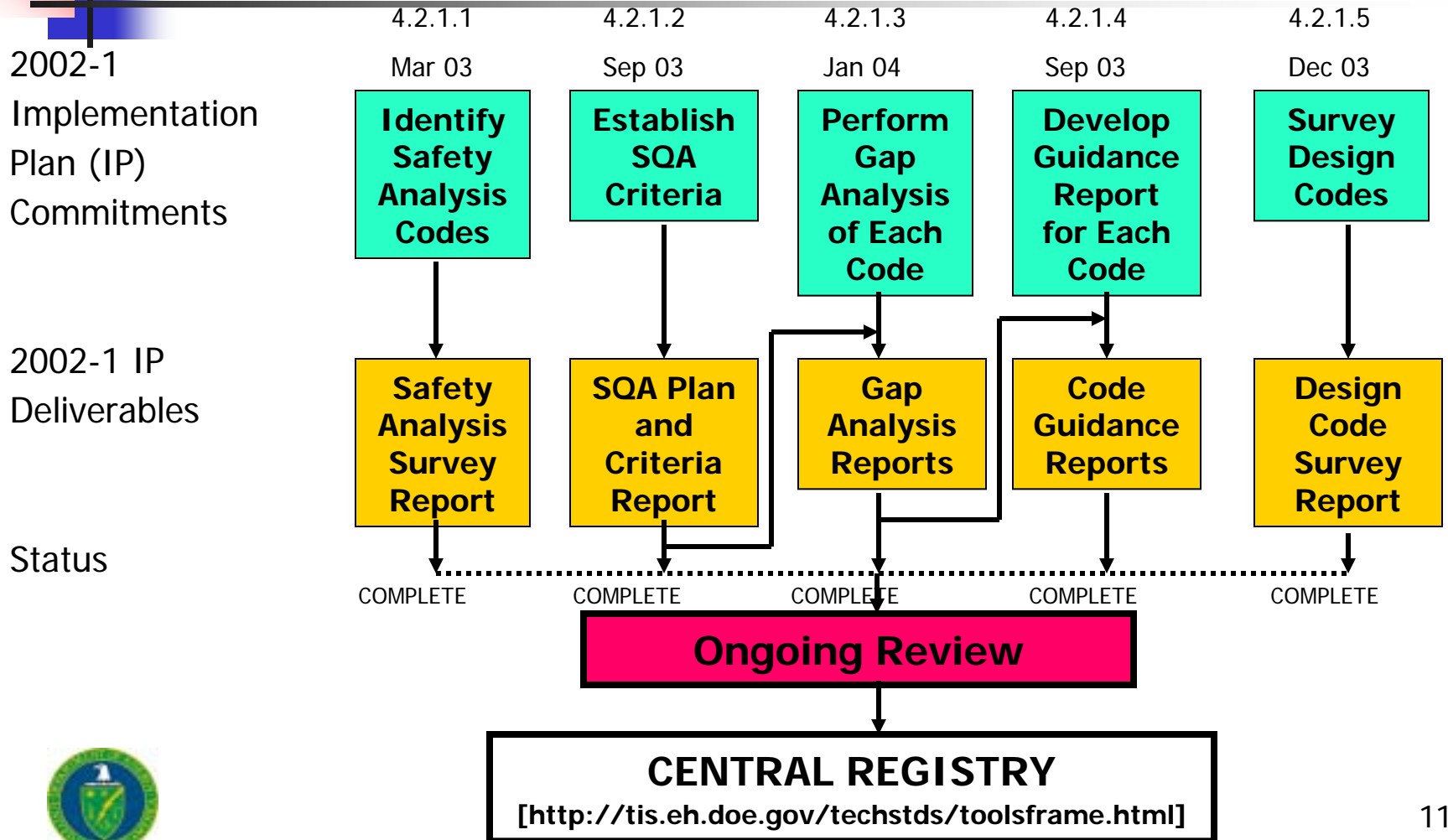


## 2002-1 IP Accomplishments (Cont.)

Commitment	Description	Responsibility	Status
4.3.2.2	Issue SQA Directives	EH	Open (12/04)
4.3.3	Review SQA Directives	NA, NNSA, etc.	Open (per issuance)
4.4.1	Establish corporate SQA function within EH	EH	Open (3/04)
4.4.2	Identify methods for capturing SQA lessons learned	EH	Completed
4.4.3	Establish relationship with outside SQA organizations	EH	Completed
5.2.1	Conduct periodic briefings to DNFSB	EH	Ongoing



# Overview of Code Commitments





# Gap Analysis of Six Toolbox Codes

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- Issued interim gap analysis reports for ALOHA, MACCS2, EPIcode, MELCOR, CFAST and GENII toolbox codes
- Reports Available:  
<http://tis.eh.doe.gov/techstds/toolsframe.html>
- No evidence of software-induced errors in the codes that would have led to non-conservatism at defense nuclear facilities
- SQA improvements identified for safety analysis software



# Toolbox Code Gap Analysis Summary

Criteria	MACCS2	ALOHA	EPIcode	MELCOR	GENII 1.485	GENII 2.0	CFAST
Software Classification	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Procedures/Plan	Part/No	Part/No	Part/No	Part/No	Yes	Part/No	Part/No
Requirements	Part/No	Part/No	Part/No	Part/No	Yes	Part/No	Part/No
Design	Part/No	Part/No	Part/No	Part/No	Yes	Part/No	Part/No
Implementation	Part/No	Part/No	Part/No	Yes	Yes	Part/No	Part/No
Testing	Part/No	Part/No	Part/No	Part/No	Yes	Part/No	Part/No
Instructions	Part/No	Part/No	Part/No	Part/No	Yes	Part/No	Part/No
Accept Test	Yes	Yes	Yes	Yes	Yes	Part/No	Part/No
Config. Cont.	Part/No	Part/No	Part/No	Yes	Yes	Part/No	Part/No
Error Impact	Part/No	Part/No	Part/No	Yes	Yes	Yes	Yes
Resources (FTE)	2.0 yr	1.25 yr	1.25 yr	2.0 yr	1.0 yr	N/A	0.5 yr





# Design Code Survey

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- Conducted a survey of design codes currently in use to determine if any should be included as part of the toolbox
- Survey period from September to December 2003
- 14 organizations at 13 DOE sites responded
- Issued Initial Report in December 2003



# Multiple-Use Design Software

## Characteristics

- Proprietary
- Extensive Worldwide User Groups
- Website Well-Supported in Many Cases
- Various methods on SQA
  - 10 CFR 50 Appendix B
  - NQA-1
  - ISO 9000/9001

Survey of Design Codes - Multiple Use Codes				
Category	Item	Code Name	Number of Sites	Number of Organizations
1. Civil/Structural/Geotechnical	1	ABAQUS	4	4
	2	ANSYS	4	7
	3	BlastX	2	2
	4	GTSTRDL	2	2
	5	RISA-3D	2	2
	6	SAP 2000	2	2
	7	SASSI	3	4
	8	SHAKE	3	3
2. Mechanical		ANSYS	4	7
	9	AutoPIPE	3	4
	10	COSMOS	2	2
	11	FLUENT	1	2
	12	PIPE-FLO	1	2
3. HVAC		FLUENT	1	2
4. Electrical Systems	13	ETAP	2	2
5. Fire Protection	14	HASS	6	7
6. Instrumentation and Control		none		
7. Other	15	MicroShield	2	3



# Software Assessment Schedules

Site	Date	Site Team Lead	EH Rep
Y-12	1/20-23/04	Sherry Hardgrave	Pranab Guha
ORP	2/16-20/04	Dave Brown	Subir Sen
LANL	2/9-13/04	Chris Murnane	Pranab Guha
SRS – NNSA	2/16-20/04	Gregg Nelson	Chip Lagdon
SRS – EM	2/16-20/04	Bill Roland	Chip Lagdon
Pantex	3/22-26/04	Al MacDougall	Debra Sparkman
SNL	3/16-19/04	Mark Hamilton	Subir Sen
ID	April or June	Bob Blyth	Pranab Guha
NTS	4/26-30/04	Tim Henderson	TBD
RL	March	Shiv Seth	Subir Sen
LLNL	TBD. No later then 8/15/04	Adeliza Cordis	TBD







# SQA Knowledge Portal

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- Incorporates functions of Central Registry and SQA list server
- Repository for SQA knowledge
  - Toolbox Code information, Reports and Standards, Training Courses, Procedures
- Collaboration space for SQA Community
- SQA SME locator
- SQA Discussion Forum





## Software Quality Assurance Knowledge Portal



Welcome to the Department of Energy's Office of Environment, Safety and Health's (EH) Software Quality Assurance (SQA) Knowledge Portal. The purpose of this Knowledge Portal is to promote continuous improvement and the sharing as well as creation of knowledge of nuclear safety software quality assurance among interested parties across the DOE complex. It consolidates information and contains links to subject matter experts, procedures, training material, program descriptions, good practices, and lessons learned. The Portal also provides capabilities for member collaboration in product development and threaded discussions.

- [Central Registry](#): Covering site boundary accident dose consequences, fire accident source terms, leakpath factors, chemical release/dispersion and consequence, and radiological dispersion and consequence.
- [Site Assessments and CRADS](#): This section contains the Criteria Review and Approach Documents being utilized to assess nuclear safety software at DOE facilities. It includes site reports received and lessons learned from conducting the assessments.
- [Discussion Forum](#): The discussion forum provides a virtual workspace for end users to post information regarding SQA including general issues, toolbox code usage, and lessons learned.
- [Expert Locator](#): Subject Matter Experts (SME) were identified throughout the Complex in 2003. The SQA SMEs are provided in this listing for reference and information. Passwords are required to access this list.
- [Training](#): This site contains SQA training information that will ensure that DOE personnel possess and maintain the appropriate level of competency required for their SQA related positions.
- [SQA Directives](#): This section contains the current DOE N 411.1, "Safety Software Quality Assurance Functions, Responsibilities, and Authorities for Nuclear Facilities. It also contains links to the DOE O 414.1A, Quality Assurance, the SQA Standards Report and drafts of SQA directives under development.
- [Lessons Learned](#): The lessons learned feature of the SQA Knowledge Portal has been established to promote the sharing of knowledge across the DOE complex with specific emphasis on lessons learned relevant to SQA.
- [Program Documents](#): This section of the webpage contains SQA program documents, reports and presentations.
- [SQA Links](#): Links to websites related to SQA.
- [Frequently Asked Questions](#): This section contains frequently asked questions from the field pertaining to SQA.
- [SQA Newsletter](#): SQA newsletters designed to provide updates to the Quality Assurance community on SQA activities to improve communications and support of field activities are posted.
- [SQA Website Points of Contact](#):

[Mission/Vision](#)[Organization Chart](#)[E-mail Us](#)[DOE Phone Book](#)**ES&H Program/Topics**[Environment](#)[Facility and Nuclear Safety](#)[Health](#)[Performance & Quality](#)[Planning & Administration](#)[Price-Anderson Enforcement](#)[Worker Advocacy](#)**ES&H Corporate Reporting Databases****Resources/Tools**[Commercial & Industry Standards](#)[ES&H Document Collection](#)**Software Quality Assurance**[Program Documents](#)[Central Registry](#)[SQA Directives](#)[Site Assessments and CRADS](#)[Training](#)[FAQ](#)[Newsletter](#)[Discussion Forum](#)[Links](#)[Contacts](#)**Latest News**

[Notice of Availability of the West Valley Demonstration Project Final Waste Management Environmental Impact Statement \(01/16/2004\)](#)

[West Valley Demonstration Project Waste Management Final Environmental Impact Statement \(01/15/2004\)](#)

[Notice of Proposed Withdrawal and Opportunity for Public Meeting; Nevada \(01/15/2004\)](#)

[DOE - Medical and Infectious Disease Update - Wednesday, January 14, 2004 \(01/15/2004\)](#)

[More News](#)**Events**

[America's Fire Expo 2004 \(07/20/04 - 07/22/04\)](#)

[NFPA World Safety Conference & Exposition, Building a Safer World, Salt Palace Convention Center, Salt Lake City, UT, \(05/23/04 - 05/26/04\)](#)

[National Homeland Security Conference & Expo \(02/25/04 - 02/26/04\)](#)

**Information for...**[Lessons Learned](#)[Daily Occurrence Reports](#)[Safety Concerns](#)



# SQA Directives Status

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- Software Categorization Grading Work Paper Developed
- First SME Panel Review Complete
  - Additions to software type/approach table
  - Definitions clarified for software types and their application
  - Concern grading definitions go beyond SQA IP scope





# SQA Directives Status

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- Order and Guide Development
  - March – Sept 04
  - SME Input throughout
  - DOE O 414.1C on REVCOM – Sept 04
- Consider extending DOE N 411.1 until DOE O 414.1C is issued
- DOE O 414.1B contains SQA responsibilities, clarify safety system software w/in scope



# 2002-1 IP Commitment Summary and Path Forward

- Developed SQA Knowledge Portal with Central Registry
- Finalize safety analysis code guidance and gap analysis reports by April 2004 and develop path forward
- Issue SQA directives by end of 2004
- Participate in NNSA and EM SQA site assessments
- Partner with NNSA and EM to complete site assessments
- NNSA and EM to update FRA documents
- Host SQA training May 2004
- Partner with NNSA and EM in monitoring of cross-cutting SQA issues

