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April 2002

DOE STANDARD

QUALITY ASSURANCE FUNCTIONAL AREA QUALIFICATION STANDARD

DOE Defense Nuclear Facilities Technical Personnel

U.S. Department of Energy
Washington, D.C. 20585

AREA TRNG

APPROVAL

The Federal Technical Capability Panel consists of senior U.S. Department of Energy managers responsible for overseeing the Federal Technical Capability Program. This Panel is responsible for reviewing and approving the Qualification Standard for Department-wide application. Approval of this Qualification Standard by the Federal Technical Capability Panel is indicated by signature below.

Roy J. Schepens
Chairman
Federal Technical Capability Panel

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TABLE OF CONTENTS

ACKNOWLEDGMENT vii

PURPOSE 1

APPLICABILITY 1

IMPLEMENTATION REQUIREMENTS 2

EVALUATION REQUIREMENTS 3

CONTINUING EDUCATION, TRAINING AND PROFICIENCY 4

DUTIES AND RESPONSIBILITIES 4

BACKGROUND AND EXPERIENCE 5

REQUIRED TECHNICAL COMPETENCIES 5

APPENDIX A - CONTINUING EDUCATION, TRAINING AND PROFICIENCY PROGRAM . . 23

LIST OF CONTINUING EDUCATION, TRAINING AND OTHER PROFICIENCY RELATED ACTIVITIES 23

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ACKNOWLEDGMENT

The Assistant Secretary for Environment Safety and Health is the Sponsor for the Quality Assurance (QA) Functional Area Qualification Standard. The Sponsor is responsible for coordinating the development and/or review of the Functional Area Qualification Standard by subject matter experts to ensure that the technical content of the standard is accurate and adequate for Department-wide application for those involved in QA activities. The Sponsor, in coordination with the Federal Technical Capability Panel, is also responsible for ensuring that the Functional Area Qualification Standard is maintained current.

The following subject matter experts (SMEs) participated in the development and/or review of this qualification standard:

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FUNCTIONAL AREA

QUALITY ASSURANCE

1. PURPOSE

The U.S. Department of Energy's (DOE) Federal Technical Capability Program Policy, P 426.1, issued by the Secretary in December 1998, commits DOE to continuously strive for technical excellence and establishes the Technical Qualification Program (TQP). The TQP, along with the supporting technical Functional Area Qualification Standards, complements the personnel processes that support DOE's drive for technical excellence. Detailed operating requirements for the TQP and Functional Area Qualification Standards are described in the Federal Technical Capability Manual, DOE M 426.1-1.

The technical Functional Area Qualification Standard has been developed as a tool to assist DOE program and Field offices in the development and implementation of the TQP in their organization. The technical Functional Area Qualification Standards are not intended to replace the U.S. Office of Personnel Management's (OPM) Qualifications Standards, nor other DOE personnel standards, rules, plans, or processes. The primary purpose of the TQP is to ensure that employees have the requisite technical competency to support the mission of DOE. The TQP forms the basis for the development and assignment of DOE personnel responsible for ensuring the safe operation of defense nuclear facilities.

2. APPLICABILITY

This QA Functional Area Qualification Standard establishes common functional area competency requirements for DOE personnel who provide assistance, direction, guidance, oversight, or evaluation of contractor technical QA activities impacting the safe operation of defense nuclear facilities. Implementing and/or overseeing the quality assurance functions of DOE O 414.1A and 10 CFR 830, Subpart A, is an interdisciplinary function that involves many organizational components. QA implementation is not considered as the sole domain of a single person or component or an organization. Therefore, an organization may choose to use this Technical Functional Area Qualification Standard as is, or they may use parts of it to facilitate the development of their own unique Technical Functional Area Qualification Standards. In either case, satisfactory and documented attainment of the competency requirements of this Technical Functional Area Qualification Standard, or similar Standards, provides a level of confidence that personnel posses the requisite competence to fulfill their QA functional area duties and responsibilities.

The competency requirements defined in the technical Functional Area Qualification Standards should be aligned and integrated with the recruitment and staffing processes for technical positions. The technical Functional Area Qualification Standards should form the primary basis for developing vacancy announcements, qualification requirements, crediting plans, interviewing questions, and other criteria associated with the recruitment, selection, and internal placement of technical personnel. OPM minimum qualification standards will be greatly enhanced by the application of appropriate materials from the technical Functional Area Qualification Standards.

3. IMPLEMENTATION REQUIREMENTS

This technical Functional Area Qualification Standard identifies the technical competency requirements for personnel assigned to the QA functional area. Although there are other competency requirements associated with QA positions, this Functional Area Qualification Standard is limited to identifying the specific technical competencies. The competency statements define the expected knowledge and/or skill that an individual must meet. Each of the competency statements is further explained by a listing of supporting knowledge and/or skill statements. The supporting knowledge and/or skill statements are not requirements and do not necessarily have to be fulfilled to meet the intent of the competency.

The competencies identify a familiarity level, a working level, or an expert level of knowledge; or they require the individual to demonstrate the ability to perform a task or activity. These levels are defined as follows:

a. **Familiarity level** – The basic knowledge of or exposure to the subject or process adequate to discuss the subject or process with individuals of greater knowledge.

b. **Working level** -- The knowledge required to monitor and assess operations/activities, to apply standards of acceptable performance, and to reference appropriate materials and/or expert advice as required to ensure the safety of DOE activities.

c. **Expert level** – A comprehensive, intensive knowledge of the subject or process sufficient to provide advice in the absence of procedural guidance.

d. Demonstrate the ability – The actual performance of a task or activity in accordance with policies, procedures, guidelines, and/or accepted industry or DOE practices.

Headquarters and Field elements shall establish a program and process to ensure that QA personnel possess the competencies required for their position. That includes the competencies identified in this technical Functional Area Qualification Standard or a similar standard developed by the organization. Documentation of the completion of the requirements of the standard shall be included in the employee's training and qualification record.

Equivalencies may be granted for individual competencies based upon an objective evaluation of the employee's prior education, experience, certifications, and/or training. Equivalencies shall be granted in accordance with the policies and procedures of the program or field office. For example, personnel qualified to the DOE Albuquerque Operations Office competency requirements for *Weapons Quality Staff General Engineer/Physical Scientist* may be reviewed for equivalency with the DOE-wide standard. The supporting knowledge and/or skill statements, while not requirements, should be considered before granting equivalency for a competency.

Training shall be provided to employees in the Technical Qualification Program who do not meet the competencies contained in the technical Functional Area Qualification Standard. DOE training will be based upon appropriate supporting knowledge and/or skill statements similar to the ones listed for each of the competency statements. Headquarters and Field elements should use the supporting knowledge and/or skill statements as a basis for evaluating the content of any training courses used to provide individuals with the requisite knowledge and/or skill required to meet the technical Functional Area Qualification Standard competency statements.

4. EVALUATION REQUIREMENTS

A qualifying official or the immediate supervisor of a person seeking qualification should document the attainment of the QA competencies listed in this technical Functional Area Qualification Standard by using any of the following methods:

- Documented evaluation of equivalencies;
- written examination;
- documented oral evaluation; or
- documented observation of performance.

5. CONTINUING EDUCATION, TRAINING AND PROFICIENCY

Qualified personnel shall participate in an office/facility/position-specific continuing training and qualification program. Suggested learning proficiency activities for QA personnel are listed in Appendix A of this Standard.

6. DUTIES AND RESPONSIBILITIES

The following are the typical duties and responsibilities expected of DOE defense nuclear facility technical personnel assigned to the QA Functional Area:

a. Serve as or support the senior manager responsible for developing the organization's QA Program (QAP) consistent with the DOE QA Order, 414.1A and other customer requirements.

b. Review and evaluate the organization's and the contractor's QAP, plans, and processes to verify compliance with applicable regulations, standards, and DOE Orders.

c. Monitor and evaluate DOE and contractor implementation of QAPs, plans, and processes to verify adequacy, effectiveness, and compliance with applicable regulations, standards, and DOE Orders, including the evaluation of QA related award fee and performance based incentives.

d. Lead/perform QAP implementation assessments, document results, prepare reports, and monitor resulting actions.

e. Serve as an information source to the organization's management that is independent of line management responsibilities and or cost and schedule considerations.

f. Support the organization's top management in DOE QA rule enforcement activities involving contractors.

g. Provide QA support to accident/event investigations and perform appropriate analysis.

h. Serve as the organization's subject matter expert and/or technical point-of-contact for QA activities.

i. Interface with DOE Headquarters and Field elements, regulators, and stakeholders to ensure the organization's effective application of DOE QA documents.

Position-specific duties and responsibilities for QA personnel are contained in their Office/Facility-Specific Qualification Standard or Position Description.

7. BACKGROUND AND EXPERIENCE

The U. S. Office of Personnel Management's (OPM) Qualification Standards Handbook establishes minimum education, training, experience, or other relevant requirements applicable to a particular occupational series/grade level, as well as alternatives to meeting specified requirements. The preferred education and experience for QA personnel is:

1. Education – Bachelor or Science degree in engineering, science, or a related discipline; or meet the alternative requirements specified for engineers or scientists in the OPM Qualifications Standards Handbook. Bachelor degrees in other disciplines may also be appropriate based on the duties to be performed and considering the experience gained in performing related QA activities. For example, the 1910 series "QA Specialist" position may have equivalencies appropriate to the functions to be performed. (See the above discussion on equivalencies.)

2. Experience – Industry, military, federal, state, or directly related background that has provided specialized experience in quality assurance activities is recommended. Specialized experience may be demonstrated through possession of the competencies outlined in this standard.

In addition to the above stated education and experience, a national Lead Auditor Certification (e.g., NQA-1 and ASQ), Certified Quality Engineer (CQE), or Certified Quality Manager (CQM) may serve as the basis for equivalency of competencies in portions of this Standard.

8. REQUIRED TECHNICAL COMPETENCIES

Each of the competency statements defines the level of expected knowledge and/or skill that an individual must possess to meet the intent of this Technical Qualification Standard. The supporting knowledge and/or skill statements further describe the intent of the competency statements but are not requirements.

Note: When regulations, DOE directives or guides, or other industry standards are referenced in the Qualification Standard, the most recent revision should be used.

A. QA PROGRAM, MANAGEMENT

1. QA personnel shall demonstrate a working level of knowledge of DOE QA policy, programs, processes, and regulatory requirements contained in:

- DOE O 414.1A, Quality Assurance
- 10 CFR 830, Subpart A, Quality Assurance
- Office of Price-Anderson Enforcement Procedures and Guidance
- 10 CFR 820, Procedural Rules for DOE Nuclear Activities

Supporting Knowledge and/or Skills

a. Discuss the purpose and scope of the Price-Anderson Amendments Act and its applicability to the DOE's QA activities.

b. Discuss the purpose, interrelationships, and importance of DOE Policy 450.4, *Safety Management System Policy,* DOE Policy 450.5, *Line Environment, Safety and Health Oversight,* DOE O 414.1A, *Quality Assurance,* and 10 CFR 830, Subpart A, *Quality Assurance*.

c. Discuss the DOE and contractor requirements and responsibilities for development, review, approval, and implementation of QAPs.

d. Discuss the process for obtaining an exemption to DOE O 414.1A, Quality Assurance and 10 CFR 830, Subpart A, Quality Assurance.

e. Discuss the requirements of DOE O 414.1A, Quality Assurance and 10 CFR 830, Subpart A, Quality Assurance.

f. Referring to DOE Guide 414.1-2, *Quality Assurance Management System Guide for use with DOE O 414.1A and 10 CFR 830, Subpart A*, discuss the implementation of an effective Quality Assurance Program (QAP).

g. Referring to DOE G 414.1-2, discuss the shared attributes of quality and safety management systems and the methods for integrating the implementation of the DOE Safety Management System and QAP.

h. Discuss the purpose, benefits, and restrictions of the graded approach in the implementation of DOE quality assurance requirements.

i. Referring to DOE Guide G 450.4-1 discuss the objectives, requirements, and implementation of DOE O 414.1A, Attachment 2, "Safety Issue Corrective Action Process" for reporting, tracking, and resolution of quality problems.

2. QA personnel shall have a working level knowledge of the QAP requirements identified in their organization and the contractor's QA documents.

Supporting Knowledge and/or Skills

a. Describe the purpose and elements of an effective QAP.

b. Discuss line management's responsibilities for the QAP.

c. Describe the graded approach for application of quality requirements.

d. Discuss stop work authority as it relates to:

- Origin of stop work authority
- Intended purpose
- Legal implications

3. QA personnel shall have a working level knowledge of the application of appropriate regulations, codes, and consensus standards to DOE QAP implementation.

Supporting Knowledge and/or Skills

a. Discuss the applicability of NRC and EPA QA regulations to the organization's activities.

b. Describe the general relationship and applicability of the following documents (or the latest version) to DOE QA requirements:

- American Society for Quality ASQ-E4, *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs*;
- ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*;
- ASQ Q9001, *Quality Management Systems - Requirements*;
- DOE/RW/0333P, *Quality Assurance Requirements and Description*;
- ISO 14001, *Environmental Management System*; and
- DOE Nuclear Weapons QA Requirements QC-1.

c. Describe the relationship of consensus standards adopted by DOE and contractor organizations to the DOE quality requirements and any enhancements to the standards that are necessary to meet DOE requirements.

4. QA personnel shall have a familiarity level knowledge of the DOE Regulations, Orders, and Standards generally applicable to DOE contracts, programs, and projects that affect QA. For example:

- 10 CFR 970, *Department of Energy Acquisition Regulations (DEAR), DOE Management and Operating Contracts*
- DOE O 430.1, *Life-Cycle Asset Management*
- DOE O 413.3, *Program and Project Management for the Acquisition of Capital Assets*
- DOE 0 200.1, *Information Management Program*
- DOE Notice 203.1, *Software Quality Assurance*
- DOE O 250.1, *Directives System Order*
- DOE O 360.1, *Federal Employee Training*
- DOE O 425.1, *Startup and Restart of Nuclear Facilities*

- DOE O 5480.19, *Conduct of Operations for DOE Facilities*
- DOE O 433.1, *Maintenance Management Program For DOE Nuclear Facilities*
- DOE-STD-1073, Parts I & II, *Guide for Operational Configuration Management Program*
- DOE O 435.1, *Radioactive Waste Management*
- DOE O 451.1B, *National Environmental Policy Act Compliance Program*
- DOE O 460.2, *Departmental Materials Transportation and Packaging Management*
- DOE O 470.1, *Safeguards and Security Program*
- DOE O 151, *Comprehensive Emergency Management*
- DOE O 442.1, *Department of Energy Employee Concerns Program*
- DOE O 225.1, *Accident Investigation*
- DOE O 232.1, *Occurrence Reporting and Processing of Operations Information*
- DOE O 210.1, *Performance Indicators and Analysis of Operations Information*
- DOE Guide 430.1-2, *Implementation Guide for Surveillance and Maintenance During Facility Transition and Disposition*
- DOE Guide 430.1-3, *Deactivation Implementation Guide*
- DOE Guide 430.1-4, *Decommissioning Implementation Guide*
- DOE N 221.6, *Reporting Fraud, Waste, and Abuse*

- DOE-STD-1082-94, *Preparation, Review, and Approval of Nuclear Safety Requirements*
- DOE-STD-1083-95, *Requesting and Granting Exemptions to Nuclear Safety Rules*
- DOE-STD-7501-99, *The DOE Corporate Lessons Learned Programs*

Supporting Knowledge and/or Skills

a. Discuss the applicability, purpose, scope and impact of the above DOE Regulations, Orders, and Standards.

b. Discuss the authorities, roles, and responsibilities of QA personnel with regard to the above documents.

5. QA personnel shall have a working level knowledge of channels to maintain communication with Headquarters, field elements, and the public.

Supporting Knowledge and/or Skills

a. Identify the various internal and external groups with whom quality assurance personnel must interface in the performance of their duties.

b. Describe DOE's organization and discuss DOE's procedures for communicating between organizational elements.

c. Describe DOE's procedures and policies for communicating with regulatory agencies and other stakeholders.

6. QA personnel shall demonstrate the ability to effectively communicate (both orally and in writing) with the contractor, stakeholders, and other internal and external organizations.

Supporting Knowledge and/or Skills

a. Demonstrate written communication skills as applicable in the development of:

- Assessment reports
- Technical reports
- Technical papers
- QAP
- Work process documents (e.g., procedures)

b. Demonstrate effective and appropriate communications skills during interactions with contractors.

7. QA personnel shall demonstrate a working level knowledge of control of documents and records.

Supporting Knowledge and/or Skills

a. Describe the role of documents for prescribing processes, the specification of requirements, and the establishment of design.

b. Define and explain the control of documents and records.

c. Describe implementation techniques and/or procedures for the development and control documents and records.

d. Discuss methods of record storage and retrieval requirements.

e. Discuss the definitions of "temporary records," "lifetime records," and "permanent records." Identify the sources of requirements and describe how different types of records are maintained.

f. Discuss the management requirements contained in DOE O 200.1, *Information Management Program*

B. GENERAL TECHNICAL, PERFORMANCE

1. QA personnel shall demonstrate a working level knowledge of the processes for performing work to established technical standards, administrative controls, and other hazard controls to meet regulatory or DOE requirements

Supporting Knowledge and/or Skills

a. Describe the methods used to identify work to be performed and the associated hazards (e.g., FEOSH).

b. Describe the methods for approving work process controls, such as procedures or instructions.

c. Discuss the use of approved work process controls to conduct work.

2. QA personnel shall demonstrate a working level knowledge of the processes for identification, marking, and control of items.

Supporting Knowledge and/or Skills

g. Discuss methods of identifying and controlling items that have been procured and accepted.

h. Discuss methods for the control of items during handling, storage, and shipping.

i. Describe methods for assuring that items remain properly identified throughout their life cycle.

3. QA personnel shall have a familiarity level knowledge of maintenance management practices. Reference DOE O 433.1, *Maintenance Management Program For DOE Nuclear Facilities*

Supporting Knowledge and/or Skills

a. Define each of the following maintenance-related terms and explain their relationship to each other.

- Corrective
- Planned
- Preventive
- Reliability-centered
- Predictive

b. Describe the elements of an effective work control program and the documentation used to control maintenance.

c. Discuss the relationship between maintenance and Conduct of Operations, QA, and Configuration Management.

d. Discuss the storage and maintenance requirements for parts, materials, and equipment.

e. Describe the difference between temporary and permanent repairs/work and the requirements and controls to prevent inadvertent modifications.

4. QA personnel shall demonstrate a familiarity level knowledge of the processes for design and engineering practices.

Supporting Knowledge and/or Skills

a. Describe methods of identifying and controlling design inputs, design processes, and design outputs.

b. Discuss different methods of design analysis and design changes, and state how they are documented and controlled.

c. Identify the methods of design verification and describe their relative advantages and disadvantages.

d. Discuss the controls for computer software used to originate design solutions and design verification.

5. QA personnel shall demonstrate a familiarity level knowledge of the computer software quality assurance.

Supporting Knowledge and/or Skills

a. Discuss the objectives, applicability, requirements, and responsibilities prescribed in DOE Notice 203.1, *Software Quality Assurance*.

6. QA personnel shall demonstrate a familiarity level knowledge of the procurement processes.

Supporting Knowledge and/or Skills

a. Discuss the relationship between the organization with technical authority over the procurement (engineering) and: the organization that negotiates and executes the purchase (buyer); ESH&Q organizations; and, the receiving/storage organization.

b. Discuss the importance of clearly specifying the contents (especially technical and quality requirements) of procurement documents.

c. Discuss the purpose and methods of supplier qualification during a typical procurement process, including the process approach used to evaluate the supplier.

d. Discuss the purpose and methods of supplier performance monitoring.

e. Discuss the methods for assuring that suppliers continue to provide acceptable items and services.

f. Discuss the purpose and importance of acceptance inspection(s) during a typical procurement process.

g. Discuss the purpose and importance of supplier documentation and controls.

h. Discuss the purpose and methods of commercial grade item dedication process for items important to safety.

7. QA personnel shall have a working level knowledge of suspect/counterfeit items.

Supporting Knowledge and/or Skills

a. Discuss the suspect and counterfeit item controls and reporting requirements contained in DOE O 440.1, *Worker Protection Management* for DOE Federal and Contractor Employees.

b. Discuss the suspect/counterfeit item notification and reporting requirements in DOE Order O 440.1, and guidance in G 440.1-6, *Implementation Guide for use with Suspect/Counterfeit Items*

Requirements of DOE O 440.1, Worker Protection Management; 10 CFR 830.120; and DOE 0 414.1A, Quality Assurance, and DOE O 232.1, *Occurrence Reporting and Processing of Operations Information.*

8. QA personnel shall have a working level knowledge of testing and inspection techniques and methods.

Supporting Knowledge and/or Skills

a. Describe the use of dimensional measurement devices (e.g., proper instruments used for degree of accuracy required, temperature, cleanliness, and calibration effects on instruments as well as work pieces).

b. Discuss the basic operating principles of the following:

- Nondestructive examination (NDE) methods such as visual, radiography, magnetic particle, liquid penetrant, ultrasonic, spectral analysis, hardness tests, and eddy current.
- Destructive examination methods such as tensile tests, compression tests, fatigue tests, bend tests, and metallurgical sectioning.
- Control of non-conforming material and processes as the result of tests and inspections and in production settings.

c. Discuss the advantages, disadvantages, and inherent limitations of destructive and nondestructive examination methods.

d. Describe testing and inspection methods commonly used in the following areas:

- Electrical
- Mechanical
- Chemical
- Soil and concrete
- Welding/fabrication
- Computer software

9. QA personnel shall have a working level knowledge of inspection and test planning methodology.

Supporting Knowledge and/or Skills

a. Discuss the criteria/logic used to determine critical characteristics that need to be verified through inspection (i.e., operational and design requirements) and testing.

b. Describe the merits of inspection at source, receipt, in process, and final stages.

c. Compare the advantages and disadvantages of inspection by item attributes versus inspection of process variables.

10. QA personnel shall have a working level knowledge of metrology and calibration systems.

Supporting Knowledge and/or Skills

a. Discuss the use of primary, secondary, and working standards.

b. Discuss the purpose and application of calibration systems with respect to:

- Process/product quality
- Accuracy
- Precision

c. Discuss the requirements for calibration programs contained in the following:

- 10 CFR 830, Subpart A, *Quality Assurance*

- DOE O 414.1A, *Quality Assurance* requirements applicable to *Work Processes* and *Inspection and Testing,* regarding Control of measurement and test equipment

- ASME NQA-1-2000, *Quality Assurance Requirements for Nuclear Facility Applications,* Basic Requirement 12 (with appropriate guidance), regarding control of measurement and test equipment.

d. Discuss the components of an effective calibration recall system.

e. Discuss the importance of calibration traceability.

f. Discuss methods for determining a proper calibration interval.

11. QA personnel shall have a familiarity level knowledge of statistical process control and sampling procedures for work processes, inspection/testing, and quality improvement.

Supporting Knowledge and/or Skills

a. Discuss the following statistical terms and their inter-relationships:

- Mean
- Median
- Mode
- Variance
- Mean variance
- Standard deviation

b. Discuss in general, the following sampling procedures:

- Simple random sampling
- Stratified sampling
- Cluster sampling
- Systematic sampling
- Acceptance sampling

c. Discuss the terms “confidence interval” and “confidence limit.”

d. Discuss control charts and their relationship to statistical process controls.

C. ASSESSMENT, OVERSIGHT AND IMPROVEMENT

1. QA personnel shall demonstrate a working level knowledge of assessment principles and techniques. Reference DOE G 414.1-1, *Management Assessment and Independent Assessment*

Supporting Knowledge and/or Skills

a. Describe the assessment requirements applicable to DOE and contractor organizations.

b. Explain the essential elements of assessments, the relationship and differences between management and independent assessments, and the role of quality assurance personnel relative to the two assessment types.

c. Describe how the results of management assessments are used by management to improve their management processes

d. Describe how the results of independent assessments are used by the management assessment process.

e. Describe the fundamental differences between performance and compliance based assessments.

f. Describe the contents of a typical assessment report.

g. Explain the essential elements and processes associated with the following assessment activities:

- Plan and schedule
- Management of the Assessment Team
- Communicating team findings
- Analyzing data and determination of overall performance
- Conduct of exit interviews
- Closure process, tracking to closure, and follow up
- Corrective action implementation

h. Discuss the conduct of formal meetings between DOE management and senior contractor management to discuss results of quality assurance assessments.

i. Discuss the ethical responsibilities of quality assurance personnel when conducting assessments.

2. QA personnel shall have a working level knowledge of quality improvement principles and processes. Reference DOE G 414.1-2, *Quality Assurance Management System Guide*.

Supporting Knowledge and/or Skills

a. Identification of quality problems (includes clearly defined variations from requirements).

b. Resolution of quality problems.

c. Analysis and prioritization of quality problems to identify immediate, short-term and long term corrective as well as preventive measures.

d. Quality improvement including feedback, monitoring, method of measuring effectiveness, and programmatic adjustments.

3. QA personnel shall have a working level knowledge of quality improvement methods including: problem analysis techniques used to identify problems/potential improvements; analysis tools to determine potential causes of problems; and systems to identify track and complete corrective action(s) or improvement opportunities. Reference G 414.1-1, G 450.4-1 and G 414.1-2.

Supporting Knowledge and/or Skills

a. Describe the application of effective problem analysis principles and techniques including the following:

- Root cause analysis
- Causal factor analysis
- Change analysis

- Barrier analysis
- Management Oversight Risk Tree (MORT) analysis

b. Describe the application of root cause analysis processes in the establishment of corrective actions and improvement opportunities.

- Event and causal factor charting
- Root cause coding
- Generation of recommendation(s)

c. Describe various data gathering techniques and the use of trending and history when analyzing problems.

d. Using event report information apply any problem analysis techniques to identify the problems and how they could have been avoided.

4. QA personnel shall have a working level knowledge to trend performance.

Supporting Knowledge and/or Skills

a. Discuss the key process methodology used in the trending analysis of operations information.

b. Using an actual list of performance measures, determine what type of assessments should be performed and in what areas.

c. Given a set of assessment report data for a specified period, analyze the information for quality trends or compliance problems.

5. QA personnel shall have a working level knowledge of how to conduct independent assessments of the contractor's approved QAP implementation in accordance with all applicable QA requirements and standards. Reference G 414.1-1 and G 414.1-2.

Supporting Knowledge and/or Skills

a. Discuss the means for determining the adequacy and effectiveness of a work activity being assessed.

b. Discuss some criteria that may be used by line management to determine the significance of issues or observations.

c. Describe possible assessment alternatives when actual work activities cannot be observed.

d. Discuss conventional assessment team member qualification requirements.

e. Describe the benefits of monitoring or surveillance of contractor activities.

f. Discuss how QA criteria are evaluated in a readiness review.

g. Discuss "performance-based" assessment method of a quality assurance program.

6. QA personnel shall have a working level knowledge of how to oversee the effective implementation of appropriate QA criteria. Reference G414.1, and P 450.5 Line ES&H Oversight.

Supporting Knowledge and/or Skills

a. Describe the goals, objectives, and methods used to conduct effective oversight of QA activities contained in 10 CFR 830, Subpart A, *Quality Assurance*, and DOE G 414.1-2, *Quality Assurance Management System Guide*.

b. Evaluate the organizational effectiveness in conforming to selected elements of the QAP such as:

- Management assessment
- Quality improvement
- Actual performance to schedule
- Performance of Corrective action

c. Discuss the reporting techniques for communicating evaluation results to DOE and contractor management.

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APPENDIX A - CONTINUING EDUCATION, TRAINING AND PROFICIENCY PROGRAM

The following list represents suggested continuing education, training, and other opportunities that are available for QA personnel after completion of the competency requirements in this technical Functional Area Qualification Standard. It is extremely important that personnel involved with QA activities maintain their proficiency through continuing education, training, reading, or other activities such as workshops, seminars, and conferences. The list of suggested activities was developed by the SMEs involved in the development of this Functional Area Qualification Standard but is not all inclusive.

Based on the knowledge and experience of the SMEs, it is suggested that continuing learning activities are necessary to maintain proficiency in the QA functional area after completion of the competencies in the Standard and other requirements of the Technical Qualification Program.

LIST OF CONTINUING EDUCATION, TRAINING AND OTHER PROFICIENCY RELATED ACTIVITIES

1. Technical education and/or training coverage topics directly related to the assigned duties and responsibilities of QA personnel as determined by management. This may include courses and/or training provided by:

    - DOE
    - Other government agencies
    - Outside vendors
    - Educational institutions

2. Training covering topics that address identified deficiencies in the knowledge and/or skills of QA personnel.

3. Training in areas added to the QA Functional Area Qualification Standard since initial qualification.

4. Specific continuing training requirements should be documented in Individual Development Plans.

5. Participation in activities required to maintain QA related certification, such as:

    - Lead Auditor qualification to: ASME NQA-1, ASQ 10011 (19011) ASQ E-4,or DOE RW-0333 P

- AWS Certified Welding Inspectors
- ASNT Nondestructive Examination Personnel
- ASQ Certified Lead Auditor/Quality Engineer/Quality Manager
- NEC Inspector Certification

6. Participation in activities recommended for maintaining proficiency, such as:

   - QA related audits, surveillance, operational readiness reviews
   - QA related training, workshops, seminars, and conferences

   (Organizations may establish minimum amount of “field time” overseeing QAP implementation.)

CONCLUDING MATERIAL

Review Activity:

DOE
DP-NNSA
EH
EM
NE
NN-NNSA
RW
SC
FE

Field Offices
AL
CH
ID
NV
OR
RL
SF
SR
Fernald
Oak
RF

Area Offices
Amarillo Area Office
Kirtland Area Office
Princeton Area Office
Rocky Flats Area Office
Los Alamos Area Office

Preparing Activity:
DOE-EH-53

Project Number:
TRNG-0018