

Department of Energy
FEDERAL TECHNICAL QUALIFICATION PROGRAM

Weapon Quality Assurance Professional
Program-Specific Qualification Standard



FTCP-PSQS-1125-2021

This document
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APPROVAL

Per Department of Energy (DOE) Order (O) 426.1B, the Federal Technical Capabilities Panel (FTCP) is responsible for concurring on Program-Specific Qualification Standards (PSQS). The signatures below indicates approval and concurrence with this PSQS.

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ACKNOWLEDGMENT

The Department of Energy (DOE) / National Nuclear Security Administration (NNSA) Office of Stockpile Production and Integration (NA-121) developed this Weapon Quality Assurance (WQA) Professional Program-Specific Qualification Standard (PSQS), with support from the National Training Center (EA-50) FTCP Support Office.

The organizations and specific personnel that contributed to the development of this PSQS were as follows:

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INTRODUCTION

This Program-Specific Qualification Standard (PSQS) establishes a core set of performance competencies for fulfilling the duties and responsibilities of Weapon Quality Assurance (WQA) Professionals for a typical Department of Energy/National Nuclear Security Administration (DOE/NNSA) organization. Any additional competencies needed to fulfill organizational-specific duties and responsibilities of a WQA Professional should be included in an Organization-Specific Qualification Standard (OSQS).

The governing directives for NNSA Technical Qualification and Continuing Training (CT) are DOE O 426.1B, *Department of Energy Federal Technical Capabilities* and NNSA SD 426.1, *Technical Qualification Program (TQP)*. As specified in DOE O 426.1B, a PSQS was determined to be applicable for WQA Professionals in order to provide a defined and consistent qualification program to ensure personnel have technical competence commensurate with their oversight responsibilities.

PURPOSE

The DOE/NNSA, NA-121, developed this PSQS to establish a common set of performance competencies for personnel fulfilling the duties and responsibilities of a WQA Professional for a typical DOE/NNSA organization. The content of this PSQS should be referenced and used as appropriate to develop vacancy announcements, crediting plans, interview questions, and other criteria associated with the recruitment, selection, and internal placement of personnel assigned this PSQS.

This PSQS specifies the competencies and supporting knowledge and or skill elements that must be met to successfully complete qualification as a WQA Professional. Satisfactory and documented completion of the performance competency requirements and the knowledge and skill evaluation elements contained in the PSQS ensure that the WQA Professional possesses the requisite knowledge and skills to fulfill their WQA duties and responsibilities in support of the DOE/NNSA mission.

This PSQS was developed using the systematic approach to training to identify the knowledge, skills, and abilities required for successful task performance, and specifies performance competencies based on task performance. Tasks included in this PSQS were primarily derived from the NNSA Policy (NAP) 401.1, *Weapon Quality Policy*. Consistent with DOE O 426.1B, this PSQS includes mandatory performance activities (MPAs) for tasks considered critical for demonstrating attainment of the associated technical performance competency. Verification of attainment of the knowledge requirements and MPAs for the performance competencies contained in this PSQS must be documented in the Electronic Technical Qualification Program (eTQP) at: <https://etqp.ntc.doe.gov>.

APPLICABILITY

This PSQS should be assigned to personnel in designated TQP positions who perform tasks associated with weapon quality related duties and tasks. For ease of transportability of qualifications between DOE elements, Program and Field Offices must use this PSQS without modification or addition to the performance competency knowledge requirements. If the

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performance competencies in this PSQS do not closely align with the individual's duties and responsibilities, supervisors, with the concurrence of the local Federal Technical Capability Panel (FTCP) Agent, may elect to develop and assign these individuals a Job-Specific Qualification Standard (JSQS). As described in DOE O 426.1B, a JSQS can be utilized to establish performance competencies specific to a particular job function for DOE personnel who provide assistance, direction, guidance, oversight, or evaluation of contractor technical activities that could impact the safe operation of DOE's defense nuclear facilities. A JSQS may also be assigned to personnel performing oversight of multiple topical areas or job functions unique to a specific mission at a particular site or office. Additionally, an OSQS may be developed to supplement this PSQS and establish unique performance competencies at the headquarters, field element, site, or facility level. Potential OSQS performance competencies might include weapon familiarization courses, site-specific control of stamps, Contractor Assurance Verifications, Inspection Equipment, delegation of authority, or a site-specific Product Acceptance Process.

The applicability of the DOE STD-1146-2017, *General Technical Base (GTB) Qualification Standard (QS) Part A, Knowledge Requirements*, was evaluated during the development of this PSQS, and was determined to not be required for the WQA Professional due to the few pertinent sub-elements of the GTB QS Part A competencies being covered in this PSQS. However, depending on the job duties and responsibilities of personnel assigned this PSQS, supervisors may elect to assign all or a subset of the competencies in Part A of the GTB QS as part of an OSQS or as part of the CT requirements. Per the requirements of DOE O 426.1B, personnel assigned this PSQS must complete the knowledge requirements and MPAs in DOE STD-1146-2017, GTB QS Part B, *Oversight Performance*, prior to or in parallel with attaining the knowledge requirements for the performance competencies in this PSQS.

IMPLEMENTATION

This PSQS includes performance competencies that define the depth of breadth of knowledge required to perform common WQA duties and responsibilities. As noted above, to ensure transportability of qualifications, personnel assigned this PSQS must complete all of the performance competencies without modification, however, Program and Field Offices may supplement this PSQS with a JSQS or an OSQS.

In some cases, the technical competencies in this PSQS apply to specific job tasks that are identified as MPAs. The objective of the MPAs is to determine whether the personnel assigned this PSQS can apply the related knowledge to satisfactorily perform the associated job task.

The following evaluation process is applicable to all MPAs and must be used to evaluate the MPAs identified in this PSQS. MPAs should be performed in the candidate's assigned technical program area. Expectations for evaluating observed MPAs should be based on DOE and NNSA Directive requirements, as well as local implementing procedures.

- Identify expectations (i.e., criteria) for the specific MPA.
- Compare results of the MPA to expectations (criteria) and draw conclusions.
- Document results of the MPA using local procedures for an operational awareness activity.

The MPAs in this PSQS are required to be performed adequately only once, however, if any of the evaluation criteria are not satisfactorily met during performance of the MPA, the designated Qualifying Official (QO) may require the candidate to perform either a portion of the MPA, or the

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entire MPA, again. In these cases, satisfactory completion of the MPA only needs to be documented once. If any of the MPAs in this PSQS are also included in an OSQS, the designated QO only needs to verify completion of the MPA once, however, completion of the MPA must be documented by the QO in both this PSQS and the OSQS.

Candidates should perform the MPAs listed in the PSQS in their normal work environment, such as in assigned facilities or areas where the associated mission work is being accomplished. However, supervisors may use other options to facilitate completion of the MPA requirements in cases where candidates cannot perform the MPAs exactly as written in their normal work environment within the required qualification timeframe. This could include performance of the MPA in a simulated environment or by making minor modifications to the MPA or MPA evaluation criteria to fit local conditions. The reason for any changes in the MPA or MPA evaluation criteria or changes in the method of performance (e.g., simulate or use of exercise materials) must be approved by the supervisor and local FTCP agent, as well as documented in eTQP by the designated QO.

EVALUATION CRITERIA

Personnel enrolled in the TQP must document the attainment of performance competency knowledge requirements and MPAs listed in this PSQS in accordance with the TQP plan or policy of the organization qualifying the individual, as well as the requirements in DOE O 360.1C, *Federal Employee Training*, and DOE O 426.1B, *Federal Technical Capabilities*. The competency statements and supporting knowledge and/or skill evaluation elements included in this PSQS define the required knowledge and/or skills that an individual must possess. Each performance competency includes knowledge requirements that need to be completed in order to demonstrate the performance competency has been met. Attainment of the performance competency knowledge requirements listed in this PSQS must be verified by a designated QO using one or more of the following methods identified in DOE O 426.1B:

- Satisfactory completion of a written examination
- Satisfactory completion of an oral evaluation
- Documented evaluation of equivalencies
- Completion of approved training courses that confirm attainment of specific knowledge requirements

As discussed above, successful completion of any MPAs associated with the performance competencies in this PSQS must also be verified by a designated QO. The QO must verify that the evaluation criteria, including any organization specific requirements, are satisfactorily met during observation of the MPA and/or review of the results of the MPA. Satisfactory attainment of the performance competency knowledge requirements and MPAs contained in this PSQS must be documented using the WQA Professional PSQS qualification card in the eTQP at <https://etqp.ntc.doe.gov>.

After verification of attainment of all the performance competency knowledge requirements and the MPAs in this PSQS, the WQA professional participant must satisfactorily complete the final qualification activity requirements identified in DOE O 426.1B and any other applicable organization specific requirements before being designated as qualified to the WQA Professional PSQS.

EDUCATION AND EXPERIENCE

The Office of Personnel Management (OPM) determines minimum qualification requirements for job positions as well as alternatives to meeting the specified requirements. The preferred education and experience for the WQA Professional listed below neither alters nor limits the authority of DOE/NNSA managers or supervisors to assign duties and responsibilities to employees, as necessary, in order to accomplish their assigned mission.

WQA Core-Level Professional preferred education and experience are as follows:

Education:

- A High School Diploma or equivalent, with emphasis on technical or vocational curriculum; preferably including quality assurance, statistics, mathematics, production management, industrial management, computer science, engineering, engineering technology, physical sciences, textiles, or other relevant fields. At the discretion of the employer, other disciplines and employer training may also be appropriate, based on the duties to be performed as well as taking into consideration the experience gained in performing quality assurance-related activities.

Experience:

- Two to three years of related work experience, during which quality assurance, quality control, quality inspection, quality systems, product realization, or other quality functions were used/employed. Industrial, military, federal, state, or other directly-related background that has provided specialized experience relevant to WQA may also be considered.

Note: In addition to the preferred education and experience stated above, certifications such as National Lead Auditor Certification (e.g., NQA-1, ISO 9001, etc.), Certified Quality Auditor (CQA), American Society for Quality (ASQ), Certified Quality Engineer (CQE), or Certified Quality Manager (CQM) may serve as the basis for equivalency of competencies in this PSQS.

WQA Engineer-Level Professional preferred education and experience are as follows:

Education:

- A Bachelor's degree in engineering or physical science, that includes studies in quality assurance, statistics, mathematics, production management, industrial management, computer science, engineering, engineering technology, physical sciences, or other relevant fields, or which meets the alternative requirements specified for engineers or scientists by the OPM to satisfy educational requirements. At the discretion of the employer, a Bachelor's degree in another discipline may be determined to be appropriate, based on the duties to be performed as well as taking into consideration the experience gained in performing quality assurance-related activities.

Experience:

- Three to five years of experience in fields such as nuclear weapon (NW) quality assurance and/or quality control; design and development; testing and evaluation;

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weapon quality assessments; quality inspection; product realization; industrial or production planning; research and engineering; or test evaluation that provided: (1) familiarity with quality assurance or related work; (2) pertinent product or process knowledge and skill; (3) ability to interpret and apply contract requirements and engineering specifications; and (4) experience as an inspector, auditor, or assessor. Industrial, military, federal, state, or other directly-related background that has provided specialized experience relevant to WQA may also be considered.

Note: In addition to the preferred education and experience stated above, certifications such as National Lead Auditor Certification (e.g., NQA-1, ISO 9001, etc.), CQA, ASQ, CQE, or CQM may serve as the basis for equivalency of competencies in this PSQS.

FORMAL TRAINING TO SUPPORT INITIAL QUALIFICATION

Personnel may attend training courses to support attainment of select knowledge requirements and practice of mandatory performance activities included in this PSQS.

Acceptable methods for completing initial training (and CT) include:

1. Formal/Classroom training: for example, attendance at DOE-sponsored technical training, such as that provided by the NTC, or other courses;
2. Structured self-study;
3. Symposiums, seminars, workshops; and
4. Walkthroughs, tours.

Training resources in support of the initial training and CT associated with this PSQS can be found at the DOE Learning Nucleus website: <https://learningnucleus.energy.gov/login/index.php>.

CONTINUING TRAINING REQUIREMENTS

Following initial qualification to this PSQS, WQA personnel must participate in an organization-specific Continuing Training Program (CTP) that meets the requirements of DOE O 426.1B and NNSA SD 426.1. The CTP is essential to ensure TQP participants remain current in their technical field of expertise as well as maintain awareness of the policies, practices, and requirements associated with performing their duties. CT includes prescribed training that must be completed on a defined periodicity to maintain qualification after initial qualification.

WQA Professionals must complete a minimum of 80 hours of CT activities and two MPAs over a five-year period. The CTP should address expectations for documenting satisfactory completion of CT activities during the five-year time period, as well as completion of an annual update to the CTP. Additionally, the candidate's CTP and Individual Development Plan should align.

TQP participants can maintain proficiency in an assigned TQP-designated position by satisfactorily performing and documenting their performance of duties in that position, such as activities and written products produced in support of mission requirements. For tasks that are infrequently performed or where there are no site-specific opportunities for observing actual performance, WQA Professionals may use exercises conducted during formal classroom

training or locally-developed exercises to maintain proficiency. Participants may also meet CT requirements through collaborative efforts, such as group training with other TQP participants.

DUTIES AND TASKS

This section identifies the **tasks** required for the WQA Professional **Core Level** and **Engineer Level**, which were primarily derived from NAP-401.1. Due to the diverse nature of WQA, all WQA Professionals need to be able to complete the **Core Level** tasks. Additionally, personnel assigned as a Weapon Quality Engineer must also complete the tasks specified for the **Engineer Level**. The corresponding competencies and MPAs are identified below. Where a task or competency is not applicable to all entities, the responsible/applicable entity (i.e., Field/Production Office [F/PO] or NNSA Headquarters Weapon Quality Division [HQ WQD]) is identified in brackets.

CORE LEVEL TASKS

1. Monitor Management and Operating (M&O) Contractor compliance with the DOE and NNSA Directives/Policies that govern WQA, including NAP-401.1, *Weapon Quality Policy*, as well as the weapon quality requirements within the NNSA Defense Programs processes for directing, managing, operating and executing programs at production facilities and laboratories within the Nuclear Security Enterprise (NSE), which are maintained on the Defense Programs Business Process System (DPBPS) Portal/website.
2. Perform oversight of weapon quality functions/activities, consistent with DOE and NNSA Directives/Policies and DPBPS processes that govern and implement WQA requirements as well as the respective organization's Quality Assurance Activities Plan (QAAP), including conducting Quality Assurance Surveys (QASs) and assessments, as assigned, to: evaluate WQA program performance of NNSA, NNSA contractors, and subcontractors throughout the product lifecycle; effect weapon quality improvements where needed; and obtain quality evidence upon which to base NNSA acceptance of weapon product and weapon-related product.
3. Collect and analyze M&O contractor performance measures/information to be included in the Quality Report that the F/POs provide to the NNSA HQ WQD. [F/PO]
4. Implement the nonconforming material process for suspect and actual nonconformances, including documenting and transmitting Nonconforming Material Reports (NMRs) and evaluating the M&O contractors' corrective action process to ensure the corrective actions taken (e.g., specific and systemic) are adequate/effective.
5. Conduct NNSA Product Acceptance activities, as assigned, including:
 - a. Utilizing the Quality Instruction List (QIL), Quality Assurance Inspection Procedures (QAIPs), Sampling Plans, and Certificates of Inspection (COI) to perform Verification Inspections to ensure product meets the Design Definition;
 - b. Preparing and/or reviewing Quality Assurance Defect Reports (QADR) to report and manage defects identified during Verification Inspection of submitted material; review associated Contractor Corrective Action Responses (CARs) to evaluate the adequacy of the identified root cause and associated corrective action(s) as well as verify proper disposition of defective material;

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- c. Performing NNSA product stamping for NNSA-accepted product and diverted weapon product; and
 - d. Monitoring contractor performance per the Contractor Delegation Plan for product verification and stamping (if applicable).
6. Interface with appropriate levels of staff and management in federal and contractor organizations across the NSE to assist with timely resolution of WQA challenges/issues, such as facilitating communication between Federal Program Managers (FPMs), the F/PO, and HQ WQD regarding pertinent weapon quality topics (e.g., NMRs, CARs, hardware diversion, product holds, etc.).
 7. Support independent WQA audits (e.g., Office of the Inspector General, Primary Standard Laboratory, etc.).

ENGINEER LEVEL TASKS

1. Provide guidance to FPMs and M&O contractors regarding implementation of NNSA WQA requirements to ensure correct and consistent application across the NSE.
2. Provide expert advice/input to resolve WQA issues and ensure quality requirements are adequately applied to NW design, qualification, production, maintenance, and surveillance, including reviewing and providing feedback regarding WQA deliverables and functions such as Quality Plans, Product/Process Qualification, Supplier Management, and Issues Management.
3. Plan and lead QASs and technical studies (e.g., Root Cause Analyses) to evaluate NNSA and M&O contractor execution of weapon quality requirements, in order to ensure WQA requirements are adequately implemented by the Design and Production Agencies in support of successful product realization for NNSA weapon programs.
4. Research and develop new and revised WQA requirements for use across the NSE to ensure quality principles are adequately integrated into the Directives/Policies that govern the design, development/production, and testing of nuclear weapon and weapon-related processes, components, and equipment, as well as address specific problems encountered at the NSE sites. [HQ WQD]
5. Develop and/or evaluate site-specific quality metrics, data trending analyses, and oversight strategies to evaluate the effectiveness of the M&O contractor's Quality Management System and measure the health of WQA implementation; utilize that information as the basis for developing the QAAP and for preparing the Quality Report that submits M&O contractor performance measures/information to HQ WQD. [F/PO]
6. Evaluate contractor documentation and conformance to requirements, in order to determine applicability of contractor delegation of authority for Verification Inspections and NNSA stamping, and issue Letters of Delegation, as appropriate.
7. Develop quality metrics to identify, track, and trend weapon quality performance across the NSE, including evaluating/analyzing QAAPs, QASs, Quality Reports and NMRs from all of the NSE sites to identify systemic issues and programmatic impact; utilize that information as the basis to develop the HQ WQD QAAP. [HQ WQD]

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8. Perform Product Verification/Product Acceptance planning activities, as assigned, including: [F/PO]
 - a. Identify items requiring verification inspection on the QIL, and ensure the QIL is maintained/updated as necessary;
 - b. Develop and maintain NNSA QAIPs for each part type or family for Verification Inspections, as applicable, and maintain a summary log that records submittals for each QAIP configuration; and
 - c. Select sampling plans that establish the basis and reflect the level of assurance for Verification Inspections.
9. Work collectively across the NSE to build quality principles into solutions, including participating in NNSA-wide WQA working groups (e.g., Quality Forums, WQD Quality Workshop, etc.) to support weapon quality initiatives as well as contribute to resolution of complex NSE weapon quality challenges.
10. Engage with other DOE and NNSA organizations, as well as other stakeholders (e.g., DoD), regarding cross-cutting areas, including Sensitive Compartmented Information (SCI), Nuclear Enterprise Assurance (NEA), and Software Quality Assurance (SQA).

PERFORMANCE COMPETENCIES

The purpose of this section is to identify the **performance competencies** required for the **NNSA WQA Professional Core Level and Engineer Level**. Due to the diverse nature of WQA, all personnel must meet the **Core Level** competency requirements. Additionally, personnel assigned as a Weapon Quality Engineer must also meet the competency requirements specified for the **Engineer Level**.

Note: When regulations, DOE/NNSA directives, or other industry standards are referenced in this PSQS, the most recent revision should be used. It is recognized that some WQA personnel may oversee facilities that utilize prior versions of documents due to contractual reasons. In those cases, the most recent versions of the documents should be included in the candidate's CTP or an OSQS, as applicable.

CORE LEVEL COMPETENCIES

1. The candidate must demonstrate knowledge of applicable WQA requirement documents (orders, directives, manuals, etc.), including the NAP-401.1 *Weapon Quality Policy*, as well as the quality assurance requirements contained in the NSE Product Realization Process, as codified in the DPBPS.

Knowledge Requirements:

- a. Discuss the purpose and main elements of NAP-401.1.
 - b. Discuss the relevant quality management principles for implementing a successful Quality Management System for WQA.
 - c. Discuss the purpose of NNSA SD 452.3-1A, *Defense Programs Business Process System* (DPBPS) and NNSA SD 452.3-2, *Phase 6.X Process*.
 - d. Discuss the purpose and key aspects of each of the DPBPS processes listed below, including how they're relevant to the WQA Professional's implementation of NAP-401.1:
 - Program Direction
 - Core Mission
 - Weapons Acquisition Lifecycle
 - Technology Assessment
 - Program Support
 - Control Product Definition
 - Control Supply Chain
 - e. Discuss the remaining active Development and Production (D&P) Manual Chapters and Technical Business Practices (TBPs) that are relevant to weapon quality.
2. The candidate must demonstrate knowledge of the Department of Energy's approach to implementing quality assurance programs.

Knowledge Requirements:

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- a. Discuss the objectives and applicability of the DOE quality requirements, including the relationship between DOE O 414.1D, Chg. 1, *Quality Assurance*, and NAP-401.1, *Weapon Quality Policy*.
 - b. Discuss 10 CFR 830.4, *General Requirements*; 10 CFR 830, Subpart A, *Quality Assurance Requirements*; and DOE O 414.1D, Chg. 1, including the federal responsibilities and the applicability of the requirements to DOE and its contractors.
 - c. Describe the requirements in 10 CFR 830 Subpart A and DOE O 414.1D, Chg. 1, that integrate the ISM system description with the Quality Assurance Program.
 - d. Discuss and contrast quality assurance and quality control.
 - e. Explain “Prevention Versus Detection”, including discussing the methods contained in the applicable Site/M&O contractor’s Quality Management System for preventing nonconformance, reducing variability, and building quality into weapon and weapon-related products and processes (e.g., process characterization, mistake-proofing, and reduction of product and process variability).
3. The candidate must demonstrate knowledge of the M&O contractor’s Weapon Quality Program, and how it implements the NAP-401.1 requirements.

Knowledge Requirements:

- a. Discuss applicable Site/M&O contractor’s approach for implementation of weapon quality requirements contained in NNSA Weapon Quality directives/policy, as well as contractual documents, and their flow down to implementing procedures, as documented in the M&O contractor’s Quality Management System for WQA. [FPO]

MPA 3.1: Review and evaluate one M&O contractor management assessment and/or self-assessment against NAP-401.1 requirements.

4. The candidate must demonstrate knowledge of NNSA oversight of weapon quality functions/activities, including their respective organization’s QAAP.

Knowledge Requirements:

- a. Discuss two or more contractor deliverables that are evaluated by NNSA to ensure compliance with NNSA weapon quality requirements.
- b. Discuss the role of the WQA professional in the Product Realization process/requirements contained in NNSA SD 452.3-2, *Phase 6.X Process*, and in DPBPS Content on the DPBPS Website/Portal.
- c. Discuss why the different types/objectives of surveys and assessments are selected when developing the QAAP.

MPA 4.1: Review a QAAP against NNSA weapon quality requirements and discuss which QAAP activities, if any, provide assurance regarding contractor delegations.

5. The candidate must demonstrate knowledge of the QAS process.

Knowledge Requirements:

- a. Discuss the purpose for conducting QASs, and describe the different types of Surveys.

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- b. Describe the basic elements for planning and performing a QAS.
- c. Discuss the definitions for QAS conclusions (i.e., Level 1-3 Findings, Remarks, and Noteworthy Practices) for weapon quality surveys.
- d. Describe the Process for managing QAS Corrective Actions to resolution.

MPA 5.1: Review a QAS 1 Report and analyze the results.

MPA 5.2: Participate as a Team Member on a QAS 1.

MPA 5.3: Support the performance of one QAS 2, one QAS 3, and one QAS 4.

- 6. The candidate must demonstrate knowledge of the implementation of weapon quality requirements and practices in NSE Product Realization processes/operations.

Knowledge Requirements:

- a. Discuss the importance of weapon quality throughout the weapon design process.
- b. Discuss Design/Product Definition requirement(s) (e.g., interchangeability, form, fit, function, critical characteristics).
- c. Discuss the use of geometric dimensioning and tolerancing on product drawings.
- d. Discuss measurement uncertainty, including Test Accuracy Ratios (e.g., 4:1) and guard-banding.
- e. Discuss the DOE/NNSA Standards and Calibration Program (SCP), including:
 - 1) the function and responsibilities of the NSE Primary Standards Laboratory;
 - 2) the respective Site's M&O contractor metrology/SCP program, including their Contractor Standards Laboratory (CSL);
 - 3) commercial calibration laboratories (CCLs), and designated calibration sources (DCSs), as applicable, including the specific measurement fields/parameters, ranges, and uncertainties that they're approved to perform calibrations within;
 - 4) SCP activities conducted by the respective F/PO (e.g., QASs of contractor SCP, participating in PSL survey of contractor SCP, shadowing or participating in contractor assessments/surveys of CCLs and DCSs); and
 - 5) the types of NW production activities normally requiring use of certified measurement standards and Measuring and Test Equipment (M&TE).
- f. Discuss the requirements for: Technology Readiness Level, Manufacturing Readiness Level, Technology Readiness Assessment, and Producibility.
- g. Discuss the NSE Engineering Evaluation Process.
- h. Discuss the function of a QER and describe the three types of QERs (i.e., "acceptable" status QER, "conditional" status QER, and "expired" QER).

MPA 6.1: Review two product drawings, specifically identifying the use of dimensions and tolerances.

MPA 6.2: Review and evaluate an "acceptable" status QER, a "conditional" status QER and an "expired" QER against the QER requirements codified in DPBPS.

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7. The candidate must demonstrate knowledge of the weapon quality metrics and performance measures included in the Quality Report.

Knowledge Requirements:

- a. Explain how your F/PO maintains assessment results, continuous improvement initiatives, and Quality Management System for WQA and weapon activity metrics for your F/PO and respective M&O contractor(s). [F/PO]

MPA 7.1: Review and discuss a Quality Report that was previously submitted to HQ WQD, as required by NAP-401.1, including site performance measures and trends.

8. The candidate must demonstrate knowledge of the nonconforming material processes.

Knowledge Requirements:

- a. Discuss the requirements documents that govern the identification, investigation, correction and disposition of potential and actual non-conforming items/materials.
- b. Describe the requirements and method for reporting nonconforming material delivered between NNSA sites (i.e., Nonconforming Material Reports [NMRs]), the purpose of an NMR, and the different types of NMRs.
- c. Discuss the different methods that can be utilized to control non-conforming items to prevent their use until they've been appropriately dispositioned.
- d. Discuss the following:
 - 1) NMR investigation requirements to determine root cause and corrective action(s); and
 - 2) Extent of condition review and systemic issues.
- e. Discuss the processes and procedures for dispositioning nonconforming material/product.
 - 1) Discuss the options for dispositioning material that does not conform to product definition.
 - 2) Discuss Specification Exception Release (SXR), SXR/SXN Severity Class Criteria, and the corrective action documentation requirements for a Specification Exception Release (SXR).

MPA 8.1: Review both a Shipped Material Report (SMR) and an Incoming Material Report (IMR) against the requirements in NAP-401.1 and DPBPS.

MPA 8.2: Review and evaluate an SXR against the SXR requirements as codified in DPBPS, including discussing the adequacy of the technical basis for the SXR.

9. The candidate must demonstrate knowledge of NNSA product acceptance, including responsibilities, processes, methods, and sampling requirements.

Knowledge Requirements:

- a. Discuss how NNSA attains assurance in support of product acceptance.

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- b. Discuss Product Definition, including the governing requirements in NAP 401.1 and DPBPS.
- c. Describe the M&O contractor testing and inspection processes for certification of product in support of overall NNSA product acceptance, including:
 - 1) the governing requirements for development, qualification and maintenance of Acceptance Equipment;
 - 2) the types and applications of non-destructive/destructive testing; and
 - 3) the use of test data and reporting.
- d. Discuss process control methods that are utilized in weapon production processes, (e.g., statistical process control [SPC] and 100% test and inspection).
- e. Describe the NNSA verification inspection process, including applicable requirements, QILs, QAIPs, reviewing product certification documentation and drawings, and performing/documenting the verification inspection (e.g., COI).
- f. Discuss the process to report defects and disposition defects identified during the verification inspection, including the documentation (e.g., QADR) and corrective action process.
- g. Discuss the requirements for control of measuring and test equipment, including acceptance equipment.
- h. Describe NNSA stamping activities (i.e., which stamps are used for different product/package situations and applications).
- i. Describe the method/process for NNSA approval for delegation (and reauthorization of delegation) of NNSA processes (e.g., NNSA stamping and verification inspections) to the M&O contractor.

MPA 9.1: Review a QIL against the weapon quality requirements.

MPA 9.2: Participate in (i.e., observe/shadow) product acceptance activities that use a QAIP to perform verification inspection.

MPA 9.3: Review a QAIP and QAIP Summary Log against weapon quality requirements to ensure they address the required elements.

MPA 9.4: Review a QADR against the weapon quality requirements.

MPA 9.5: Review a Contractor Corrective Action Response (CAR) for a QADR to evaluate the adequacy of the identified root cause and associated corrective action(s) as well as verify proper disposition of defective material.

MPA 9.6: Evaluate the corrective action process to determine whether corrective actions are preventing recurrence.

MPA 9.7: Review and discuss applicable Contractor Delegation Plan, Letter(s) of Delegation, as appropriate.

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10. The candidate must demonstrate their understanding of their WQA roles and responsibilities, consistent with NNSA Governance, in order to effectively interact with NNSA and contractor peers and management.
 - a. Discuss the roles and responsibilities of the FPM, F/PO and HQ WQD regarding NMRs, hardware diversion, and product holds.

ENGINEER LEVEL COMPETENCIES

The purpose of this section is to identify the **competencies** required at the **Engineer Level** for the WQA Professional. The **Engineer Level** competency requirements listed below are in addition to the **Core Level** competency requirements.

Engineer Level performance competency requirements are as follows:

11. The candidate must demonstrate knowledge and leadership capability to interact with various levels of NNSA, contractor, and stakeholder management and make convincing arguments on weapon quality trade-offs with weapon program objectives based on risk methodologies, quality, and customer impacts.

Knowledge Requirements:

- a. Explain examples of potential near and long-term impacts of inadequate weapon quality implementation.
 - b. Discuss two past experiences briefing leadership on various topics and identify potential methods to broaden/improve one's abilities to communicate effectively with management.
12. The candidate must demonstrate detailed knowledge of the implementation of NAP-401.1 requirements by the NSE design and production agencies as well as sound engineering judgement and expertise required to evaluate the effective implementation of quality assurance requirements.

Knowledge Requirements:

- a. Describe the role of the M&O contractor quality engineer on a Product Realization Team (PRT).
- b. Discuss the importance of the Engineering Authorization (EA) System used by the NSE to document and authorize information pertaining to development, production, surveillance, and dismantlement activities, including:
 - 1) the EA System purpose;
 - 2) the EA Architecture;
 - 3) the purpose of each EA Category;
 - 4) the EA types in each Category; and
 - 5) the set of data captured by each EA type (*DPBPS T040*).
- c. Discuss the Design process/requirements, including:

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- 1) Design Input;
 - 2) Design Process;
 - 3) Design Verification;
 - 4) Traceability;
 - 5) Technical/Design Reviews;
 - 6) Program/Gate Reviews;
 - 7) Design Qualification;
 - 8) Design Documents;
 - 9) Design Change Control and Configuration Management; and
 - 10) Design Records.
- d. Discuss the planning, conducting and documenting of Engineering Evaluations (EEs) used to qualify or re-qualify production or surveillance processes or products.
- e. Discuss the following elements of the procurement process.
- 1) Requirements related to design definition and quality for procurement of weapon product.
 - 2) Supplier evaluation, selection, and monitoring, including NEA considerations.
 - 3) Buyer and supplier responsibilities for determining procured weapon product conformance to design and quality requirements.
 - 4) The purpose and requirements for a Certificate of Conformance.
 - 5) Flow down of responsibilities related to design qualification of procured weapon product from the M&O contractor to the supplier.

MPA 12.1: Attend a PRT meeting.

MPA 12.2: Attend a Design Review and/or Production Review.

MPA 12.3: Review a Qualification Plan and an EE Plan against the DPBPS requirements.

MPA 12.4: Review a purchase order against NAP-401.1 and DPBPS requirements.

13. The candidate must demonstrate knowledge regarding causal analysis techniques.

Knowledge Requirements:

- a. Discuss three different methods used for conducting a Root Cause Analysis (RCA), and the benefits/applications of each.

MPA 13.1: Conduct a RCA or review a previously conducted RCA for adequacy.

14. The candidate must demonstrate knowledge regarding the DOE and NNSA directives processes.

Knowledge Requirements:

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- a. Discuss the directive development process required by DOE O 251.1D, *Departmental Directives Program*, and NNSA SD 251.1B, *Directives Management*.
15. The candidate must demonstrate knowledge of trending and analyzing weapon quality metrics and performance measures which are utilized for corrective action, continuous improvement, objective evidence of performance and oversight planning.

Knowledge Requirements:

- a. Discuss the process to develop and implement metrics and performance measures, validate performance against metrics and performance measures, and trend/analyze data to establish a continuous improvement program.
 - b. Discuss respective organization's QAAP, including the metrics/information used as the basis for developing it and the planned activities for conducting weapon quality oversight of contractor weapon product design, production, verification, and surveillance activities.
16. The candidate must demonstrate detailed knowledge of the Product Verification/Product Acceptance process.

Knowledge Requirements:

- a. Discuss the development, maintenance, and issuance of the QIL.
 - b. Discuss the documented process/procedures for M&O contractor submittal of completed weapon and weapon-related product, including discussing QAIPS.
 - c. Discuss the statistical sampling plan requirements applicable to product acceptance.
 - d. Discuss some of the challenges/issues encountered during NNSA acceptance of product.
17. The candidate must demonstrate knowledge regarding resources/forums that can be utilized to collaborate with WQA colleagues and mentors to support proactive weapon quality initiatives as well as achieve resolution of complex NSE weapon quality challenges.

Knowledge Requirements:

- a. Discuss a collaborative WQA effort that you have participated in, who you collaborated with, and what was the resulting outcome/product.
- b. Describe a WQA issue that you helped resolve, and the resulting benefit/improvement for the NSE.

MPA 17.1: Attend an NSE Quality Forum or WQD Quality Workshop.

18. The candidate must demonstrate knowledge of cross-cutting areas, such as SCI, NEA, and SQA.

Knowledge Requirements:

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- a. Review and discuss SCI requirements contained in DOE O 5639.8A, *Security of Foreign Intelligence Information and Sensitive Compartmented Information Facilities*.
- b. Review and discuss the NEA requirements contained in DOE/NNSA Directives and DPBPS, including DOE O 452.4, *Security and Use Control of Nuclear Explosives and Nuclear Explosives*; DOE O 452.1E, *Nuclear Explosive and Weapon Surety Program*; NNSA SD 452.3-2, *Phase 6.X Process*; and DPBPS documents.
- c. Discuss the SQA requirements in DOE O 414.1D and NAP-401.1.
- d. Discuss the process-specific quality requirements required to be implemented under a Quality Assurance Program for the control of nuclear safety software.
- e. Identify the processes/procedures used by the M&O contractors for Software development, testing, use control, and error reporting and correction.

MPA 18.1: Review and discuss NEA Documents, including a Program Protection Plan/Program Trust Assurance Plan and a Trust Assurance Case/Program Trust Assurance Report, against the requirements in DOE/NNSA Orders/Directives, NAP-401.1 and DPBPS.

MPA 18.2: Formally assess (e.g., QAS-4) M&O contractor implementation of NEA or SQA.