DEPARTMENT OF DEFENSE
Defense Contract Management Agency

PAMPHLET

Quality Assurance Engineer (QAE)

DCMA-QA PAM 300.1
OPR: Quality Assurance (DCMA-QA) **5 March 2012**

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1. PURPOSE. This Pamphlet provides guidelines for DCMA Quality Assurance Engineers (QAE) operating at the strategic, operational, and tactical levels throughout the agency.

2. APPLICABILITY. This Pamphlet applies to all DCMA activities.

3. RELEASABILITY – UNLIMITED. This Pamphlet is approved for public release.

4. EFFECTIVE DATE. This Pamphlet is effective immediately.

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Executive Director
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REFERENCES

(a) FAR Part 42.302(a)(38, 46, and 47), Contract Administration Functions
(b) FAR Part 46, Quality Assurance
(c) DCMA Instruction, "GCQA Surveillance Planning"
(d) DCMA Instruction, "First Level Supervisory Review - QA"
(e) DCMA Instruction, "Contract Technical Review - QA"
(f) DCMA Instruction, "Customer Complaints"
(g) DCMA Instruction, "First Article Testing
(h) DCMA Instruction, "GIDEP and DCMA Forum Regarding Defective/Nonconforming Product and Process Notifications"
(i) (FAR 52.246-11
(j) DCMA Instruction, "Quality System Audit - QA" (Unpublished at issuance of Pamphlet)
(k) DCMA Instruction "Nonconforming Material Control"(Unpublished at issuance of Pamphlet)
(l) DCMA Instruction, "Safety of Flight (SOF)"
(m)DFARS 252.228-7001
(n) MIL-HDBK-61A, Section 6.3, Configuration Management Guidance
(o) DCMA Instruction. "Military DAWIA Training"
(p) DCMA Instruction, "QA Development"
(q) DoD Directive 5105.64, "Defense Contract Management Agency (DCMA) ," September 27, 2000

CHAPTER 1

QAE GUIDANCE OVERVIEW

1.1. OVERVIEW.

1.1.1. Advancing technology and enhanced manufacturing processes place high demands on assuring the quality of supplies being procured across the DoD acquisition enterprise as well as NASA and Missile Defense Agency acquisitions. Also, quality assurance (QA) system requirements have become increasingly complex. FAR Part 42.302 (a)(38, 46, and 47) (Reference (a)) and FAR Part 46 (Reference (b)) and prescribe certain contract administration responsibilities with QAE implications as normal for DCMA performance unless specifically withheld by the purchasing activity.

1.1.2. The QAE function is performed on acquisition program contracts usually during the Production & Deployment and Operations & Support phases on DoD projects; i.e., post Milestone C of the Defense Acquisition System. However, QAEs should also be focused on determining the adequacy of a supplier's QA planning and process controls that have a direct impact on final product quality. These activities may occur prior to Milestone C. The Engineering & Analysis (E&A) Directorate retains the responsibility for core engineering activities.

1.2. QUALITY ASSURANCE ENGINEERING PROGRAM.

1.2.1. This Pamphlet focuses on the primary responsibility of support to the QA organization performing DCMA's QA mission and the secondary responsibility of overall processes and procedures related to QA operations within DCMA, as well as at suppliers. These focus areas are divided into two broad programs:

1.2.1.1. Quality Assurance Representative Assistance Program (QARAP). This program provides guidance and procedures for the performance of QAE assistance to QARs in support of the DCMA Government Contract Quality Assurance (GCQA) mission.

1.2.1.2. Quality Assurance Engineering Support Program (QAESP). This program provides the guidance and procedures relative to broader QAE responsibilities performed at the strategic, operational, and tactical levels throughout the agency.

1.2.2. The QARAP and QAESP are described in detail in Chapters 3 and 4 respectively of this Pamphlet. Chapter 5 provides a single repository for definitions and descriptions, listed alphabetically, referenced in the guidance and procedures of the QARAP and QAESP.

CHAPTER 2

QAE MANAGEMENT STRUCTURE

2.1. HEADS OF DCMA QA-HQ AND OPERATIONS.

2.1.1 The heads of the DCMA headquarters (HQ) Quality Directorate and the Quality Division of the Operations Directorates are responsible for the overall performance of the QAE function. Quality management personnel in operational level organizations that employ QAEs are responsible for performance of the QAE in their organizations.

2.2. DCMA QAE MANAGEMENT.

2.2.1. QAE activities are to be developed and documented in the applicable DCMA Instruction, "GCQA Surveillance Planning" (Reference (c)) to support contracts, customer programs, and broader QAE responsibilities in support of the GCQA mission. QA management should assure that these strategies are developed and that they provide for an integrated approach between the QAE and QAR whenever appropriate. The plan is to clearly identify which activities are performed by the QAE and those performed by the QAR.

2.2.2. QA management is to also ensure that QAEs provide technical assistance when requested in accordance with the QARAP in the most effective manner; i.e., on designated contracts; by product line; on a geographic basis covering appropriate facilities within an area; on an individual facility basis where special emphasis is required (this could result in assignment of a QAE as the QAR); on a functional basis such as for first articles or non-destructive testing; or, on a combination of the above. QA management will also assure QAEs perform the quality assurance engineering responsibilities included in the QAE Pamphlet.

CHAPTER 3

QUALITY ASSURANCE REPRESENTATIVE ASSISTANCE PROGRAM (QARAP)

3.1. QARAP OVERVIEW.

3.1.1. The QARAP provides a process for QAE assistance to QARs in support of the DCMA GCQA mission. This process applies to engineers (i.e., 0800 series) in QAE positions or performing QAE responsibilities at the strategic, operational, and tactical levels. QAE support can be initiated by a QAR requesting assistance through their first line supervisor (FLS) or through a management decision to assign QAE support.

3.1.2. QAEs will provide technical assistance to QARs in support of GCQA programs at specific supplier facilities. The intent is for the QAR and QAE to jointly develop and execute the best solutions to ensure contract compliance, accept product, and solve technical problems and other issues specific to GCQA.

3.1.3. The following are typical areas that may require QAE assistance. Each area is described in greater detail in Chapter 5 of this Pamphlet.

- Contract Technical Review
- Post Award Orientation Conferences
- QAE Surveillance Strategies
- GCQA Surveillance Analysis
- Quality Assurance Troubleshooting
- Critical Safety Items (CSI) Programs
- Safety of Flight (SOF)
- Waivers and Deviations
- First Article and Production Lot Testing
- Engineering Change Proposals (ECPs)
- Technical Data Packages
- Materials and Special Processes
- Automated Test Equipment
- Pre-Production Product Examination
- Customer Complaint Investigations
- Modernization Programs

CHAPTER 4

QUALITY ASSURANCE ENGINEERING SUPPORT PROGRAM (QAESP)

4.1. QAESP OVERVIEW.

4.1.1. The QAESP provides a process for broader QAE responsibilities performed by QAEs at the strategic, operational, and tactical levels. This process applies to engineers in QAE positions (0800 series) or performing QAE responsibilities.

4.1.2. The QAE is to maintain a proactive role in the execution of the responsibilities outlined in the QAESP. The QAE responsibilities are to be clearly documented in the applicable GCQA Surveillance Planning (Reference (c)) to ensure responsibilities are clearly assigned.

4.1.3. QAEs at all levels maintain broad QA surveillance responsibilities. They support DCMA QA management planning, policy deployment, special initiatives, and problem investigations. Technical reports are used to document the results of performing these responsibilities. QAEs are key enablers in leading the QA workforce in pursuit of quality assurance as opposed to quality control. As assigned by the QAE FLS, QAEs are to ensure that GCQA Surveillance plans are adequate and effective in accordance with DCMA instruction and local supplier performance. These efforts do not replace or are not used in lieu of the First Level Supervisory Review – QA (Reference (d)). QAEs will analyze product defects data and other QA findings and work with suppliers to drive Quality Management System (QMS), inspection system, and manufacturing systems improvements. Areas of QAE assigned responsibilities may include:

- Quality System Audits
- Technical Training
- Customer Relations Visits
- Safety of Flight (SOF) Programs
- Process and Performance Capability Studies
- Statistical Analysis Tools
- Non-Destructive Testing Program
- Compliance Reviews
- Cost of Quality Studies
- Nonconforming Material (NCM) Review
- Nonconformance Reduction Program
- Independent Laboratory Testing Program
- Naval Special Emphasis Programs (NSEP)
- Commercial Standards (i.e. ISO 9000)
- Government Industry Data Exchange Program (GIDEP)
- Technical Information Papers (TIPs)
- Qualified Manufacturers List (QML)
- Quality Assurance Data Control
- Technical Analyses
- Performance Indicators

CHAPTER 5

QAE FUNCTION DETAILS

5.1. QAE FUNCTIONAL REQUIREMENTS.

5.1.1. This section provides detailed information relative to the responsibilities of QAEs in DCMA. The details in this section address the activities performed by the QAE in support of both the QARAP and QAESP. Some responsibilities support QARs and the descriptions include information about the role and responsibilities of the QAR to ensure QAEs understand the context of the support provided to the QARs. Other responsibilities are solely under the purview of the QAE. The scope and context of QAE responsibilities is dependent on workload assignments made by the QAEs FLS.

5.1.2. Automatic Test Equipment (ATE). The QAR is responsible for assuring that the supplier's procedures for ATE performance are adequate and in compliance with contract requirements when used for product acceptance. When technical assistance is requested, the QAE will make a determination on whether or not the ATE supports the measurements set forth in the contract. Since ATE encompasses both hardware and software, technical assistance of the computer software specialist/engineer will also be requested as required. These responsibilities also apply to automated inspection devices.

5.1 3. Commercial Standards. When assigned by the FLS, the QAEs are to be responsible for understanding the impacts to the contractor's QMS based on changes to quality related commercial standards such as those issued by the International Standards Organization (ISO). For example, ISO 9000:2000 was updated to ISO 9000:2008, and if the supplier is awarded any contracts with the new ISO standard, the QAE would be responsible (as assigned by the FLS) for ensuring that quality assurance surveillance strategies are updated as required, as well as monitoring the supplier's changes to conform their QMS to the new requirement.

5.1.4. Compliance Reviews. QAEs may support compliance reviews conducted by DCMA HQ (generally Mission Reviews), DCMA Operations (generally periodic Management Control Reviews), or other types of reviews conducted by Operations staff at CMOs to evaluate execution of the DCMA mission according to agency instructions.

5.1.5. Contract Technical Review. QAEs may perform QA Contract Technical Review (Reference (e)) on Acquisition Category (ACAT) Level I & II program contracts. This review would complement the QAR review and would typically focus on QA involvement in multiple areas including: configuration management, manufacturing, and system test plans. The contract technical review documentation should not be duplicative between the QAR and QAE. When technical assistance is requested, the QAE may assist the QAR in interpreting complex technical requirements, making risk determinations, and planning of strategies to perform appropriate levels of surveillance.

5.1.6. Cost of Quality Studies. When assigned by the FLS, the QAEs are to serve as the lead QA personnel in conducting Cost of Quality analysis for suppliers under surveillance. QAEs

may serve as the CMO focal point for driving improvements to the contractors QMS to reduce the total cost of quality. Also, QAEs are responsible for reviewing Cost of Quality studies undertaken by suppliers. When suppliers have not initiated Cost of Quality initiatives or studies on their own, when applicable and based on resource availability, QAEs may work with suppliers to formally establish Cost of Quality initiatives aimed at reducing costs on existing and future contracts. QAEs are encouraged to include all disciplines, government, and suppliers, in these efforts. Emphasis should be placed upon assuring contractors collect and use cost of quality data. Assistance may be in the form of assisting QARs in collecting and analyzing contractor data to determine trends which require corrective action and ensure contractors comply with contractual requirements.

5.1.7. Critical Safety Item (CSI) Programs. QAEs may support quality assurance efforts, primarily performed by QARs related to inspection and acceptance of product classified as CSI. Support includes but is not limited to identification of CSI through Contract Technical Review, identification of significant characteristics that augment those identified by engineering support activities, product testing, configuration control of CSIs, and compliance to agency CSI policies.

5.1.8. Customer Complaint Investigations. QAEs may support investigations in response to Product Quality Deficiency Reports as assigned. Investigations are to be conducted in accordance with DCMA Instruction Customer Complaints QA (Reference (f)).

5.1.9. Customer Relations Visits. QAEs are responsible, and may support, as requested, customer visits and program reviews as part of the agency's overall support to major programs and buying offices.

5.1.10. Engineering Change Proposals (ECP). In order to determine cut-in dates and other similar QA requirements, the QAEs may review all ECPs related to systems in production. QAEs may ensure new configuration items or design elements are included in QA surveillance plans on the applicable products. Also, QAEs may validate related work instruction changes. The E&A Directorate has the primary responsibility for ECP review, so care should be taken not to duplicate efforts.

5.1.11. First Article and Production Lot Testing. QARs have primary responsibility for First Article Testing (FAT) as described in the First Article Test instruction (Reference (g)). When assigned by the FLS, the QAE is to provide assistance or evaluate the first article to contractual requirements, review test reports, and make appropriate comments to the purchasing activity. First articles may be required at the system, sub-system, equipment, assembly, or component level. Software related FAT is to require coordination with E&A software engineering personnel.

5.1.12. Government Industry Data Exchange Program (GIDEP). QAEs may support DCMA GIDEP program managers with expertise, investigations, and analysis related to specific GIDEP actions as well as the overall approach of the GIDEP within DCMA (Reference (h)).

5.1.13. Independent Laboratory Testing Program. QAEs may support QARs when independent laboratory testing is allowed per contract requirements. The QARs will request

assistance from the QAEs when determining whether independent testing is required, the appropriate test method, test result interpretation, and which laboratory (Government or private) has the capabilities to perform the required testing.

5.1.14. Modernization Programs. QAEs may work jointly with the QAR to review and evaluate the maintenance and/or modification program for technical adequacy when accomplished by the supplier. The following are to be evaluated as applicable: planning, work instructions/procedures, verification procedures, technical manual validation plans/procedures, and test programs both prior to and after work is performed.

5.1.15. Quality System Audits. QAEs may support the Lead Auditor as an audit team member as assigned for Quality Management System Audits on contracts with higher level quality assurance requirements (FAR 52.246-11)(Reference (i)). QAEs may be assigned as Lead Auditor in accordance with any requirements outlined in the DCMA QA Systems Audit instruction (Reference (j)).

5.1.16. Materials and Special Processes. When assigned by the FLS, the QAE is to support quality assurance efforts when special processes or materials are included in the supplier's processes or are contractually required. These often include processes such as welding, plating, heat treating, soldering, and others. QAEs are required to support QARs in evaluating contractor's equipment, process controls, data control, and corrective actions related to any special processes.

5.1.17. Nonconforming Material (NCM) Review. QAEs may perform oversight of contractor's NCM activities in accordance to the Nonconforming Material Instruction (Reference (k)). Coordination with E&A personnel is to take place for core engineering decisions.

5.1.18. Naval Special Emphasis Programs (NSEP). The QAE is responsible for supporting QAR's efforts involving product acceptance within the context of the NSEP. QAEs supporting NSEP activities are to receive training in accordance with the NSEP Quality Assurance Representative Instruction.

5.1.19. Nonconformance Reduction Programs. QAEs may initiate efforts, in conjunction with the QAR and other DCMA specialists, aimed at obtaining commitments from contractors to reduce the type and quantity of nonconforming product presented to the government for acceptance.

5.1.20. Non-Destructive Testing (NDT) Program. When assigned by the FLS, QAEs who are certified Level II in the applicable NDT discipline, are to participate in NDT process reviews and perform product examination, as required. When suppliers use vendors for NDT requirements, QAEs, when requested, will assist in ensuring delegations sent to CMOs contain the necessary and sufficient information for proper NDT.

5.1.21. Performance Indicators (PI). QAEs may support data collection and analysis for all PIs related to QA initiatives. Where required, QAEs are expected to develop and implement any

necessary corrective actions when PIs trend negatively. Generally, PIs are reviewed annually to ensure the correct type and quantity of PIs are monitored for QA initiatives.

5.1.22. Post Award Orientation Conference (PAOC). When assigned by the FLS, the QAEs are to serve as the QA Lead in managing QA PAOCs and have the responsibility for reviewing the contract requirements and any impacts to DCMA QA surveillance. The QAE will ensure that critical elements such as product acceptance methodology is established for production systems that yield multiple product variants and that all CSI critical characteristics are established or a plan is in place to otherwise ensure CSI compliance (i.e., coordinate with Engineering Support Activity through buying activity for development). The QAE is responsible for participating in non QA only Post Award Conferences to support discussions and answer questions in the areas that QAEs will provide support to the QAR.

5.1.23. Pre-Production Product Examination. QAEs may take a lead role during the evaluation of pre-production product examinations including physical and functional configuration audits (PCA and FCA) on major systems. The QAE may lead the DCMA QA effort in these audits in accordance with the specific requirements of the applicable contracts. These efforts may include review and evaluation of audit plans and reports, actual participation, and making recommendations/comments to the purchasing activity. This may be a shared effort between the QAR and QAE, but the responsibility for the DCMA effort remains with the QAE. Software related FCA/PCA is to require coordination with E&A software engineering personnel.

5.1.24. Process and Performance Capability Studies. When assigned by the FLS, the QAEs are to be responsible for the analysis of contractor data relating to process and performance capability studies. A process capability study (Cpk) is a systematic procedure for determining the capability of a process to produce conforming product. The process capability is a measurable property of a process to the specification, expressed as a process capability index (e.g., C_{pk} or C_{pm}) or as a process performance index (e.g., P_{pk} or P_{pm}). The output of this measurement is usually illustrated by a histogram and calculations that predict how many parts will be produced out of specification. If the process is capable, then statistical process controls can be used to monitor the process and conventional acceptance efforts (ex: inspections, etc.) can be reduced which will affect the risk assessment and surveillance strategy implemented by the QAR. The QAE may evaluate the data and study as a whole and provide feedback to the QAR for their use in risk assessment and development of their surveillance plan.

5.1.25. Qualified Manufacturers List (QML). When assigned by the FLS, the QAE is to support all efforts associated with QMLs. Assistance can be in the form of support to QARs, program integrators, or technical specialists at program offices and buying commands.

5.1.26. Data Collection and Analysis. QAEs may serve as the primary QA personnel responsible for ensuring the comprehensive data collection and analysis takes place for supplier and government data. The QAE may provide a comprehensive data analysis plan as part of the QA surveillance strategy.

5.1.27. GCQA Surveillance Analysis. When assigned by the FLS, QAEs are to review QA risk assessments and surveillance plans on a continuous on-going basis, for adequacy and

effectiveness. The QAE will conduct data analysis to determine the effectiveness of the current surveillance strategy and notify leadership when surveillance adjustments should be made based on data analysis. Also, the QAE may assist QARs in determining the most appropriate surveillance method(s) to apply in implementing their surveillance activities. These efforts do not replace or are not used in lieu of the First Level Supervisory Review – QA (Reference (d)). Surveillance methods include product examination, process review, and system audit. These methods are defined in their respective QA instruction.

5.1.28. Quality Assurance Troubleshooting. The QAE is responsible for engaging in investigations and root cause analyses identified by QARs, other QAEs, or any other government personnel, in order to resolve problems or issues associated with the quality and QA of products and services provided by suppliers.

5.1.29. Safety of Flight (SOF) Programs. QAEs may participate on teams to develop local and standard SOF Platform lists and SOF surveillance plans in accordance with the DCMA Safety of Flight Instruction (Reference (l)). Also, the QAE will provide support to Government Flight Representatives, Government Ground Representatives, Aviation Program Teams (APT) members and QARs on contracts that invoke the Government Ground and Flight Risk Clause (DFARS 252.228-7001)(Reference (m)) or other aircraft flight risk clauses, as required.

5.1.30. Statistical Analysis Tools. QAEs are responsible for supporting QARs when evaluating processes and products that rely on statistical analysis tools used by suppliers. Verification of the adequacy, accuracy, and proper use of statistical tools by suppliers is vital to quality assurance of all products. Where the application and use of statistical tools exceeds the experience of the QAR or QAE at the CMO-level, then assistance should be requested from the QA Operations directorate.

5.1.31. QAE Surveillance Strategies. Based on reviews of ACAT I & II program level contracts and associated Memorandum of Agreements, Quality Assurance Letters of Instruction, and Letter of Delegations, the QAE is to incorporate their surveillance requirements into the GCQA Surveillance Planning (Reference (c)). QAE surveillance requirements are to be delineated with a separate header to ensure clear identification of QAE surveillance activities.

5.1.32. Technical Analyses. QAEs may provide support to contract negotiations and other program support efforts, when requested, pertaining to quality aspects of cost proposals, cost analysis, or other related CMO products.

5.1.33. Technical Data Package (TDP). QAEs may review TDPs during the contract review process defined by the DCMA Contract Technical Review – QA Instruction (Reference (e)) on ACAT I & II program level contracts.

5.1.34. Technical Information Papers (TIP). QAEs at the HQ level are responsible for preparing TIPs on QA related topics that require clarification or additional guidance in carrying out the GCQA mission. TIPs will be distributed through the chain of command to QA managers and supervisors in operational organizations for further distribution.

5.1.35. Technical Training. QAEs may develop and administer technical training on an as needed basis. Topics could include: new analytical tools, new developments concerning materials, manufacturing processes and testing methods, etc. Training may occur at local meetings, workshops, technical conferences, or as on-the-job training activities.

5.1.36. Deviations. QAEs may review all "major" quality related deviations processed by suppliers ("Major" deviations are defined in MIL-HDBK-61A, Section 6.3 (Reference (n)). Quality deviations change the QA requirements. The QAE review will assure that complete and accurate evaluations with recommendations for approval or disapproval are forwarded to the Administrative Contracting Officer. The review will consider adverse effects on health, safety, performance, interchangeability, reliability, survivability, and maintainability; on use and operation; on weight and appearance (when it is a factor). The QAE will recommend disapproval of all recurring major waivers and deviations.

CHAPTER 6

QAE COMPETENCIES AND CERTIFICATIONS

6.1. QAE EDUCATION AND CERTIFICATION REQUIREMENTS.

6.1.1. Specific technical requirements, skill levels, workload and location of needed support will determine the necessary operational staff complement for performing QAE functions. QAEs are to serve as part of the QA functional organization. CMO Quality Directors and QA Teams should integrate quality engineers into their organization structure.

6.1.2. QAEs are to achieve Systems, Planning, Research, Development and Engineering (SPRDE) certification at the career level required by the employee's job series (i.e. 0800) and grade in accordance with the Defense Acquisition Workforce Improvement Act (DAWIA) Training instruction (Reference (o)). In addition to Defense Acquisition University (DAU) training, QAEs are to achieve the appropriate DCMA QA Systems, Technical Skill, and QAE Skill set certification for their role and responsibilities as defined in the QA Development instruction (Reference (p)) and the Training Competency Assessment Tool (TCAT).

ACRONYMS

ACAT	Acquisition Category
ATE	Automatic Test Equipment
C_{pk}/C_{pm}	Process Capability Index
CMO	Contract Management Office
Cpk	Process Capability Study
CSI	Critical Safety Items
DAWIA	Defense Acquisition Workforce Improvement Act
DFARS	Defense Federal Acquisition Regulations Supplement
DoD	Department of Defense
E&A	Engineering & Analysis
ECP	Engineering Change Proposals
FAR	Federal Acquisition Regulations
FAT	First Article Testing
FCA	Functional Configuration Audit
FLS	First Line Supervisor
GCQA	Government Contract Quality Assurance
GIDEP	Government Industry Data Exchange Program
HQ	Headquarters
ISO	International Standards Organization
NCM	Nonconforming Material
NDT	Non-Destructive Testing
NSEP	Naval Special Emphasis Programs
P_{pk}/P_{pm}	Process Performance Index
PAOC	Post Award Orientation Conferences
PCA	Physical Configuration Audit
PI	Performance Indicators
QA	Quality Assurance
QAE	Quality Assurance Engineers

QAESP	Quality Assurance Engineering Support Program
QAR	Quality Assurance Representative
QARAP	Quality Assurance Representative Assistance Program
QML	Qualified Manufacturers List
QMS	Quality Management System
SOF	Safety of Flight
SPRDE	Systems, Planning, Research, Development and Engineering
TDP	Technical Data Packages
TIP	Technical Information Paper