



QA Plans

Planning For Success

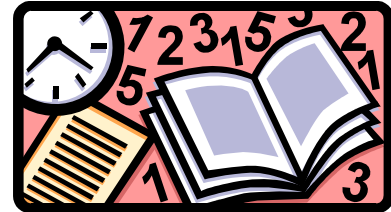


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Basic steps to successful QA Planning

Obtaining quality construction is a combined responsibility of the construction contractor and the government. Their mutual goal must be a quality product conforming to the contract requirements. A cooperative and professional working relationship should be established in order to realize this common goal. The contract documents establish the quality required in a project to be constructed. Quality Assurance is required on all construction contracts. The extent of assurance shall be commensurate with the value and complexity each contract.

The Contractor should focus on four-objectives:

- (1) Plan and control progress of work.
- (2) Perform evaluations of progress/quality.
- (3) Provide time analysis for changes.
- (4) Provide basis of payment on progress.

The Quality Assurance Representative (QAR) should focus on four-objectives:

- (1) Evaluate progress for timely completion.
- (2) Plan for QA Verification.
- (3) Conduct and Document QA Evaluations of progress/quality.
- (4) Evaluate the effects of proposed modifications on contract duration.

General Responsibilities

Quality assurance is the process by which the government assures end product quality. The process starts well before construction and includes reviews of the plans and specifications for biddability, constructibility, operability and environmental responsibility, plan-in-hand site reviews, coordination with using agencies or local interests, establishment of performance periods and quality control requirements, field office planning, preparation of QA plans, reviews of quality control plans, enforcement of contract clauses, maintenance of quality assurance and quality control inspection and work records, and acceptance of completed construction.

Monitoring the contract progress is a responsibility of both the Government and the Contractor. As a contract progresses, both the Contractor and the Government make daily reports as to that progression. These reports include activities started and completed, inspections made, QC requirements met, problems experienced and, if any, accidents encountered, as well as a variety of other information.

Identify Government Personnel

Members of the Project Delivery Team need to be identified in advance of Contract Award. This team will likely include Construction Branch personnel from both the Resident and District Office, the Project Manager, A/E Personnel, Base Personnel, and Local Sponsor Personnel.

Assess Training Requirements

The Corps of Engineers has been requiring the **Contractors' Quality Control Manager** to complete the course entitled "**Construction Quality Management for Contractors**," since 1994. It is recommended that Corps of Engineers Quality Assurance personnel and other members of the PDT participate in these sessions when offered. Each QA Representative should also be familiar with both RMS and QCS. Local and Regional training is offered on frequent intervals. In addition, each QA Representative should develop an Individual Development Plan with their supervisors outlining specific training associated with current and near future job assignments.

Participate in Pre-Award Activities

- (a) Participate in the design review conference. It is recommended that a representative of the field office responsible for the administration of the contract participate.
- (b) Conduct biddability, constructibility, operability and environmental reviews as required by ER 415-1-11. Input from field office required.
- (c) Conduct site plan-in-hand reviews. This is a field office responsibility.
- (d) Establish the contract CQC requirements. Input from field office required.

Identify Submittal Requirements

The Contractor is required to furnish a specified quality of construction, including materials and equipment to be incorporated in the work. Control of the quality of materials and equipment require timely review, testing, or other evaluation. All required submittals must be made in time to allow for evaluation, approval, procurement, and delivery prior to the preparatory control phase and before the item is needed in the construction process. The primary responsibility for the overall management and control of contractor submittals lies with the **Prime Contractor**. Monitoring of the Contractor's quality management control to assure that submittals are timely appropriately certified, and in compliance with the contract is the responsibility of the **Government**.



While the submittal process can be time consuming for both Contractor and Government technical and administrative personnel and can significantly affect the construction schedule, procurement, placement, testing, and transfer procedures, it is critical to the success of both the quality control and quality assurance processes. As such, its scope must be carefully thought out during the design process and submittal requirements tailored to trim-fit the specific job. Because submittal approval must be timely to allow procurement and delivery of materials or equipment prior to the preparatory inspection (P/I) phase of the 3-step inspection process, the number and type of submittals required by the contract must be kept to the minimum amount sufficient to assure the specified construction quality is achieved. From a contractual standpoint, all required submittals are “important”. However, some are more critical to quality management than others, particularly extensions of design, deviations, and those involving critical materials or equipment, which must be compatible with an entire system. By regulation and policy, these critical submittals require Government approval. Review for Government approval can involve construction field and District Office, District engineering division, and design Architect-Engineer personnel. Submittals of a less critical nature are usually approved by the contractor and submitted to the Government “**For Information Only**” (FIO). As a quality assurance measure, regulations require Government review of a percentage (10%) of all Contractor approved **FIO** submittals.

It has been noted that some Districts require up to seventy five percent of all submittals be for Government approval. The logic apparently has been that if a few submittals are necessary to help protect the Government’s interest, a greater number should help even more. However, in today’s government-wide cost cutting and downsizing mode, we can no longer add an extra measure of quality safety factor in our contracts by requiring a wide variety of submittals addressing the same item or feature of work.

As part of our pre-award activities, we should review the nature and number of submittals on the ENG Form 4288, **Submittal Register**, which is located in the specifications. The BCOE reviewer should look closely at the nature of submittals indicated for Government approval, comparing them with the types identified in **ER 415-1-10** as requiring Government approval (listed below). The driving factor should be to have the construction contractor responsible for review of as many submittals as regulations and policy will permit. Submittals that should always require Government Approval are: (Examples provided are not all inclusive and are used only for illustration purposes.)

Extensions of Design

- Examples:
1. Fire Alarm Systems
 2. Fire Sprinkler Systems
 3. Prefabricated Buildings
 4. Structural Steel Drawings
 5. Standing Seam Metal Roof Drawings
 6. Coordination Studies such as short circuit analysis



Critical Materials.

(Materials that must meet specific quality performance standards)

- Examples:
1. Coatings for Cathodic protection of storage tanks
 2. High-pressure piping and controls
 3. Acid and Hazardous Waste Systems
 4. Architectural Finishes for Customer Approval

Deviations.

(Any submittal by the construction Contractor that varies from the construction contract specifications.)

O&M Manuals

Those submittals involving equipment that must be checked for compatibility with the entire system. These manuals must be submitted early in the construction process so that incompatibilities can be discovered and resolved before the equipment is released for manufacture.

- Examples:
1. Sewage Treatment Systems
 2. Water Purification Plants
 3. Energy Management Control Systems
 4. Intrusion Detection Systems
 5. Power Generation and Distribution Systems

QA Verification

The contractor makes evaluations of progress/quality through a series of actions (**QC Requirements**). Many of these actions are critical enough to be specifically verified by the Government. It would not be reasonable that the Government QA Staff be required to verify 100% of these actions, therefore only a representative number should be selected from each of the categories as requiring specific verification from the QA Staff. This selection should take place during the initial planning stages of the contract, after the requirements are identified and coordinated with the Contractor's CQC Plan. The extent of our verification effort will be directly related to the effectiveness of the Contractor's overall execution of their plan.

Review Schedule and/or Pay Activities

Schedule (Pay) Activities shall include an appropriate level of detail. The schedule shall be the basis for measuring Contractor progress. Schedule activities will show the order in which the Contractor proposes to perform the work, the dates on which the Contractor contemplates starting and completing salient features. Sum of pay activities must equal the contract amount and be grouped by Contract Line Item (CLIN). Sum of all CLIN's equals the contract amount. Each activity must include its relation to a specific Contractor or Subcontractor, Feature of Work, Phase, Project Area, and Work Category. Lack of an approved Schedule of Activities will result in an inability of the Contracting Officer to review or approve progress for the purposes of payment. Each schedule must be reviewed to determine if the sequencing of activities is logical and that activity durations are reasonable. Less than 2-percent of non-procurement activities should have durations exceeding 20 workdays. Procurement items should not be added to the schedule unless they are for critical procurements or items requiring longer than a 30-day procurement period.

Review the Contractor's CQC Plan

- (a) Does the plan adequately cover control of all features of the contract?
- (b) Is the CQC staff adequately sized to maintain quality and accomplish tests required?
- (c) Have the person or persons responsible for each definable feature of work, all tests, and submittal control and review been identified?
- (d) Do the qualifications of the staff appear adequate for the control and test requirements?
- (e) Is the delegation of responsibility and authority to the CQC staff manager clear? Does this person report directly to the highest-ranking contractor personnel on-site with responsibility for the overall management of the project including quality and production?
- (f) Are the CQC organization lines of authority and responsibility clear?
- (g) Are individual control and test duties clearly assigned?
- (h) Do the proposed control and test report forms include all the required features and reporting items? Are system commissioning procedures clearly detailed?
- (i) Does it comply with the specific requirements established by the contract?
- (j) Are definable features of work identified? A definable feature of work is a task, which is separate and distinct from other tasks and



has separate control requirements. For example, definable features for concrete would be formwork; reinforcing and imbedded items; placement including mix design, finish, etc.; and curing.

QA Testing

Engineering Regulation ER 1180-1-6 (7)(c)(9) provides the requirement for the Government to perform QA tests at the job site to assure acceptability of the completed work. This section is keyed to General Construction (non-HTRW):

A sufficient number of tests, but not less than 5 percent of the frequency of the CQC tests, should be scheduled to verify CQC test procedures and results.

For test procedures for which duplicate sampling is appropriate the Contractor is required to furnish for possible QA testing duplicate samples of test specimens of a minimum of 10 percent of the CQC tests.

A minimum of one-fourth of these duplicate samples should be tested and the results compared to the CQC test results to verify test procedures and results.

The duplicate samples on which QA tests are performed should not be known in advance by the Contractor, so that the CQC staff will not know which of the CQC test results are subject to verification.

The results of QA test performed on duplicate samples should be made available to and discussed with the Contractor in order to reconcile any discrepancies.

Testing duplicate samples is part of, not in addition to, the requirement to perform QA tests at a minimum frequency of 5 percent of the CQC tests.

QA testing and inspection should be conducted at unannounced intervals.

The QA Staff should verify the accuracy and calibration of equipment, assure correct application of specified test standards, and verify the coverage and accuracy of required CQC test by observing approximately 10 percent of the CQC tests.

The exact number of tests observed will be commensurate with the confidence level in the Contractor's CQC system and consistency in Government and Contractor test results.

Government engineering, laboratory, and/or QA personnel assigned to the work, depending on the type of test, should review test reports, which should be submitted as attachments to the Contractor's CQC reports.

RMS provides the tools to identify the precise QA tests performed and provides the means to record, track and otherwise document the QA testing performed on the job site.

Implementation and Enforcement

The following activities will be performed by quality assurance personnel (QAP) during construction:

- (1) After the preconstruction conference, the area/resident engineer or other responsible designee shall conduct a coordination meeting with the contractor on the CQC/QA program. Minutes of the meeting will be prepared for signature by both the contractor and the government representative.
- (2) Delay construction start until after the coordination meeting and submittal and acceptance of at least the interim CQC plan, if required.
- (3) Require revision of the CQC plan and its execution as necessary to obtain quality.
- (4) Verify adequacy and calibration of test equipment, application of specified test standards and computation of test results.
- (5) Spot check CQC approved submittals.
- (6) Review contractor's daily quality control reports (QCR) to assure that they adequately document his/her quality control operations. If reports are not adequate, require the contractor to submit a supplementary report containing the necessary information as specified in CEGS-01451. The QAP will not alter, sign, initial or approve the QCR.
- (7) Hold periodic job-site assurance conferences on CQC/QA interrelationship of activity and effectiveness.
- (8) Participate in the three-phase control process as necessary to assure that the contractor is adequately conducting the required control processes. Attendance at a majority of the preparatory and initial-phase meetings including mechanical, electrical and critical features (i.e., roofing and waterproofing) is required. Government participant will be totally familiar with contract requirements. Ensure that the contractor prepares minutes of each preparatory and initial meeting and includes highlights of each control phase on the daily CQC report. These reports shall be made readily accessible for quick reference throughout the life of the project.
- (9) Conduct government QA tests at the job-site to assure acceptability of the completed work. A sufficient number of tests, but not less than 5 percent of the frequency of the CQC tests, should be scheduled to verify CQC test procedures and results. For test procedures for which duplicate sampling is appropriate the contractor shall be required to furnish for possible QA testing duplicate samples of test specimens of a minimum of 10 percent of the CQC tests. A minimum of one-fourth of these duplicate samples should be tested and the results compared to the CQC test results to verify test procedures and results. The duplicate samples on which QA test are performed should not be known in advance by the contractor, so that the CQC staff will not know which of the CQC test results are subject to verification. The results of QA test performed on duplicate samples should be made available to and discussed with the contractor in order to reconcile any discrepancies. Testing duplicate samples is part of, not in addition to, the requirement to perform QA test at a minimum frequency of 5 percent of the CQC tests. QA testing and inspection should be conducted at unannounced intervals. The contracting officer's representative should verify the accuracy and calibration of equipment, assure correct application of specified test standards, and verify the coverage and accuracy of required CQC tests by observing approximately 10 percent of the CQC tests. The exact number of tests observed will be commensurate with the confidence level in the contractor's CQC system and consistency in government and contractor test results. Test reports, which should be submitted as attachments to the contractor's CQC reports, should be

reviewed by government engineering, laboratory, and/or QA personnel assigned to the work depending upon the type of test.

(10) Monitor contractor's procedures for tracking construction deficiencies to assure acceptable corrective action and that an audit trail is maintained.

(11) Ensure that new work is not placed on unacceptable work or that progress payments do not include the value of non-conforming construction.

(12) Prepare QA reports (QAR) and all other necessary QA documentation as detailed below:

(a) Quality assurance personnel will prepare a report for each visit day of construction or fabrication on each contract and each project accomplished by government plant and hired labor. The purpose of the QAR is to document government activities in the day-to-day administration of the contract. Memoranda for the record (MFR), letters, and the QAR will be used to provide a formal record of contract information. Particular care will be taken to record and preserve all possible data and exhibits with respect to any matter, which may become the basis for a claim.

(b) All pertinent items of information will be included on the QAR. Data incorporated on the contractor quality control report will not be repeated on the QAR unless it is necessary to augment or correct erroneous entries on the QCR.

(c) The resident engineer/project engineer or their designees are responsible for assuring that the QAR contains all pertinent items of information. In order to assure the accuracy and completeness of the QAR, this individual will review initial reports of any QAP and perform follow-up reviews as deemed necessary to confirm/maintain continued acceptability. Those reports reviewed will be initialed.



(13) The QAP will review the entries on the contractor's QCR. The QCR should contain information on the contractor's quality control operations as described above and not be burdened with other peripheral information. The QCR will be attached to or filed with the QAR, if separate report forms are used, to form a complete quality control/quality assurance report, retained until completion of the job, and then forwarded to the district office to be kept in the specific contract file.

(14) Conduct and Document QA Evaluations of progress/quality. Documentation may include the frequent use of photos and/or videos along with a narrative of why photos were taken and what they represent. Detailed documentation is the key to providing outstanding contractor evaluations or correcting unsatisfactory performance.

Finalize Your Plan

Obtaining quality construction is a combined responsibility of the construction contractor and the government. Their mutual goal must be a quality product conforming to the contract requirements. A cooperative and professional working relationship should be established in order to realize this common goal. The contract documents establish the quality required in a project to be constructed. Contracting officers are responsible for assuring the contract documents clearly define the quality of materials and workmanship

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required for a project and that construction contractors comply with the contract documents and produce the required product. Contractors are responsible for executing their Plan to schedule, control, and assure the end product quality.

The Government's role is one of assurance that the Contractor prepares and maintains an effective CQC Plan and that the contractor executes his plan on a daily basis producing the quality required in the contract plans and specification. The Sacramento Resident Office has prepared a QA Plan template that is reviewed and completed on any project. This plan should contain most if not all of the elements discussed above and shall be finalized and signed at the time of Contract Award.