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**CONSTRUCTION QUALITY MANAGEMENT
PROGRAM**

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Executive Summary

It is the South Dakota Science and Technology Authority's (SDSTA) objective that the quality of construction projects shall be properly managed to assure that the requirements are being fully met. To meet this objective, the SDSTA will implement this Construction Quality Management (CQM) Program for all capital construction projects.

The CQM Program is designed to:

- Properly assign responsibilities for the management of quality on construction projects.
- Support construction projects across the entire spectrum of size, complexity, scope and acquisition strategy.
- Tailor a project to ensure appropriate levels of monitoring are provided.

The following points are fundamental to the CQM Program:

- SDSTA is not responsible for controlling the quality of the contractor's work.
- Contractors have always been implicitly responsible for the quality of their work; under the CQM Program, the Contractor is contractually assigned QC responsibilities. The Contractor controls the quality of the work.
- The level of quality is established by the contract requirements in the specifications and drawings.
- All work is subject to inspection by SDSTA, i.e.; SDSTA has the right to inspect.
- SDSTA must assure that construction work conforms to contract requirements by ensuring that the Contractor's Quality Control (QC) System is properly functioning. This is the role of SDSTA's Quality Assurance (QA) System.

CQM can prevent deficiencies and the removal of defective work. Through proper planning, the Contractor can establish the correct quality at the beginning of each feature of work and monitor the work through completion to ensure that quality requirements are met. Quality is built-in.

The Contractor controls Quality and SDSTA assures Quality is being built. When the Contractor fails to meet quality requirements or carry out their contractual QC responsibilities, the QA System is designed to establish that fact. The CQM Program ensures proper recourse mechanisms are placed into all construction contracts to correct these kinds of deficiencies.

Chapter 1. CONSTRUCTION QUALITY MANAGEMENT (CQM)

1.1 Purpose.

This document states the objective of the SDSTA Construction Quality Management (CQM) Program. The Program is composed of the Contractor 's Quality Control (QC) System and the SDSTA's Quality Assurance (QA) System. These objectives encourage a mutual effort on the part of the Contractor and the Authority to produce a quality product, on time, and in compliance with the terms of the contract. The level of effort required to properly implement these systems will vary for each contract, depending upon the type of work, duration, and complexity.

While the objectives for ensuring quality shall apply to all projects, the formal procedures established in this program shall be used for capital construction contracts valued greater than \$75,000. The SDSTA Engineering Director or his/her designated representative must approve any deviation from these procedures.

1.2 Terminology.

The following terms are generally accepted and used throughout the SDSTA.

- **Quality** is defined as conformance to properly developed requirements. In the case of construction contracts, the contract specifications and drawings establish the requirements.
- **Quality Control (QC)**. The Contractor's management and control of his own, his suppliers' and his subcontractors' activities to comply with contract requirements.
- **Quality Assurance (QA)**. The means by which the SDSTA fulfills its responsibility of assuring the QC System is functioning and determining through reviews, surveillance and tests assures that the completed project complies with contract.
- **Construction Quality Management (CQM)**. Defined as quality control and assurance activities instituted to achieve the quality levels established by the contract requirements.

$$\underline{\mathbf{CQM = QC + QA}}$$

- **Contracting Officer (CO)**. An individual appointed and given the authority to execute contractual documents that obligate the SDSTA and/or modify the contractual requirements.
- **Definable Feature of Work (DFOW)**. A task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines and is an item or activity on the construction schedule. For example, excavation, electrical, concrete, roofing, mechanical, HVAC, etc. are all Definable Features of Work.
- **Project Manager (PM)**. The individual in the SDSTA that is responsible for the technical administration and management of assigned capital projects.

- **QUALITY ASSURANCE REPRESENTATIVE (QA REP).** The individual in the SDSTA that is assigned specific duties as the primary point of contact at the jobsite level between the Contractor, Client, User and the PM.
- **Quality Control Manager (QC Manager).** An employee of the Construction Contractor, appointed in writing, by the Contractor and approved by the SDSTA, with the responsibility for administration and implementation of the QC System at the job site.
- **Quality Control (QC) Plan.** A plan prepared by the Contractor and approved by the SDSTA, which outlines the procedures, instructions, reports, and personnel, the Contractor intends to use in the implementation of the QC System.
- **Factory Inspection.** Inspection that is performed at the point of manufacture for various products and components to be incorporated into the work.
- **Inspection.** The examination of the activities of construction that supplements quality control of the work and assists in obtaining compliance with contract requirements. The examinations may be conducted on a full or part-time basis and may be made during progress or at strategic intervals of the work performed by the contractor.
- **Officer of the Firm.** An owner or employee of the construction firm whom, by virtue of position, is empowered to obligate the company.
- **Quality Level.** The degree of excellence, basic nature, character or kind of performance of a particular type of work established by the designer and indicated in the drawings and specifications.

1.3 Contractor Quality Control.

A contractor inspection system is required by this policy. Incorporation of the SDSTA's specific requirements into the contract is generally accomplished through the Guide Specification titled, *Quality Control*. The Engineering Director shall be consulted regarding the appropriate editing and use of the guide specifications for Quality Control.

The Contractor has the responsibility to control the quality of the work. The primary emphasis of the QC System is on controlling the work to prevent quality problems, rather than inspection to discover problems after they occur. The QC System, which are discussed further in Chapter 2, is the baseline program that contractors will use to control the quality of the work. Significant control and inspection of the work, as well as documentation that the work meets the requirements of the contract, is required of the Contractor under the QC System.

1.4 SDSTA Quality Assurance.

1.4.1 Policy on Construction Quality

The SDSTA and the researchers we support measure the quality of what we receive not only in terms of the physical appearance, but also in terms of on-time delivery, within project budget, and meeting

specific requirements. We must have a well-established quality management program to meet these expectations.

The Program, as set forth in this policy, encourages the mutual effort on the part of the SDSTA, the Construction Contractor and his Quality Control organization to achieve a quality end product as specified. By implementing the following guidelines, you will be able to effectively and successfully administer construction contracts.

1.4.2 SDSTA's Responsibility

SDSTA is responsible for evaluating all construction prior to final acceptance and payment to determine compliance with the contract documents. During construction, quality assurance is the means by which the SDSTA fulfills its' responsibility of verifying that the QC System is functioning properly. Through reviews, surveillance, and tests the SDSTA assures the completed product complies with the contract requirements.

The requirement for SDSTA quality assurance is independent of any quality control effort of the Contractor. SDSTA QA efforts focus on evaluating the Contractor's QC System rather than inspection of specific items of work. A properly implemented Contractor QC System is necessary to produce a quality project. However, some items of work can be so critical to the project as to need specific detailed inspection. Under the contract, the Authority has the right to inspect, while the Contractor has the responsibility to inspect.

Chapter 2. QUALITY CONTROL (QC) SYSTEM

2.1 Applicability

This Chapter outlines procedures, requirements and application of the Contractor's Quality Control (QC) System for construction contracts.

This policy applies to all capital construction work, regardless of contract vehicle or scope. However, it is important to recognize that the amount of effort that can be expended in controlling the work does depend on the individual project. The SDSTA will develop realistic requirements for each project, based upon the complexity and operational requirements of the project. The policies outlined in this chapter will be incorporated during the development of the contract documents. The SDSTA will ensure that the specification is tailored for the particular project and ensure that the Contractor's QC System and his prior experience are key elements in any source selection plan. This is the most important contribution the SDSTA can make during pre-award too positively control the success of the project. Experienced SDSTA personnel shall be consulted in tailoring the quality control requirements to the specific project.

2.2 Contract Requirements.

Plans and specification comprise the requirements of a contract. These documents must be included and must clearly state what is required. The Contractor must know what is expected and required to prepare a reasonable proposal. He cannot be required to perform work that is not included in the contract drawings and specifications. When the proper contract clauses and specifications are included in the contract for the CQM Program, the Contractor is fully responsible for the quality of his work.

2.3 Submission of the Quality Control Plan

The Contractor is required to provide the Project Manager (PM) a tailored QC Plan that meets the specific project quality control requirements. Generally, this submittal is required within [14] calendar days after receipt of Notice of Award. The completed list of definable features of work must be coordinated with the construction schedule. Critical submittals and tests should be identified in the schedule as distinct actions.

No construction work will be allowed at the site prior to the approval of the QC Plan. Exception may be made for mobilization work, which includes surveying for location of Contractor's offices, laydown areas and temporary utilities, and installation of temporary utilities. The only exception to this requirement is work approved under an "Approved As Noted" submittal of the QC Plan. Any exceptions must be personally

authorized in writing by the PM. There are three (3) circumstances in which an “Approved as Noted” approval may be appropriate.

1. First 90 Days: The QC Plan is a preliminary submittal and lists the definable features of work to cover the first ninety (90) days of construction. This option may be used in some cases to allow a Contractor to start without a complete plan. It is not always practical to delay the start of construction until a complete QC Plan is submitted and approved. The PM may approve a QC Plan which covers the few activities at the very beginning of the project using the “Approved as Noted” approval method. This will permit the Contractor to start work. However, the Contractor's operation must be limited to the definable features of work covered by the “Approved as Noted” plan. The PM must stop the work if an acceptable plan has not been submitted upon completion of the authorized work.

2. Phased Project: It is permissible to allow the Contractor to proceed with an acceptable QC Plan covering each particular phase.

3. Minor Changes: It is permissible to approve the QC Plan with minor changes or additions. The PM may use an “Approved as Noted” approval to grant permission to start work if the Contractor agrees in writing to correct the plan by a specified date. The PM must not allow the Contractor to continue work beyond the specified date if a corrected plan has not been approved.

It is important for the SDSTA to closely monitor the submission of the final plan. The PM (through the Contracting Officer) has the responsibility to stop the work under the authority of the contract, if a final, acceptable plan is not submitted and approved within 90 days of the contract award.

2.4 Overview of Section *Quality Control*

Guide Specification Section that describes the QC System the Contractor is required to establish and maintain. Per the Section, “The QC System consists of a QC Organization, a QC Plan, a Coordination and Mutual Understanding Meeting, submittal review and approval, testing, completion inspections, and QC certifications and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract.” These requirements are discussed in detail in the remainder of this chapter.

2.5 QC Reporting Requirements

A QC Manager's duties and responsibilities will be defined in the QC Section. Dependent on the complexity of the project, the QC Manager may be multi-tasked to include the duties of a project superintendent or have his duties restricted to only those related to quality. The Contractor's reporting requirements may be slightly different depending on the scope of the QC Manager's responsibilities.

2.6 QC System Requirements

The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work called for by the contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the SDSTA.

Quality Control is the Contractor's system in place during execution to manage, control and document his own, his supplier's and his subcontractor's activities in order to comply with contract requirements. The CQM Program places full responsibility on the Contractor for producing the quality work prescribed in the contract plans and specifications.

The Contractor is required to establish and maintain a QC System as described in the specification and tied to the Contractor's schedule. The QC System covers on-site and off-site work and shall be keyed to the work sequence and the construction schedule.

No work or testing may be performed unless the QC Manager or in the case of afterhours work, the Alternate QC Manager is on the work site. The contractor's staff will be held responsible for the quality of work on the job and are subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract.

2.7 Quality Control Organization

The people involved in Quality Control range from the laborers and craftsmen performing the work, through the on-site supervision and up to the management of the construction firm. Some of the positions with specific Quality Control responsibilities are:

- Project Superintendent
- Subcontractor Foreman
- Quality Control Manager
- Alternate Quality Control Manager
- Registered Fire Protection Engineer
- Submittal Reviewer(s)

Collectively, these individuals are responsible for carrying out the requirements of the QC System. When required, some or all of these positions and their duties and responsibilities will be included in the contract requirements.

2.7.1 Duties and Responsibilities of the QC Manager.

The QC Manager implements and manages the QC System, and is directly responsible to management. The QC Manager is responsible for the daily QC inspections and verification of the installed

work, perform submittal review prior to submission for approval, ensure testing is performed and provide required QC certifications and documentation. The QC Manager manages and coordinates the documentation performed by designated Testing Laboratory personnel and any other inspection and testing personnel required by this Contract. The Guide specifications outline the QC procedures that must be followed. Responsibilities of the QC Manager include:

- Access to references called for in the contract.
- Ensure all submittals are prepared, reviewed, and submitted for approval in a timely manner to avoid project delays.
- Coordinate changes or substitution requests made by the Contractor to the PM; however, he does not have the authority to approve them.
- Inspect all work for compliance and maintain a Rework Items List on all nonconforming work.
- Coordinate all testing required to maintain the schedule.
- Must ensure that As-Built Drawings and As-Built Record of Materials are kept current and on- site.

Constructing a quality project requires proper planning of all Definable Features of Work (DFOW) to prevent deficiencies with costly tear out and replacement. The QC Manager should focus on proper preparatory and initial phases of control in order to minimize or prevent rework. He is required to obtain assistance from the QC staff or an outside consultant for any discipline(s) where the QC Manager lacks proficiency. The QC Manager must have the authority to correct any deficiency even though it might result in stopping work on a particular segment of the project.

The QC Manager shall not perform any duties such as layout work, time keeping, etc. Obviously this restriction does not apply in circumstances where the particular contract allows the QC Manager to be multi-tasked as the Project Superintendent. The Contractor may request to assign construction site safety related duties with the approval of the PM and the concurrence of the ES&H. This exception would apply only on small jobs as an exception from the norm (i.e.; where the owner of the company is the on-site Superintendent and the QC Manager). The QC Manager is always responsible for observing the work and monitoring safe work practices during the normal course of his jobsite duties, but as a rule is not assigned as the safety competent person.

The qualifications requirements for QC Managers can be extensive. 1. The QC specification requires an individual with significant experience as a superintendent, inspector, QC Manager, project manager, or construction manager on similar size and type construction contracts that include the major trades that are part of the Contract. 2. The individual must be familiar with OSHA and construction safety requirements and have experience in the areas of hazard identification and safety compliance. 3. On large or

complex projects, he may be required to be a graduate of a four-year accredited college program in one of the main engineering or architecture disciplines.

2.7.2 Alternate QC Manager Duties and Qualifications

The Contractor is required to designate an alternate for the QC Manager at the work site to serve in the event of the designated QC Manager's absence. The period of absence may not generally exceed two weeks at one time, and not more than 30 workdays during a calendar year. The qualification requirements for the Alternate QC Manager shall be the same as for the QC manager. The Alternate QC Manager may also be used on the work site during supplemental work shifts (beyond the regular shift) to perform the duties of the QC Manager during such work.

2.7.3 Registered Fire Protection Engineer

A U.S. Registered Fire Protection Engineer (FPE) may be specified. This individual shall be an independent third party hired directly by the Prime Construction Contractor as an integral part of the Prime's CQC Organization. This FPE shall be responsible for review, approval, and coordination of all fire protection system submittals, calculations, shop drawings, etc.

2.7.4 Manufacture's Representatives, Factory Representatives, etc.

The technical specifications may also require the presence of manufacture or factory technical representative(s) to be on-site prior to, during installation and/or testing of material/equipment to ensure compliance with installation recommendations, etc. The representative(s) shall be considered an extension of the QC System during their presence on-site or off-site, as the case maybe.

2.8 Quality Control Plan

The SDSTA must approve a QC Plan before the Contractor starts work. The plan outlines and describes the people and the process that the Contractor will use to carry out the requirements of the QC System, and identifies the Definable Features of Work (DFOW) for the project.

The Contractor QC System requires the Contractor to submit a QC Plan within a specified number of calendar days after receipt of the notice of award. This plan must detail the procedures, instructions, and reports the Contractor will use during the project. It will contain as a minimum the requirements listed in the specification section used in the contract. Table 1., included in Appendix B, should be used as a reference describing the individual requirements for each element of the QC Plan.

If the Contractor elects to make any changes to the QC Plan, including any personnel, the Contractor must notify the PM a minimum of seven calendar days prior to the proposed change. The PM also reserves the right to request changes to the QC Plan, including interviewing QC Personnel to verify submitted qualifications and if necessary, to have personnel replaced.

2.9 Meetings

2.9.1 **Preconstruction Conference**

The Preconstruction Conference or “Precon” is an important meeting required on all construction contracts for discussion of the administrative procedures for the contract. During the conference, ground rules are established and understandings reached that will affect relationships throughout the contract. It will be important to emphasize the importance of the QC organization during this meeting and depending on the project size, the CQM Program discussion may be best reserved for a separate *QC Plan Meetings*. However, discussion of the QC System requirements and their due dates should definitely be included in the Precon. Where practical, the Precon and QC Plan Meeting (if required) may be scheduled for the same day, provided that the two agendas are properly separated.

2.9.2 **QC Plan Meeting**

The first meeting specifically relating to CQM is the *QC Plan Meeting*. This meeting is an excellent communication forum to ensure the QC Plan and Program is quickly and efficiently instituted. The purpose for meeting is to develop a mutual understanding of the QC Plan requirements. All QC requirements from the QC Section and the requirements included in the Submittal Procedures Section of the specifications should be discussed.

2.9.3 **Coordination and Mutual Understanding Meeting**

The Contractor, their QC Manager, and the SDSTA Project Management Team shall meet to discuss quality control requirements after the QC Plan is submitted and prior to the start of construction. The PM sets the time and place and prepares the agenda. The agenda must require the Contractor to present the QC System in its' entirety. The agenda and length of this meeting depends upon the Contractor's familiarity with the QC requirements. The purpose of this meeting is to establish a mutual understanding of the QC and QA requirements for the contract. The SDSTA Management Team should thoroughly review the proposed QC Plan before the meeting. As a minimum, the Contractor's QC Manager, Superintendent and the SDSTA PM should attend this meeting. Each subcontractor who will be assigned a critical QC responsibilities shall have a representative of the firm at the meeting. The details of the contractual requirements relative to QC should be discussed. The relationships of the QC Manager to the superintendent and to the SDSTA representatives should be discussed. The basic philosophy of the CQM Program should be discussed.

Minutes of the meeting will be prepared by the QC Manager and signed by the Contractor, the Architectural Engineer (optional) and the SDSTA PM. The Contractor shall provide a copy of the signed minutes to all attendees. The coordination and mutual understanding meeting must be repeated when a new QC Manager is appointed.

2.9.4 **QC Meeting**

As part of or in addition to Weekly Status meetings, QC meetings shall be held as required by the specification or as agreed to during the mutual understanding meeting. They should be used to reinforce the

philosophy of the CQM Program. The QC Manager develops the agenda, conducts the meeting, and prepares the minutes. All problems or questions should be directed to him. Subcontractor QC personnel should also attend the meetings to discuss approaches to upcoming phases of work and correction of any deficiencies. Agendas for these meetings include items such as:

- Status of submittals;
- Review test reports for deficiencies and results;
- Review Construction Schedules to see which phases of control, tests, or inspections are scheduled for upcoming definable feature.
- Review outstanding problems from minutes of last meeting.

The QC Manager shall be required to address how the Contractor intends to correct problems. As part of the documentation of the project, the QC Manager must keep minutes of the meeting and distribute them to attendees. These minutes become part of the official contract file.

2.10 Submittals

One of the most important responsibilities of the QC Manager is to ensure that the Contractor, subcontractors, vendors, etc. submit their submittals in a timely manner to ensure the project schedule can proceed without any adverse impact. Critical submittals and long lead-time materials must be identified as separate activities on the schedule. The QC Manager must ensure that the submittal packages are complete so that valuable time is not wasted and effort lost on a resubmittal. Submittal status should be the lead off agenda item of the weekly Status/QC Meeting. The QC Manager, Submittal Reviewer(s) (if necessary), the A/E, and SDSTA team must partner on this effort and look far enough ahead (2-3 months) to ensure that the submittals are submitted soon enough to be approved by the A/E or the SDSTA. Timely submittal review and approval will enable the materials to be ordered and delivered to keep the project successfully, proceeding on or ahead of schedule.

Delays to the project schedule due to lack of diligence on submittals are unacceptable and should be viewed as a failure of the QC Manager and the SDSTA Project Management Team.

There are only two approval authorities for submittals, the SDSTA or their duly authorized representatives such as the A/E. The QC Manager has specific responsibilities regarding submittals:

- Coordinate all submittal actions
- Maintain necessary submittal records in an organized fashion
- Review and certify all submittals for compliance
- Check all material and equipment delivered to the project for compliance with the contract.

All submittals, shop drawings, catalog cuts, samples, etc., unless otherwise specifically noted, must be certified by the Contractor as conforming to the drawings and specifications. In most cases, the contract

documents will include Submittal Procedures Section, which will state the proper procedures for handling submittals.

Submittals are intended to document that materials and methods used, and/or tests conducted meet the requirements of the contract. A submittal is a “variation” in those cases where a Contractor proposes an item or procedure that is different in any material way from the requirements specified. Variations to contract requirements must be submitted, reviewed and approved by the SDSTA, prior to the work being done. In addition, any submittal forwarded to the SDSTA or A/E for approval that is a variation must be in writing, separate from the drawings and clearly marked as such. Failure to call attention to the variation is generally sufficient grounds for the SDSTA to recover costs in the event that a non-conforming variation must be later corrected.

When the Contractor submits for a variation, they will include (but not limited to) the following:

- The reason for the variation;
- A warrant that the proposed variation is compatible with all other aspects of the contract work;
- Substantiated change in cost, if applicable, either plus or minus (if resulting in a cost reduction, it should be submitted as a value engineering proposal); and,
- Any change in the time required to perform the work.

Under the Design-Build approach to design, the Contractor-A/E partnership cannot approve variations to the approved design even if the variations are “technically sufficient”. The SDSTA must approve these variations.

2.11 Testing

Tests shall be identified as specific activities on the schedule. The SDSTA Project Management Team shall identify critical tests (e.g.; fire protection, elevators, TABs, high voltage electrical, etc.) that must be included as construction schedule activities, during the constructability review. The team will coordinate the inclusion of this listing with the A/E so the importance of these tests is clearly conveyed to the contractor. By listing these tests, it must also be communicated that this listing is not to preclude the incorporation of other testing activities, but is provided to emphasize the importance of specific tests. The Contractor is still required to perform any sampling and testing required under the contract.

2.11.1 **Construction Materials Testing Laboratory Requirements**

The Contractor has to provide an independent construction materials testing laboratory, or in some cases establish a laboratory, accredited by an acceptable laboratory accreditation authority to perform sampling and tests required by the contract. The scope of the laboratory's accreditation must include the test methods required by the particular contract. Testing laboratories that have not yet obtained accreditation by an acceptable laboratory accreditation authority must submit an acknowledgment letter

from one of the laboratory accreditation authorities indicating that the application for accreditation has been received and the accreditation process has started. Certified statements, signed by an official of the testing laboratory attesting that the proposed laboratory, meets or conforms to the ASTM standards listed in the contract must be submitted to the PM for approval.

2.11.2 **Test Results**

The Contractor must cite applicable contract requirements, tests or analytical procedures used. He must provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. The Contractor must notify the SDSTA immediately if the item fails to conform. The cover sheet for each report must be stamped in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. A testing laboratory representative authorized to sign certified test reports shall sign test results. The Contractor must furnish the signed reports, certifications, and other documentation to the PM via the QC Manager. A summary report of field tests is required at the end of each month.

2.12 **Quality Control Certifications**

2.12.1 **Invoice Certification**

The Contractor must furnish a certificate to the SDSTA with each payment request, signed by the QC Manager, attesting that as-built drawings are current and attesting that the work for which payment is requested, including stored material, is in compliance with contract requirements.

2.12.2 **Completion Certification**

Upon completion of the work, or a specific portion thereof, the QC Manager shall furnish a certificate to the Authority attesting that "the work has been completed, inspected, tested and is in compliance with the Contract."

2.13 **Completion Inspections**

The basic premise of the "completion inspections" required under the contract is that the Contractor certifies the work as completed in accordance with the contract before the finished project is presented to the SDSTA for acceptance. There should be no surprises for the Contractor during the pre-final inspection, and no surprises to the client during the final walk through.

2.13.1 **Punch-Out Inspection**

Punch-Out Inspections may occur near the completion of all work or any portion thereof established by a completion time or stated elsewhere in the specifications. The QC Manager shall conduct an inspection of the work and develop a "punch list" of items that do not conform to the approved drawings and specifications. He shall include in the punch list any remaining items on the "Rework Items List" which were not corrected prior to the Punch-Out Inspection. The punch list shall include the estimated date by which the

deficiencies will be corrected. A copy of the punch list shall be provided to the SDSTA. The QC Manager or staff shall make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished the Contractor shall notify the SDSTA that the facility is ready for "Pre-Final Inspection."

2.13.2 **Pre-Final Inspection**

The SDSTA will perform a pre-final inspection to verify that the facility is complete and ready to be occupied. The PM should be sure to include members from FID and/or UGA and the end user of the facility to conduct the Pre-Final Inspection. An SDSTA "Pre-Final Punch List" may be developed as a result of this inspection. Each deficiency noted in the punch list shall reference the applicable reference (NEC, specification paragraph, Drawing No., etc.) that the deficiency stems from. The QC Manager shall ensure that all items on this list are corrected prior to notifying the SDSTA that a "Final" inspection with the customer can be scheduled. Any items noted on the "Pre-Final" inspection shall be corrected in timely manner and shall be accomplished within the time slated for completion of the entire work, or any particular increment thereof if the project is divided into increments by separate completion dates.

2.13.3 **Final Acceptance Inspection**

The QC Manager, the superintendent or other primary contractor management personnel, and SDSTA representatives will be in attendance at this inspection. The SDSTA based upon results of the "Pre-Final" inspection will formally schedule the final acceptance inspection. Notice is given to the SDSTA at least 14 days prior to the final inspection. The notice shall state that all specific items previously identified to the Contractor as being unacceptable, along with all the remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection.

2.14 **Documentation**

The CQM Program requires the Contractor to control quality and document that control. Site Safety inspections and environmental concerns are an integral part of construction quality and are therefore also included on these reports. As noted in Chapter 1, this involves a significant effort on the part of the Contractor.

The Contractor's reports in conjunction with the SDSTA reports (discussed in Chapter 3) provide the written record of job progress, control inspections, and tests. It is therefore critical that the Contractor's reports are correct and timely. These reports are the official record of work performance and compliance with drawings and specifications. The PM must obtain and review the Contractor's reports daily for accuracy and completeness. Any area(s) of disagreement must be resolved at the field level that day if possible. The PM should review these reports and ensure the QC/QA process is working.

The documentation that is generated by the QC System must be maintained in an orderly fashion. The QC Manager should maintain a series of 3-Ring binders for ready reference. These shall be arranged by specification section, and tabbed to include the following items:

- Milestone inspections arranged by Activity/Event Number for inspections conducted by the Contractor such as:
 - Pre-closure inspections for walls/ceilings
 - Mechanical/Electrical Room inspections
 - Punch-out Inspections
- Pre-final and Final Inspection results
- Rework Items Lists
- Test Results
- Contract Modifications arranged in numerical order

The SDSTA Project Management Team shall tailor the specification on larger projects to ensure that there is a comprehensive documentation process.

2.14.1 **Daily Reporting Requirements**

The Contractor must submit daily reports to the SDSTA. These reports are to be delivered to the PM or QA Rep no later than 10:00AM the following workday. The Contractor Daily Report is documentation of the efforts expended and progresses made on a daily basis. A sample of this report and the associated continuation sheet, which is used when the report lacks sufficient space, are included in Appendix D. Each entry in the Contractor Daily Report must tie to the activity underway on the Contractor's schedule and clearly identify the labor support on site for each subcontractor.

The use of this sample report format is mandatory. Any other format must be approved by the SDSTA and include the same information as shown on the samples. It is important that the reports be factual and complete as they provide a complete record of the contract.

2.14.2 **Other Contractor Reports & Documentation**

There are a number of other records and schedules required of the Contractor, in addition to the daily reports. They are a critical part of the overall written record of the contract.

2.14.2.1 Progress Schedule & Monthly Progress Report

The Contractor is required to provide an update of the approved progress schedule for the contract, and a report reflecting the progress to date with each invoice. These items are used in determining the valuation of the Contractor's progress payment. The Contractor is required to certify that he is invoicing only for work that meets the requirements of the contract.

2.14.2.2 Submittal Status Log

The submittal status log is a key part of the Contractor's QC System. The log shows the status of all shop drawings, certifications, and other submissions and shall be maintained at the project site. The log should be prepared on a standard computer spreadsheet or database. It shall show the specification paragraphs requiring a particular submittal, a description of the submittal, the early start date, who is the approver (A/E or SDSTA), and actual submission and approval dates on all actions. This allows the QC Manager to track the current status as well as pending or planned actions required by the Contractor, the A/E or the SDSTA.

2.14.2.3 Testing Plan and Log

The Contractor is required to prepare and maintain a Testing Plan and Log as part of the quality control documentation for the QC System. The plan should show the specification requirements, definable feature of work, required tests, sampling/testing by, test location and frequency. With this information the planned and current status of all required testing can be monitored by both the QC Manager and the PM. A sample Testing Plan and Log Form is provided as Appendix F.

2.14.2.4 Schedule of Values

The Schedule of Values is a document that is used to estimate progress payments. It is a Payment tool only, and is not to be used as a firm basis in estimating change orders. The schedule of values may be deleted from the contract requirements when a cost-loaded network schedule is required by the contract or selected by the Contractor.

2.14.2.5 As-built Record of Materials Used in Buildings

The QC Manager is required to maintain an accurate record of the materials incorporated into the facility. Upon completion of construction the records must be submitted to the SDSTA for record purposes.

2.14.2.6 As-built Record Drawings

Two, full size sets of drawings must be maintained on site and updated on a daily basis, showing all deviations made from the contract drawings, including buried or enclosed utilities and conditions revealed during construction. The PM must check the As-Builts each month. No progress payments should be made unless the As-Builts are certified to be up to date. Upon completion of construction the As-Built Drawings must be certified as accurate by the QC Manager and submitted to the SDSTA for record purposes. For permanent below surface excavations, these As-Builts shall include a laser-scan or similar type documentation of the final excavated structure.

2.14.2.7 Rework Items List

The list should indicate the date identified, description of each deficiency, contract requirement, action taken, resolution and the date corrected. The QC Manager should establish an agenda item to review the progress of actions to correct the items identified on the rework list. The QC Manager should not be required to record a deficiency that is corrected on the same day it is discovered. The QC Manager should

not allow the adding to, building upon or enclosing of, nonconforming work. A sample format for a Rework Items List is shown in Appendix G.

2.15 Non-Compliance

Specific actions are required on the part of the QC Organization in instances where non-compliance is encountered. The primary focus of the QC System is prevention. When this fails and non-compliance is encountered, the QC organization must identify, document, and correct the non-compliance.

The PM must take decisive actions if the Contractor's QC Organization is not effective and an unacceptable number of non-compliance issues are identified.