ROICC
CAMP PENDLETON

NAVFAC
Naval Facilities Engineering Command

Resident Officer In Charge of Construction
MCB Camp Pendleton

Field Leadership Quality Control Conference

February 22, 2011

Quality Assurance Officer

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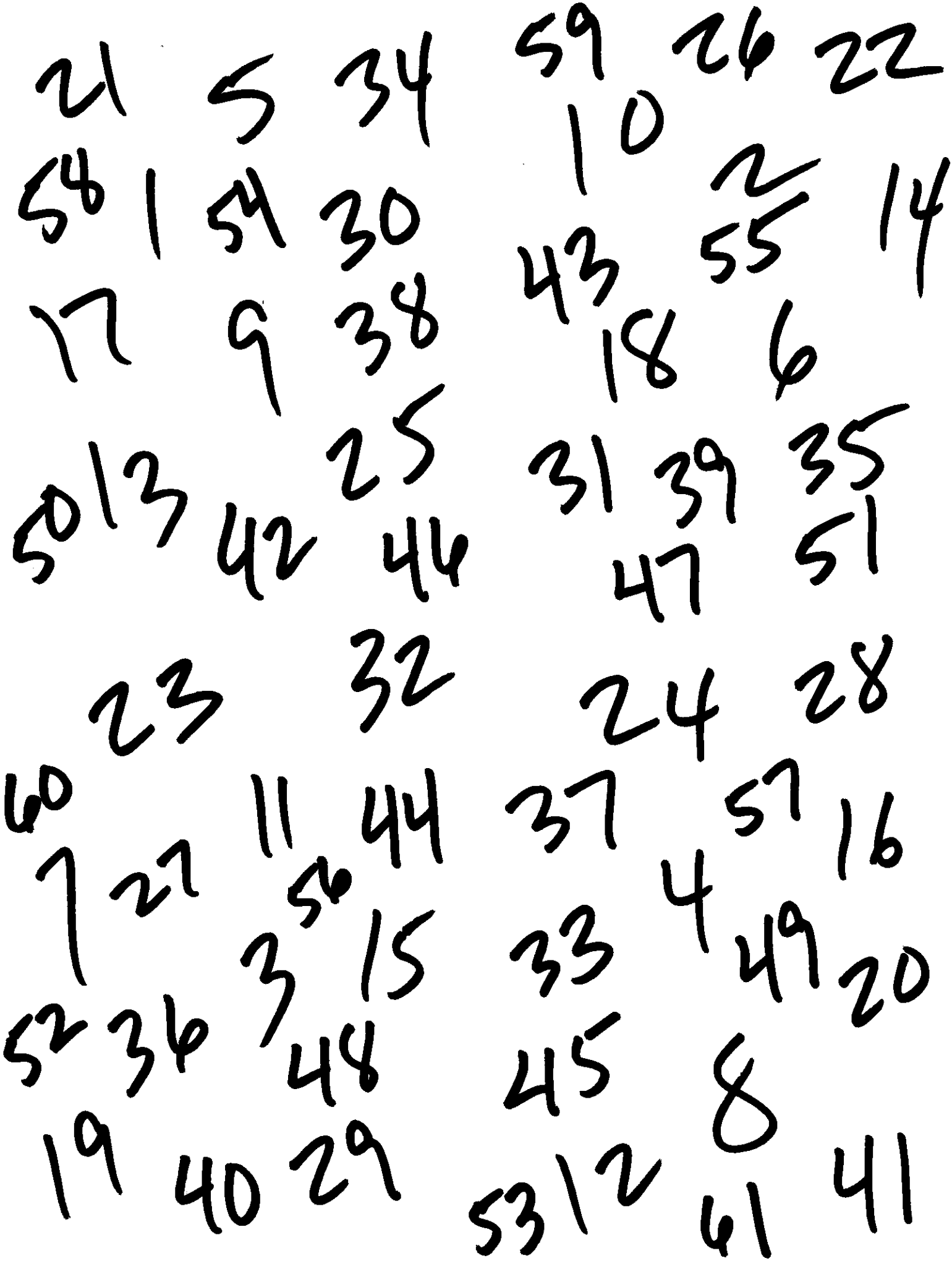
Agenda

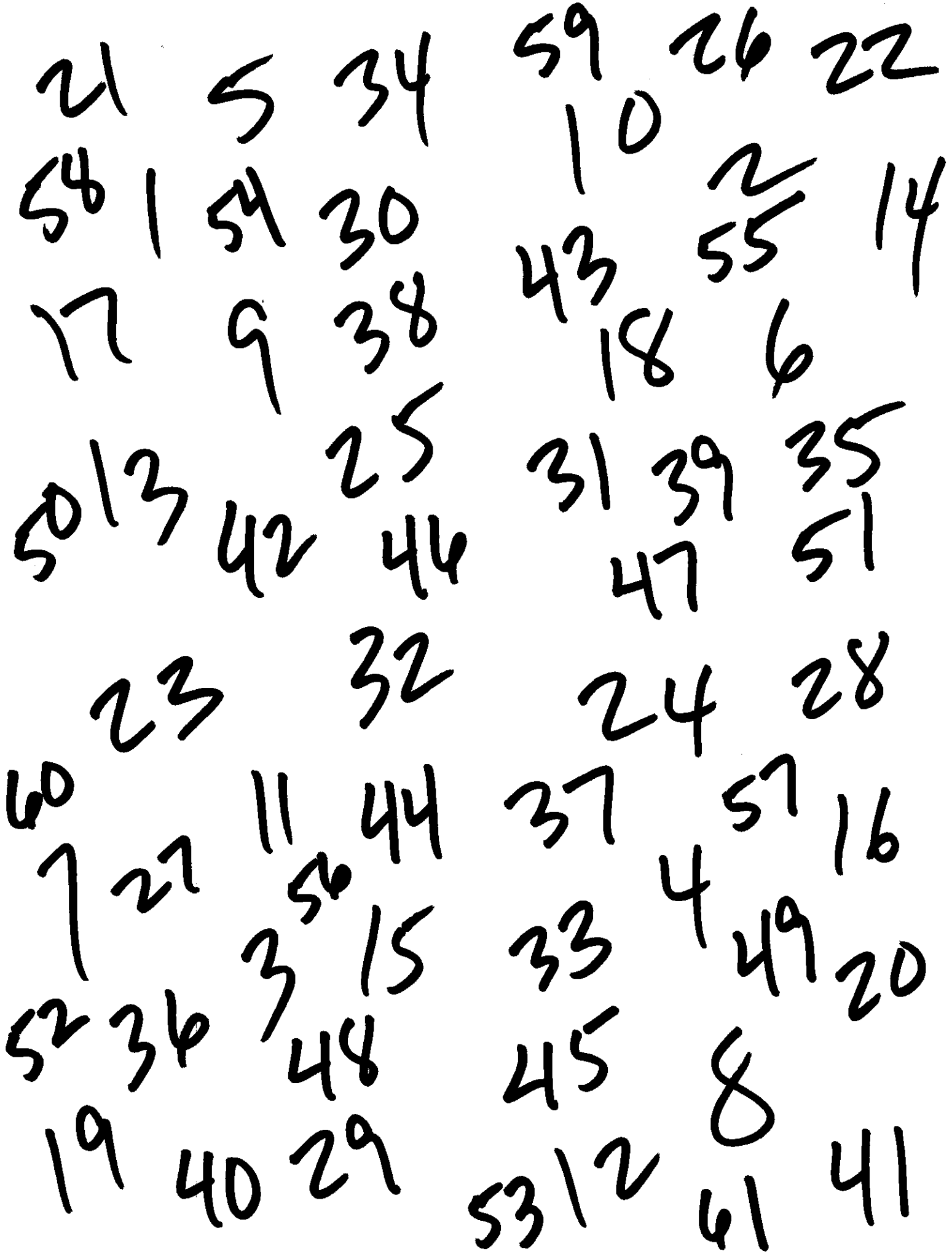
- ROICC Welcome
- CQM Program Overview
- SWPP Best Management Practices and Lessons Learned
- FMD Quality Lessons Learned
- Underground Hydronic Piping
- Contractor QC Perspective

QUALITY CONTROL

PLAN

01 45 00.05 20





SECTION 01 45 00.05 20

DESIGN AND CONSTRUCTION QUALITY CONTROL
05/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E 329	(2002) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety -- Safety and Health Requirements

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED-NC	(2002; R 2005) Leadership in Energy and Environmental Design ? Green Building Rating System for New Construction (LEED-NC)

1.2 SUBMITTALS

The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES and Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Design Quality Control (DQC) Plan; G

Submit a DQC Plan prior to the Post Award Kickoff Meeting.

Construction Quality Control (CQC) Plan; G

Submit a Construction QC Plan prior to start of construction.

[Commissioning Plan; G

Submit a Commissioning Plan within 60 days of approval of CxAuthority.]

SD-05 Design Data

Design Quality Control Documentation; G

Submit Design Quality Control Documentation identified in the DQCP with each design submittal identified in Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES

SD-07 Certificates

Preliminary Inspections and Final Acceptance Testing; G

Final Life Safety/Fire Protection Certification; G

IBC Special Inspections Certification; G

SD-11 Closeout Submittals

[Summary Commissioning Report; G]

[Training Course Outline; G

Training Video Recording; G]

1.3 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program that is administered by a Design and Construction Quality Control organization, using Quality Control (Design and Construction) Plans, Commissioning Plans and Reports, meetings, a Coordination and Mutual Understanding Meeting, three phases of control, submittal review and approval, testing, completion inspections, and QC certifications and documentation necessary to provide design, materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract. The QC program shall cover on-site and off-site work. No construction work or testing may be performed unless the QC Manager is on the work site.

1.3.1 Design and Construction Quality Control Plans

The Contractor shall provide a project specific Design Quality Control (DQC) Plan and Construction Quality Control (CQC) Plan, for review and approval by the Government. The Contractor shall perform no design until the DQC Plan is approved and no construction until the CQC Plan is approved. The Contractor's plan shall include the following:

a. The QC organization for this contract, including member resumes.

b. A letter from an officer of the company designating the QC Manager, Alternate QC Manager, DQC Manager, [Commissioning Authority,]and their authority.

c. QC Manager qualifications.

d. DQC Manager qualifications.

e. List of Definable Features of Work (DFOW) including list of design submittal packaging. DFOW is a task that is separate and distinct from other tasks and has control requirements and work crews unique to the task.

f. For the QC Plan, a plan to implement the "Three Phases of Control" for each DFOW.

g. For the QC Plan, a testing Plan, log and list of personnel and accredited laboratories that will perform tests. Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation with the testing plan.[Coordinate this testing Plan with the Commissioning Plan verification testing requirements to avoid duplication of effort.]

h. Submittal Log including design submittals, listing personnel who will review submittals and noting submittals for Government review.

i. Procedures for submitting and reviewing variations prior to submission to the Government.

j. As a part of the Contractor's plan, a statement of Special Inspections shall be prepared by the Designer of Record (DOR) describing a complete list of materials and work requiring special inspections, the inspections to be performed and any applicable quality assurance plans and structural observations. The Contractor's plan shall for implement the applicable requirements of the International Building Code (IBC), Chapter 17 "Structural Tests and Special Inspections." The plan shall include a listing of the individuals, approved agencies or firms that will be retained for conducting the required special inspections accompanied by a description of individual inspector's experience and a copy of all required certifications. Structural tests and special inspections, as outlined in Chapter 17 of the IBC, shall be conducted by individuals and agents that are under the direct supervision of a Registered Design Professional (RDP) and meet the requirements of ASTM E 329.

k. A plan for assuring the proper design, construction, installation of all life safety and fire protection features across all disciplines and trades. Examples of life safety and fire protection features include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as fire rated walls/partitions and spray-applied fire proofing of structural components, fire alarm and detection systems, fire suppression and standpipe systems, means of egress components, emergency and exit lighting fixtures. As a part of the plan, a statement of Special Inspections shall be prepared by the Fire Protection Engineer Designer of Record (DOR) describing a complete list of materials and work requiring special inspections, the inspections to be performed and any applicable quality assurance plans and fire protection observations. The plan will include a listing of the individuals, approved agencies or firms that will be retained for conducting the required special inspections accompanied by a description of individual inspector's experience and a copy of all required certifications.

l. For the DQC plan, submit a formal Communication Plan that indicates the frequency of design meetings and what information is covered in those meetings, key design decision points tied to the

Network Analysis Schedule, and how the DOR plans to include the Government in those decisions, peer review procedures, interdisciplinary coordination, design review procedures, comment resolution, etc.

The Design Communication Plan will emphasize key decisions and possible problems the Contractor and Government may encounter during the design phase of the project. Provide a plan to discuss design alternatives and design coordination with the stakeholders at the key decision points as they arise on the project. Identify individual stakeholders and suggested communication methods that will be employed to expedite and facilitate each anticipated critical decision. Communication methods may include: Concept Design Workshop, over-the-shoulder review meetings, presentation at client's office, lifecycle cost analysis presentation, technical phone conversation, and formal review meeting. The design portion of the Communication Plan must to be written by the DQC Manager and confirmed during the Post Award Kick off Partnering. Update the Communication Plan at every Partnering meeting.

m. For the DQC Plan, procedures for insuring the design documents are submitted in accordance with UFC 1-300-09N, Design Procedures and other procedures to ensure disciplines have been properly coordinated to eliminate conflicts.

n. The DQC Plan shall identify Design Quality Control documentation, for example QC Check Sets, QC Review Comments, etc.. This documentation shall at a minimum document the cross check of each discipline/consultant's drawings to one another for completeness and accuracy; the cross check of drawings and specifications; comments from discipline peer review for technical accuracy; and comments from subcontractors on constructability.

o. For the DQC Plan, a list of design subcontractors and the scope of the work which each firm will accomplish.

[1.3.2 Commissioning Plan

The Contractor shall provide a project specific Commissioning Plan for review and acceptance by the Government. Develop and submit the Commissioning Plan to define the on-site activities and roles and responsibilities for commissioning all building systems required by the Project Program paragraph entitled, Building Commissioning. The Commissioning Plan shall be updated as information changes during the project. The Plan shall include all items required by the LEED-NC version 2.2 and shall include the following:

a. Commissioning Authority qualifications and experience.

b. A description of the Commissioning Team's roles and responsibilities as well as organizational relationships with the Contractor's QC Manager, DQC Manager, and verification and testing personnel.

c. A listing of all systems required to be commissioned.

d. A description of all commissioning process activities. Include the sequence and schedule for starting and balancing air distribution systems to ensure construction materials, such as architectural finishes, are installed under the appropriate environmental conditions. Also address the procedure that will be

used to "dry out" the structure.

e. A procedures and schedule for functional performance tests of all systems to be commissioned. The Commissioning Authority shall be present for all functional performance tests. Coordinate this schedule with the QC Plan testing requirements to avoid duplication of effort.

f. A procedure and schedule detailing training sessions for Government personnel. Training sessions are to address maintenance and operation of systems required to be commissioned.

1.3.3 Summary Commissioning Report

The Commissioning Authority shall provide a Summary Commissioning Report upon completion of the performance verification items. The Summary Commissioning Report shall include all items required by LEED-NC version 2.2 and shall include the following:

a. Executive Summary of the commissioning process including results and observations of the commissioning program.

b. A history of deficiencies identified and their resolution. Indicate outstanding issues to be resolved.

c. Commissioned systems performance test results and evaluations.]

1.4 QC ORGANIZATION

The QC Manager shall report to an officer of the firm and shall not be subordinate to the Project Superintendent or the Project Manager.

The Contracting Officer may require the QC Manager, or the DQC Manager, be removed and replaced, if the Contracting Officer determines that either is not performing satisfactorily.

1.4.1 QC and Alternative QC Manager

QC and Alternative QC Manager qualifications:

a. Complete the course entitled "Construction Quality Management (CQM) for Contractors." and shall maintain a current certificate.

b. [Five] [_____] years of combined experience as a Superintendent, QC Manager, Project Manager, or Project Engineer on similar size and type construction contracts, and at least two years experience as a QC Manager.

c. Familiar with requirements of USACE EM 385-1-1, and experience in the areas of hazard identification and safety compliance.

QC and Alternative QC Manager responsibilities:

a. Participate in the Post Award Kick-off, Partnering, Preconstruction, Design Development, and Coordination and Mutual Understanding Meetings.

b. Implement the "Three Phase of Control" plan for each DFOW and notify the Contracting Officer at least 3 business days in advance of each Preparatory and Initial Phase meeting. Submit respective checklists to the Contracting Officer the next business day.

c. Ensure that no construction begins before the DOR has finalized the design for that segment of work, and construction submittals are approved as required.

d. Inspect all work and rework, using International Conference of Building Officials certified QC specialists as applicable, to ensure its compliance with contract requirements. Maintain a rework log.

e. Immediately stop any segment of work, which does not comply with the contract and plans and specifications, and direct the removal and replacement of any defective work.

f. Remove any individual from the site who fails to perform their work in a skillful, safe and workmanlike manner or whose work does not comply with the contract plans and specifications.

g. Prepare daily QC Reports.

h. Ensure that Contractor Production Reports are prepared daily.

i. Hold [weekly] [bi-weekly] QC meetings with the DQC Manager, [Commissioning Authority,]DOR (or representative), Superintendent and the Contracting Officer; participation shall be suitable for the phase of work. Distribute minutes of these meetings.

j. Ensure that design and construction submittals are reviewed and approved, as required by the contract, prior to allowing material on site and work to proceed with these items. Maintain a submittal log.

k. Update As-built drawings daily, maintaining up-to-date set on site.

l. Maintain a testing plan and log. Ensure that all testing is performed in accordance with the contract. Review all test reports and notify the Contracting Officer of all deficiencies, along with a proposal for corrective action.

m. Maintain rework log on site, noting dates deficiency identified, and date corrected.

n. Certify and sign statement on each invoice that all work to be paid under the invoice has been completed in accordance with contract requirements.

o. Perform Punch-out and participate in Pre-final and Final Inspections. Submit list of deficiencies to the Contracting Officer for each inspection. Correct all deficiencies prior to the Final inspection. Notify Contracting Officer prior to final inspection to establish a schedule date acceptable by the Contracting Officer.

p. Ensure that all required keys, operation and maintenance manuals, warranty certificates, and the As-built drawings are correct and complete, in accordance with the contract, and submitted to the Contracting Officer.

q. Assure that all applicable tests, special inspections, and observations required by the contract are performed.

r. Coordinate all factory and on-site testing, Testing Laboratory personnel, QC Specialists, and any other inspection and testing personnel required by this Contract and notify the Contracting Officer of testing schedules. Notify the Contracting Officer of factory testing scheduled for electrical equipment at least 21 days prior to test.

s. Notify the Contracting Officer of any proposed changes to the QC plan.

t. Retain a copy of approved submittals at project site, including Contractor's copy of approved samples.

u. Update the Performance Assessment Plan as described in the UFGS section 01 31 19.05 20, Post Award Meetings and discuss monthly at a QC meeting.

1.4.2 DQC Manager

The DQC Manager shall be a member of the QC organization, shall coordinate actions with the QC Manager, and shall not be subordinate to the Project Superintendent or the Project Manager.[The DQC Manager may also act as the Commissioning Authority if all Commissioning Authority qualifications are met.]

DQC Manager qualifications:

a. A minimum of [5][_____] years experience as a design Architect or Engineer on similar size and type designs /or design-build contracts. Provide education, experience, and management capabilities on similar size and type contracts.

b. Be a registered professional engineer or architect with an active registration. Provide proof of registration as part of the resume submittal package.

DQC Manager responsibilities:

a. Be responsible for the design integrity, professional design standards, and all design services required.

b. Be a member of the Designer of Record's (DOR) firm.

c. Be responsible for development of the design portion of the QC Plan, incorporation and maintenance of the approved Design Schedule, and the preparation of DQC Reports and minutes of all design meetings.

d. Participate in the Post Award Kick-Off, all design planning meetings, design presentations, partnering, and QC meetings.

e. Implement the DQC plan and shall remain on staff involved with the project until completion of the project.

f. Be cognizant of and assure that all design documents on the project have been developed in accordance with the Contract, and have been properly coordinated.

g. Develop the submittal register. Coordinate with each DOR to determine what items need to be submitted, and who needs to approve.

[h. Coordinate all training issues and validate that the testing and training requirements of this contract are accomplished.]

i. Provide QC certification for design compliance.

j. Certify and sign statement on each invoice that all work to be paid to the DOR under the invoice has been completed in accordance with the contract requirements.

k. Prepare weekly DQC Reports that documents the work the design team accomplished that week.

[1.4.3 Commissioning Authority

Commissioning Authority qualifications:

The Commissioning Authority shall be a member of the QC organization, shall coordinate actions with the QC Manager, shall not be subordinate to the Project Superintendent or the Project Manager, and shall report findings directly to the Government. The Commissioning Authority may also act as the DQC Manager if all DQC Manager qualifications are met. The Commissioning Authority selected shall meet the requirements of LEED-NC with the following additional qualifications:

a. Be certified by a recognized Building Commissioning Organization. Acceptable minimum certifications are "Certified Cx Agent" from the Associated Air Balance Council (AABC); "Certified Building Cx Professional" from the Association of Energy Engineers (AEE); "Certified Cx Professional (CxP)" from the Building Commissioning Association (BCA); or "Commissioning Process Authority Professional" or "Commissioning Process Manager" from the University of Wisconsin College of Engineering.

b. Have documented Commissioning Authority experience in at least two building projects. Provide proof of commissioning experience as part of the Commissioning Plan.

Commissioning Authority responsibilities:

a. Be responsible for development of the Commissioning Plan, the Summary Commissioning Report, and minutes of all commissioning meetings.

b. Participate in the Post Award Kick-Off, all design planning meetings, design presentations, partnering, and QC meetings.

c. Review the Request for Proposal (RFP) for energy and sustainability goals, system expectations, O&M requirements, training expectations, and construction quality expectations.

d. Review the Basis of Design and ensure the RFP requirements are met.

e. Ensure commissioning requirements are incorporated into the construction documents.

f. Be responsible for implementation and updating of the Commissioning Plan.

g. Be responsible for development of systems functional testing procedures.

h. Ensure pre-functional installation inspections are performed on all systems indicated to be commissioned in accordance with the Commissioning Plan and Contract documents.

i. Verify systems performance of all systems indicated to be commissioned in accordance with the Commissioning Plan and Contract documents.

j. Report any deficiencies in installation or performance of all systems indicated to be commissioned.

k. Coordinate all training issues and validate that the testing and training requirements of this contract are accomplished.]

1.4.4 QC Specialists

QC Specialists shall assist and report to the QC Manager and may perform production related duties but must be allowed sufficient time to perform their assigned quality control duties. QC Specialists are required to attend the Coordination and Mutual Understanding Meeting, QC meetings and be physically present at the construction site to perform the three phases of control and prepare documentation for each definable feature of work in their area of responsibility at the frequency specified below.

1.4.4.1 Fire Protection QC Specialist

The Fire Protection QC Specialist shall be a U.S. Registered Fire Protection Engineer (FPE) and shall be an integral part of the Prime Contractor's Quality Control Organization. This FPE shall have no business relationships (owner, partner, operating officer, distributor, salesman, or technical representative) with any fire protection equipment device manufacturers, suppliers or installers for any such equipment provided as part of this project. The Fire Protection Designer of Record may serve as the lead Fire Protection QC Specialist, provided the following qualifications are met.

a. Qualifications/Experience: The FPE shall have obtained their professional registration by successfully completing the Fire Protection Engineering discipline examination. This FPE shall have a minimum of 5 years full time and exclusive experience in every aspect of facility design and construction as it relates to fire protection, which includes, but is not limited to, building code analysis, life safety code analysis, design of automatic detection and suppression systems, passive fire protection design, water supply analysis, and a multi-discipline coordination reviews, and construction surveillance.

b. Area of Responsibility: The FPE is responsible for assuring the proper construction and installation of life safety and fire

protection features across all disciplines and trades. The FPE shall be responsible for assuring that life safety and fire protection features are provided in accordance with the design documents, approved construction submittals, and manufacturer's requirements. Examples include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as spray-applied fire proofing of structural components and fire rated walls/partitions, fire alarm and detection systems, fire suppression and standpipe systems, emergency and exit lighting fixtures, etc.

c. Construction Surveillance: The FPE shall visit the construction site as necessary to ensure life safety and fire protection systems are being constructed, applied, and installed in accordance with the approved design documents, approved construction submittals, and manufacturer's requirements. Frequency and duration of the field visits are dependent upon particular system components, system complexity, and phase of construction. At a minimum, field visits shall occur just prior to installation of suspended ceiling systems to inspect the integrity of passive fire protection features and fire suppression system piping, and required performance verification testing of all life safety and fire protection systems identified below and in Part 4.

(1) Preliminary Inspections and Final Acceptance Testing: FPE shall personally witness all preliminary inspections of fire alarm/detection and suppression systems. Once preliminary inspections have been successfully completed, the FPE shall submit a signed certificate to the QC Manager that systems are ready for final inspection and testing. The Naval Facilities Engineering Command Fire Protection Engineer will witness formal tests and approve all systems before they are accepted. The QC Manager shall submit the request for formal inspection at least [15] [__] days prior to the date the inspection is to take place. The QC manager shall provide 10 days advance notice to the Contracting Officer and the activity Fire Inspection Office of scheduled final inspections.

(2) Final Life Safety/Fire Protection Certification Documentation: The FPE shall provide certification that all life safety and fire protection systems have been inspected and, in the FPE's professional judgment, have been installed in accordance with the contract documents, approved submittals, and manufacturer's requirements. This certification shall summarize all life safety and fire protection features, and shall bear the professional seal of the fire protection engineer.

[1.4.4.2 Mechanical QC Specialist

Qualification/Experience in Area of Responsibility	Area of Responsibility	Frequency
Mechanical Inspector, International Conference of Building Officials (ICBO) Certified/5 years minimum	Installation and Testing of Boilers	Minimum 3 times a week during installation and full-time during testing
Elevator Inspector, International Conference	Testing of Elevators	Minimum 3 times a week during

of Building Officials (ICBO) Certified/5 years minimum		installation and full-time during testing
Mechanical Testing QC Specialist/Registered Mechanical Engineer, (PE)	Testing of Mechanical Systems	Full-time during testing

] [1.4.4.3 Soils Testing/Pile Installation and Testing QC Specialists

Provide IBC Special Inspections Certification provided by the following specialist(s):

Qualification/Experience in Area of Responsibility	Area of Responsibility	Frequency
[ ]	[ ]	[ ]

] 1.5 THREE PHASES OF CONTROL

The Three Phases of Control shall adequately cover both on-site and off-site work and shall include the following for each DFOW.

1.5.1 Preparatory Phase

Notify the Contracting Officer at least two work days in advance of each preparatory phase meeting. The meeting shall be conducted by the QC Manager and attended by the Project Superintendent, QC Specialists, and the foreman responsible for the DFOW. The DQC Manager shall also attend if required by structural tests and special inspections, as outlined in Chapter 17 of the IBC and the DQC Plan. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman shall attend the preparatory phase meeting. Document the results of the preparatory phase actions in the [daily Contractor Quality Control Report and in the] Preparatory Phase Checklist. Perform the following prior to beginning work on each DFOW:

a. Review each paragraph of the applicable specification sections;

b. Review the Contract drawings;

c. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required;

d. Review the testing plan and ensure that provisions have been made to provide the required QC testing;

e. Examine the work area to ensure that the required preliminary work has been completed;

f. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop

drawings and submitted data;

g. Discuss the specific controls used in construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW; and

h. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted.

1.5.2 Initial Phase

Notify the Contracting Officer at least two work days in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with the Project Superintendent, QC Specialists, and the foreman responsible for that DFOW. The DQC Manager shall also attend if required by structural tests and special inspections, as outlined in Chapter 17 of the IBC and the DQC Plan. Observe the initial segment of the DFOW to ensure that the work complies with Contract requirements. Document the results of the initial phase in the [daily CQC Report and in] Initial Phase Checklist. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each DFOW:

a. Establish the quality of workmanship required;

b. Resolve conflicts;

c. Ensure that testing is performed by the approved laboratory, and

d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

e. Ensure manufacturer's representative has performed necessary inspections, if required.

1.5.3 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily CQC Report:

a. Ensure the work is in compliance with Contract requirements;

b. Maintain the quality of workmanship required;

c. Ensure that testing is performed by the approved laboratory; and

d. Ensure that rework items are being corrected.

1.5.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW is resumed after

substantial period of inactivity, or if other problems develop.

1.5.5 Notification of Three Phases of Control for Off-Site Work

Notify the Contracting Officer at least two weeks prior to the start of the preparatory and initial phases.

1.6 COMPLETION INSPECTIONS

The Contractor shall perform the necessary prefinal inspections, compile punchlists, and correct deficiencies. Notify the Contracting Officer 5 calendar days prior to the date a prefinal inspection can be held. Notify the Contracting Officer at least 14 calendar days prior to the date a final acceptance inspection can be held. The Government will perform final inspection to verify that the facility is complete and ready to be occupied. All items previously identified on the prefinal punchlist will have been corrected and acceptable.

[1.7 TRAINING

The [redacted] [redacted] shall provide a comprehensive project-specific Government personnel training program for the systems of the facility specified in the technical specifications of this Contract. The core of this training will be based on manufacturer's recommendations and the operation and maintenance support information (OMSI) provided as a part of this Contract. Training shall include classroom discussion as well as hands on maintenance, replacement of typical components and repair type maintenance training for parts typically replaced or repaired in the field, such as:

1. Domestic water pressure boosting system

2. Plumbing systems, including temperature actuated thermostatic water mixing valve

3. HVAC Systems, including chillers, boilers, heat pumps, air handling equipment, exhaust fans, fan coil units, hot and chilled water pumping system

4. Steam condensate pumps

5. Direct Digital Controls/Space Temperature Controls

6. Electrical systems, including transformers, diesel-electric generator sets, automatic transfer switches, primary switchgear, secondary switchgear, high-voltage switchgear, variable frequency drives, and frequency converters

7. Fire protection systems, including fire alarm systems and detection systems

8. Site mechanical utilities, including cathodic protection

9. Site electrical utilities, including substations, transformers, and pad mounted switchgear

10. Wastewater pump systems

11. [redacted]

Provide each trainee in the course a written training course outline. Submit outline for approval at least 90 calendar days prior to training session. Provide to the Contracting Officer two copies of the training video recording in VHS or DVD format. Confirm media format required with the using activity. The recording shall capture, in video and audio, all instructors training presentations including question and answer periods with the trainees.

] 1.8 DOCUMENTATION

Maintain current and complete records of on-site and off-site QC program operations and activities.

-- End of Section --

COMPLETION INSPECTIONS

Completion Inspections by the contractor's QC organization ensure a facility that complies with the contract for turnover to the government. When work is complete, the QCM conducts a *Punch-out Inspection*. After correction of the punch list work, the QCM participates in a *Pre-Final Inspection* and *Final Acceptance Inspection* with the government. Effective QC action enables the contractor to expeditiously schedule and complete outstanding compliance items. Prompt completion allows full payment to be made.

REPORTING

Documentation is the proof of QC efforts and contract compliance. The required reports must be complete and accurate, must validate the adequacy of quality controls, and must be submitted timely.

Daily Production Reports document prime and subcontractors' activities and safety compliance. *Daily QC Reports* list the *DFOW*, Phase of Control, observations, results of control actions taken and any corrective actions. Include complete information on the 3 Phase controls, inspections, tests, rejected work, and safety monitoring. Document instructions received from the government.

Each daily report entry must be referenced to its associated *Schedule Activity ID*.

GOVERNMENT ROLE

The government will review daily reports and other required documentation to determine the adequacy of the contractor's QC system. The government's interest is that the contractor maintains the necessary control to prevent any "rework" or tear out. The government will emphasize inadequacies in the quality control program instead of individual construction deficiencies.

QC + QA = CQM

Construction Quality Management (CQM) requires the combined efforts of contractor QC personnel and government QA personnel to achieve our shared goals - quality construction built safely, on time and within budget.

Naval Facilities
Engineering Command

1322 Patterson Ave SE Suite 1000
Washington Navy Yard DC 20374-5065

Effective quality control supports worker pride, results in favorable recognition, and has the potential to increase the profit margin for contractors.

Achieving high quality performance can help the contractor earn repeat business.

NAVAL FACILITIES ENGINEERING COMMAND

For more Information

202 685 9210

Effective Quality Control

Department of the Navy

QUALITY CONTROL DRIVES COSTS DOWN...DRIVES PRODUCTION AND CUSTOMER SATISFACTION UP!

Achieving Construction Quality

Construction contractors enhance their opportunity for Navy business by maintaining a strong project Quality Control (QC) system. Schedule goals are achieved through regular production/QC meetings and proactive contractor leadership that "builds it right the first time" and builds it safely. QC staff manage specified QC processes, including submittals, preventive controls, inspections, tests and documentation. The contractor manages daily quality control of all trades from project award through Completion Inspections and acceptance by the government. The government, in its Quality Assurance (QA) role, ensures that the contractor's QC system is effective.

THREE PHASE CONTROL CONCEPT

The contractor's control of quality is divided into three phases for each Definable Feature of Work (*DFOW*). A *DFOW* is a task that is separate from other tasks and has control requirements unique to that task. Typical examples of *DFOWs* are exterior water piping, excavation for foundations, concrete foundations, masonry walls, interior electrical wiring, etc. Performance of all three phases is the contractor's responsibility. Each control phase is an opportunity to prevent problems and costly rework.

CONTRACTOR RESPONSIBILITIES

- Produce a quality product on time, safely and in compliance with the contract.
- Provide a quality control program that prevents deficiencies.
- Identify each proposed *DFOW* and establish a 3-Phase control process.
- Inspect construction and perform specified testing to ensure quality.
- Track and correct any non-complying work.
- Provide submittals of all products incorporated into the work.
- Document and maintain records of all QC activities.
- Perform Punch-Out Inspections and participate in Pre-Final and Final Acceptance Inspections.

PLAN OF ACTION

Requirements for developing the *QC Plan* are found in the QC specifications of the contract. The contractor submits a QC Plan showing how the designated QC organization will proactively manage and control all *on-site* operations, and *offsite* fabrication, e.g., structural steel, precast concrete, major systems.

REQUIRED MEETINGS

Prior to the start of work, a *Pre-Construction Conference*, a *QC Plan Meeting* and a *Coordination and Mutual Understanding Meeting* are held. These meetings ensure a complete understanding of the QC system and clarify the interrelationships between contractor and government personnel. During construction, the contractor conducts regular *QC/progress meetings*, *Preparatory* and *Initial Phase meetings*.

TRAINING

The contractor's Quality Control Manager (QCM) is required to be thoroughly familiar with the NAVFAC Construction Quality Management Program and specific requirements to ensure contract compliance. QCMs are required to complete and receive certification of completion of NAVFAC's training course, *Construction Quality Management for Contractors*, prior to serving as QCMs.

SUBMITTALS AND PROCUREMENT CONTROL

The contractor is responsible for *review*, *approval* and management of submittals and for *timely delivery* of approved materials, fabricated items and equipment to be installed. The contract lists the required submittals. The QCM *certifies* that each submittal is in compliance with the technical provisions of the contract. The contractor prepares a Submittals Register and a network of scheduled activities, updating each monthly to minimize the potential for construction delays due to missing or unapproved materials or equipment. The schedule must allow adequate time for government-approved submittals.

TESTING

Testing is the contractor's responsibility and is essential to controlling quality. The contractor must:

- Check the contract to determine required on-site and off-site testing.
- Select qualified personnel, labs, equipment and procedures that comply with specified standards.
- Schedule timely testing and follow-up testing.
- Submit required testing documentation in a timely manner.

The government may check laboratories, equipment, and procedures for compliance.

Applying *Three Phases of Control* to a Typical Activity/*DFOW**

The *Preparatory Phase* of Control must be completed before the simultaneous start of the applicable construction activity and its *Initial Phase* of Control. The subsequent *Follow-up Phase* continues for the remaining activity duration.

*Using a simplified construction schedule

Three Phases of Control

The Preparatory Phase
is performed and documented *prior to* starting the *DFOW*. Example actions include: reviewing and approving submittals; reviewing applicable contract drawings, specifications, test requirements, safety requirements and Activity Hazard Analyses; inspecting delivered materials and construction to be interfaced with, etc. Construction standards and contract interpretation issues are discussed and settled before start of the *DFOW* to avoid the need for "tear out" after work is in place. The preparatory process pays dividends by locating and resolving conflicts in advance of construction.

The Initial Phase
is performed and documented at the *beginning* of each *DFOW*. This is an opportunity for the contractor to get the work off to a proper start in compliance with contract requirements and to establish standards and quality of workmanship. Testing procedures and compliance with safety standards are validated. The Initial Phase helps to achieve preventive control and to reach early agreements on quality.

The Follow-up Phase
for each *DFOW* is surveillance, inspection and documentation of the work to determine *continuation* of compliance with the contract requirements and quality of workmanship confirmed during the Preparatory and Initial Phases. The Follow-up Phase may be performed on a daily, routine, or predetermined basis as required to ensure contract compliance. The Follow-up Phase is more productive when preceded by thorough Preparatory and Initial Phases.

Construction Stormwater Brief
ROICC Camp Pendleton

QC Conference

February 22, 2011

Objective

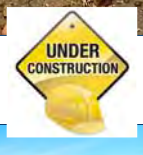
TO AVOID:

1. NOTICE OF VIOLATIONS FROM THE WATER BOARD!

2. NON-COMPLIANCE FORMS FROM THE GOVT!

AVOID THIS!!





DO THIS!!






DO THIS!!..some paper work (but not limited to...)

- WEEKLY INSPECTION FORM EVERY WEEK EVEN IF NO WORK! [Daily for Utility Projects]
  - FOR ANNUAL REPORT SUBMITTAL REQUIRED BY SEPT 2011 OR SOONER.
- POST SWPPP AS-BUILT WITH RED LINES IN TRAILER.
  - DATE & INITIAL BMP CHANGES
- FILL OUT FORMS IN SWPPP APPENDICES

DO THIS!!

SCHEDULE LANDSCAPING AS SOON AS PRACTICAL.

70% COVERAGE = N.O.T.

(Reduce Violation Risk)

DO THIS!!

GET QSP Certified by Sept 2 2011

CESSWI INSPECTOR

CISEC CERTIFIED INSPECTOR SEDIMENT AND EROSION CONTROL

Take your pick, but gotta take a test! Ugh!

With

California Environmental Protection Agency
STATE WATER RESOURCES CONTROL BOARD

QSP EXAM

Warning !

There are no sediment-impaired water bodies aboard CPEN (yet), but…

The Water Board issues a new list of impaired waters every 2 years. If CPEN waters become impaired by sediment, we will be subject to the most stringent Risk Level 3 requirements = MORE WORK FOR YOU!!!

SO KEEP THE DIRT INSIDE YOUR FENCE !

IMPORTANT TASK FOR COMPLIANCE

A rainy day is not a day off !

1. Put on your rain coat.
2. Go to your construction site.
3. Inspect the BMPs
4. Make corrective actions and record on inspection sheets.
5. Walk to the final point of discharge and make sure the water is clear.
6. If not, increase BMPs.

REMEMBER:

ONLY RAIN DOWN THE STORM DRAIN !

KEEP OUR WATERS CLEAN!

Questions?

Contact your ROICC ET
or

Sherry Williams
760-224-5227
sherry.l.williams@navy.mil

Jennifer Sullivan
760-468-8590
jennifer.a.sullivan1@navy.mil

http://ww.swrcb.ca.gov/water_issues/programs/stormwater/construction.shtml

www.casqa.org

FMD

The things we see

Part 1


01.20.2011 13:12


01.20.2011 13:12


01.20.2011 13:13


02.10.2011 09:54


02.10.2011 09:56


02.10.2011 09:56

02.10.2011 10:37

02.10.2011 10:38


02.10.2011 10:37


1403
FITNESS MGR


01.24.2011 12:49


01.20.2011 13:49

01.13.2011 08:52

LED indications will appear for (5) seconds each time the AFCI is turned "ON" and will display each time the breaker is reset up to (30) days after the last trip.

LED Indicator		Last Known Trip Condition
Yellow 1	Yellow 2	
OFF	OFF	Overcurrent

The last known trip condition can be cleared by the following process:

1. Turn the AFCI to the "OFF" position.
2. Press and hold the the PTT button.
3. Turn the AFCI to


5
6
7
8
9


STANLEY
2
3
4
5
6
7

WATER


02.09.2011 13:22


02.09.2011 13:23


02.09.2011 13:23


02.09.2011 13:21

Questions???

FMD

The QA Things
We See part 2


PINK
PINK


WARNING

- WARNI

PUMP MUST BE INSTA
INSTALLATION, OPER
MAINTENANCE MANUA
ALIGNED BEFORE INITIAL
OR WARRANTY

CAUTION

ER ALIGNMENT IS REQUIRED
AND GROUT PUMP BEFOR
K ALIGNMENT BEFORE
SYSTEM IS FILLED AFTER
P, AND AS REQUIRED. CONSULT THE
NCE INSTRUCTIONS FOR DETAILS.
URE TO FOLLOW THESE
TRUCTIONS COULD RESULT IN
URY, OR PROPERTY DAMAGE


08/02/2010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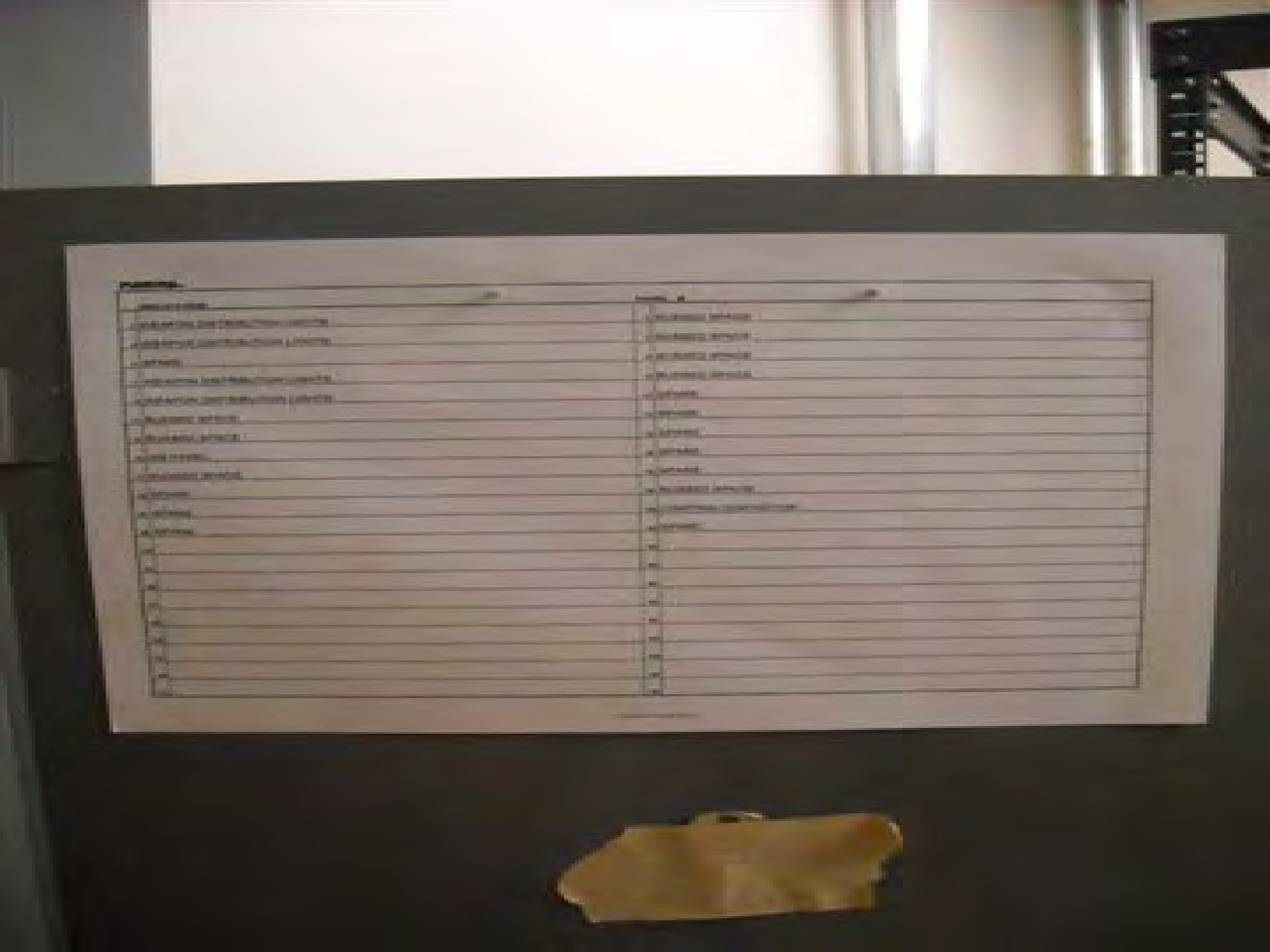


Please tell me what is wrong?

IS THIS READY TO POUR?

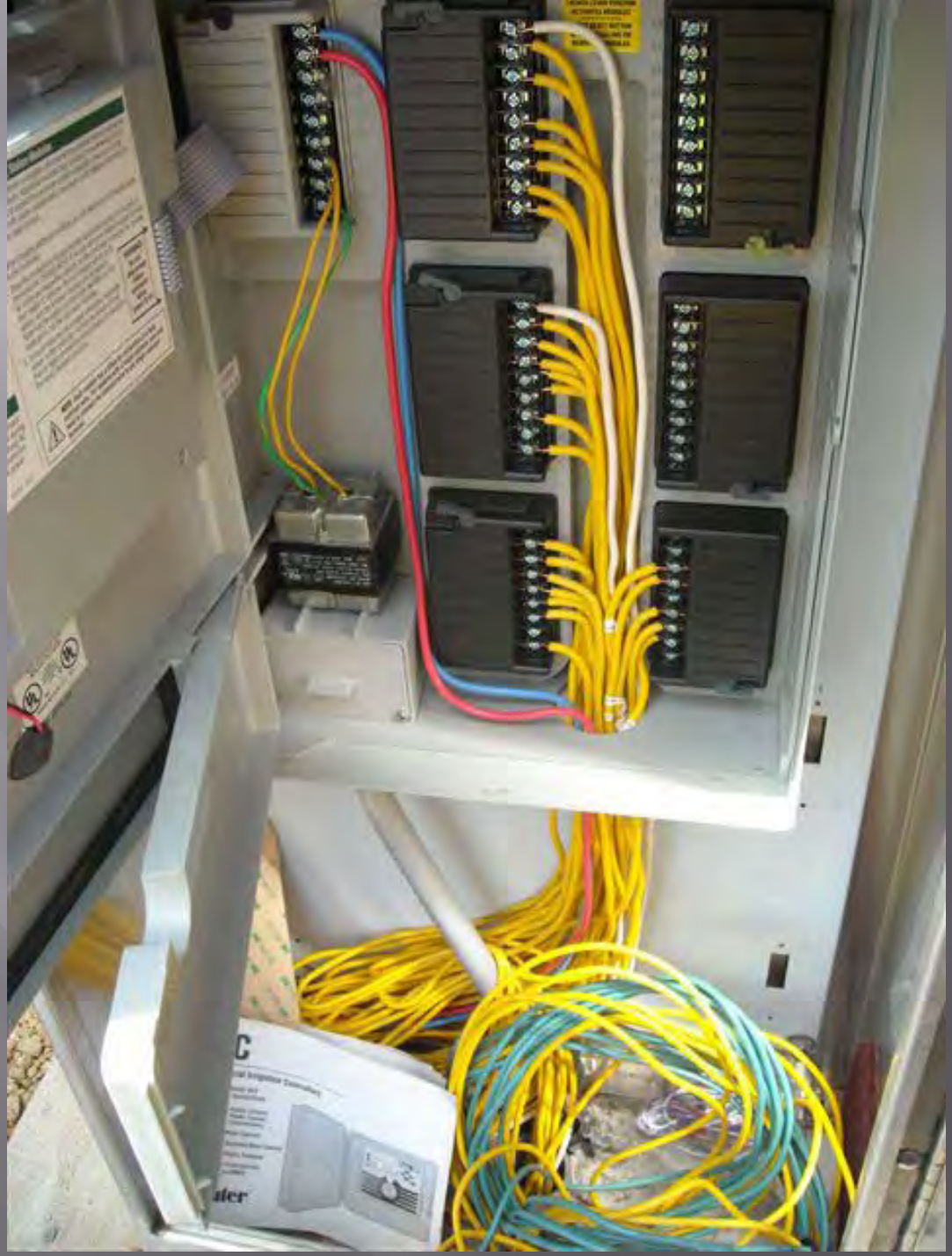

Friedrich


KS25


BURNDY
I/OST RUN
14-1/0 ST


Diamond


ELEC




KOHLER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CAUTION


WATTS


HIGH VOLTAGE
HIGH VOLTAGE


HIGH VOLTAGE
HIGH VOLTAGE


WHEN BELL
DIAL
911

Questions???

Underground Piping Systems.

UNIFIED FACILITIES CRITERIA(UFC) UFC-3-400-10N, July 2006 MECHANICAL ENGINEERING

2-4.2.16 **Underground Piping Systems.** Underground piping systems for steam, condensate and **chilled and hot water must be factory-prefabricated, pre-insulated, and direct bury type.**

The Underground Heat Distribution System manufacturer is the company responsible for the design and manufacture of the pre-engineered system. The manufacturer directs the installation of their system, and provides a representative on the job site.

UFC 1-200-01 (General Building Requirements)

To…

2-28 Chapter 28 – (Mechanical systems)

To…

UFC 3-410-02N (Heating Ventilation, Air Conditioning, and Dehumidifying System)

To…

MIL-HDBK-1003/3 > 7.2 (Water Systems)

To…

7.2.1.1 (Exterior Water Piping Design)

To…

MIL-HDBK-1003/8A Exterior Distribution of Steam High Temperature Hot Water, Chilled Water, Natural Gas, and Compressed Air

To…

UFC 3-430-09 Exterior Mechanical Utility Distribution

To…

MIL-HDBK-1003/8A Exterior Distribution of Steam, High Temperature Hot Water, Chilled Water, Natural Gas, and Compressed Air

To…

RFP

Chapter 6 -Engineering System Requirements

D30 Mechanical, System Description Design and installation shall be in accordance with IMC and UFC 3-400-10N Mechanical Engineering

To…

Appendix A

To…

UFC 3-430-09 Exterior Mechanical Utility Distribution

And finally…

MIL-HDBK-1003/8A Exterior Distribution of Steam, High Temperature Hot Water, Chilled Water, Natural Gas, and Compressed Air

Questions???