



**MCKENZIE ELECTRIC**

**QUALITY ASSURANCE PROGRAM**

Concord, North Carolina

## **OUR COMMITMENT TO OUR CUSTOMERS ...**

McKenzie Electric is committed to quality. This document details McKenzie Electric's commitment to quality through our quality assurance program. The purpose of our quality assurance program is to ensure that our customer's needs are met the first time and every time. Our quality assurance program provides the framework that ensures continuous improvement of our design and construction services, quality in our completed work, and customer satisfaction.

We recognize that our customers and our ability to meet their needs are the sole reason for McKenzie Electric's existence. Our customers rely on our expertise in electrical design and construction to provide them with safe, reliable, and efficient power, control, and communications systems. We make every effort to be deserving of our customer's trust and high expectations. In today's world, our customer's business depends on reliable and efficient power, control, and communications systems to stay competitive in the global marketplace.

McKenzie Electric does not rely on chance to provide our customers with the quality they need and deserve. All of our employees understand McKenzie Electric's customer focus and commitment to quality.

J.C. McKenzie  
President  
April 1, 2007

**MCKENZIE ELECTRIC  
QUALITY ASSURANCE PROGRAM**

**QUALITY ASSURANCE PROGRAM  
VERSION 1.0 REVISIONS**

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**NOTICE**

Photocopies of this manual are not controlled. Photocopied manuals may not contain the latest revisions of McKenzie Electric's quality assurance program and may be obsolete. Please request a current copy of this manual from the Corporate Quality Officer before providing this manual to customers or employees.

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## **1 CORPORATE PROFILE**

### **1.1 CORPORATE STRUCTURE**

McKenzie Electric is incorporated in accordance with the laws of North Carolina.

### **1.2 MARKET SERVED**

McKenzie Electric serves commercial and industrial customers primarily in the southeastern United States.

### **1.3 MISSION STATEMENT**

McKenzie Electric's mission statement is as follows:

*The mission of McKenzie Electric is to be principally an electrical contractor in the construction industry, operating for the benefit of its stockholders, employees and customers. McKenzie Electric will adhere to the highest standards of integrity and performance in order to obtain the best possible reputation and image. McKenzie Electric is committed to maintain a growth rate and profit margin adequate to insure the continuance of the company. McKenzie Electric realizes that the continued growth and profitability of the company is possible only through the growth, development and retention of people of the highest caliber. McKenzie Electric will encourage the development and implementation of improved construction techniques.*

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## **2 CORPORATE COMMITMENT TO QUALITY**

### **2.1 QUALITY ASSURANCE PROGRAM**

#### **2.1.1 Purpose**

The purpose of our quality assurance program is to delineate the structure, responsibilities, procedures, processes, and resources needed to ensure that McKenzie Electric meets or exceeds the needs of our customers.

#### **2.1.2 Basis**

Our quality assurance program is based on ANSI/ASQC Standard Q9001<sup>1</sup>. A cross reference between our quality assurance program as documented in this manual and ANSI/ASQC Standard Q9001 is provided in Section 12. ANSI/ASQC Standard Q9001 is equivalent to ISO 9001.<sup>2</sup>

#### **2.1.3 Definition Of Terms Used**

Unless otherwise noted, terms used in this quality assurance manual are defined in accordance with ANSI/ISO/ASQC Standard A8402<sup>3</sup>.

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<sup>1</sup>ANSI/ASQC Q9001-1994, *Quality Systems - Model for Quality Assurance in Design, Development, Production, Installation, and Servicing*, American Society for Quality Control, Milwaukee, Wisconsin, 1994.

<sup>2</sup>ISO 9001:1994, *Quality Systems - Model for Quality Assurance in Design, Development, Production, Installation, and Servicing*, International Organization for Standardization, Geneva, Switzerland, 1994.

<sup>3</sup>ANSI/ISO/ASQC A8402-1994, *Quality Management And Quality Assurance - Vocabulary*, American Society for Quality Control, Milwaukee, Wisconsin, 1994.

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**2.1.4 Distribution**

A copy of this manual is provided to all McKenzie Electric management level employees at the time of their quality assurance training. These manuals are registered to the individual employee. A copy of this manual is also available in the McKenzie Electric job trailer at each construction site for field employee reference.

**2.1.5 Training**

All McKenzie Electric management level employees received training in the quality assurance program within three months of its implementation on April 1, 2007. Every new management level employee who has joined McKenzie Electric since April 1, 2007 has received training in the quality assurance program within one month of his or her employment. Field employees working with McKenzie Electric receive training on the specific portions of the quality assurance program that apply directly to their work. Training of field employees is carried out at the job site by the superintendent or the project's designated trainer. Training of employees working in McKenzie Electric's corporate and branch offices is performed by the employee's department head or the department's designated trainer. A record of all formal training is kept in the employee's personnel file.

**2.1.6 Revisions And Updates**

Revisions and updates to McKenzie Electric's quality assurance program are issued to all registered holders of this manual. All registered holders of this manual are responsible for updating the manual as required. At each job site, the project superintendent is responsible for maintaining and updating the manual as required. Periodic checks of the quality assurance manuals are made by the Corporate Quality Officer to ensure that all revisions and updates have been included. Employees are

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responsible for understanding and implementing revisions and updates to the quality assurance program. When there are a number of significant revisions or an overall update of the quality assurance program, each employee is required to attend a formal training session covering the revisions or update. Project and department managers are responsible for disseminating changes and updates that affect employees.

## **2.2 QUALITY POLICY**

### **2.2.1 Quality Policy Statement**

McKenzie Electric's quality policy is as follows:

*Perform work to the exact requirements of our customers as defined by the contract documents unless those requirements are changed in accordance with procedures defined in the contract.*

### **2.2.2 Quality Policy Objective**

The objective of McKenzie Electric's quality policy is to ensure that each employee understands that he or she is responsible for quality and empowered to ensure that customers' needs and expectations, as expressed in the contract documents, are met.

### **2.2.3 Quality Policy Dissemination**

McKenzie Electric's quality policy is posted in conspicuous places throughout the corporate and branch offices and at all job sites. This policy is reinforced verbally at all company and job site meetings that deal with quality and continuous improvement.

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## **2.3 RESPONSIBILITY FOR CORPORATE QUALITY**

### **2.3.1 Levels Of Responsibility**

McKenzie Electric recognizes its responsibility to customers for providing quality electrical work.

Within McKenzie Electric, there are three levels of responsibility for quality:

- Corporate
- Project
- Individual

### **2.3.2 Corporate-Level Responsibility**

The primary responsibility for quality at McKenzie Electric is the Quality Steering Committee which consists of the following members of senior management:

- President
- Vice President
- Project Managers

The President serves as the Corporate Quality Officer for McKenzie Electric and is responsible for ensuring that the organization adopts and adheres to the quality policy.

The Corporate Quality Officer also responsible for getting feedback from customers and ensuring that McKenzie Electric is a quality organization committed to customer satisfaction and continuous improvement.

McKenzie Electric's project managers assist the President by accepting the overall responsibility for each project assigned them and assuring all aspects of the quality policy, as directed by the Corporate Quality Officer, are adhered to.

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## **2.3.4 Project-Level Responsibility**

McKenzie Electric's superintendents assist the Project Manager and the Corporate Quality Officer. Superintendents are responsible for overseeing quality in the field and customer satisfaction. Section 10.3 addresses the superintendent's responsibility for field quality in greater detail.

## **2.3.5 Individual Responsibility**

The key to the successful implementation of any quality assurance program is the individual employee. The employee performing the work is the only person who can truly control quality during the construction process. McKenzie Electric empowers employees to control quality through its quality policy and encourages open communications between employees and management about quality improvement.

## **2.4 MANAGEMENT REVIEW**

The Corporate Quality Officer and designated staff conduct regular internal reviews to ensure that the quality assurance program is being properly and effectively implemented. These management reviews include close scrutiny of the following:

- Organization structure and its impact on quality.
- Effective implementation of the quality policy.
- Internal evaluation of construction and maintenance services.
- Performance as measured by customer feedback and construction quality.

The management reviews are documented and submitted to the Quality Steering Committee which takes corrective action as necessary. In addition, data and information from previous reviews are used to identify trends and determine if corrective measures are effective.

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## **3 QUALITY SYSTEM**

### **3.1 QUALITY SYSTEM DEFINED**

McKenzie Electric's quality system is outlined in this manual. The quality system defines the organizational structure, responsibilities, procedures, and processes put in place to achieve McKenzie Electric's quality system objectives.

### **3.2 QUALITY SYSTEM OBJECTIVES**

The objectives of McKenzie Electric's quality system are fourfold:

- Provide a quality mechanical and/or electrical installation that meets or exceeds the customer's needs and expectations as expressed in the contract documents.
- Avoid rework and delays during construction through early detection and correction of problems.
- Provide a safe and productive work environment for McKenzie Electric employees.
- Support the achievement of the corporate mission and strategic objectives.

### **3.3 QUALITY SYSTEM PROCESSES**

McKenzie Electric's quality program consists of the control of the following eight processes:

| <b>PROCESS</b>                                       | <b>SECTION</b> |
|--|----------------|
| Contract Document Review                             | 4              |
| Document Control                                     | 5              |
| Design Management                                    | 6              |
| Procurement & Expediting                             | 7              |
| Tool & Equipment Maintenance, Calibration, & Testing | 8              |
| Materials & Installed Equipment Management           | 9              |
| Construction Management                              | 10             |
| Inspection, Testing, & Startup                       | 11             |

The following sections of the manual discuss each of these processes and its control in detail.

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**4     CONTRACT DOCUMENT REVIEW**

**4.1   PROCESS SCOPE & OBJECTIVES**

This process involves the review of the project contract documents to ensure that these documents accurately define the scope of McKenzie Electric's work. The objective of this process is to ensure that McKenzie Electric understands the customer's needs and requirements as expressed in the contract documents and can meet those needs and requirements.

**4.2   DOCUMENT REVIEW PROCESS**

**4.2.1 Bid Documents**

The document review process begins with the review of bid documents. These documents define the scope and requirements of the project. The bid documents normally include the following information:

- Invitation To Bid
- Bid Form
- McKenzie Electric Proposal or Quotation (Work Included & Excluded)
- Construction Agreement
- General, Supplemental, & Special Conditions
- Insurance & Bond Requirements
- Drawings & Specifications
- Addenda
- Owner Furnished Materials & Equipment
- Project Milestone Dates

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**4.2.2 Site Visit**

A site visit is normally scheduled with the customer prior to bidding. The purpose of the site visit is for McKenzie Electric to become familiar with the site and its conditions. In addition to the physical site, McKenzie Electric will investigate project logistics and local conditions that may impact the construction process.

**4.2.3 Prebid Meeting**

McKenzie Electric will attend any scheduled prebid meetings in order to interact with the customer and clarify the project scope and requirements. Where no formal prebid meeting is scheduled, McKenzie Electric will contact the customer to resolve any questions concerning the project scope and requirements prior to bidding.

**4.2.4 Contract Award**

Prior to executing the contract, McKenzie Electric will meet with the customer to review the contract scope and requirements and agree on any administrative procedures not previously addressed. Once an understanding of all outstanding details and questions has been resolved, McKenzie Electric will execute the contract.

**4.2.5 Post-Contract Award**

Following contract execution, McKenzie Electric will start work as directed by the contract. During construction, McKenzie Electric will keep the customer informed of any problems, delays, or deviations from the specified requirements in accordance with the contract documents.

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**5 DOCUMENT CONTROL**

**5.1 PROCESS SCOPE & OBJECTIVES**

This process involves the cataloging, filing, and distribution of project documents. The objective of this process is to ensure that information needed to manage and perform the work is readily available to those that need it.

**5.2 DOCUMENT CONTROL PROCEDURES**

**5.2.1 Documents To Be Controlled**

All documents that affect project quality are required to be cataloged, filed, and distributed as required. Controlled documents typically include the following:

- Contract formation and maintenance documents that include the construction contract; general, supplemental, and special conditions; addenda, change orders, and field directives; among others.
- Planning and design documents that include design criteria, site information, material and equipment information, calculations, drawings, specifications, among others.
- Procurement and expediting documents that include quotations, agreements and purchase orders, shipping and receiving records, test and inspection documentation, warranties and guarantees, among others.
- Tool and equipment maintenance and calibration procedures and records.
- Material and equipment shop drawings and catalog cuts along with review and approval documents.
- All correspondence, memoranda, meeting minutes, requests for information, schedules, and budgets relating to the construction process.

**5.2.2 Responsibility For Document Control**

The project manager is responsible for project document control.

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**5.2.3 Document Control System**

All documents received are stamped with the date of receipt. All internally generated documents are dated and marked with the project number and the name or initials of the originator. A central project file is established at the beginning of the project and maintained throughout the project. Where appropriate, a document log is kept for particular classes of documents.

**6 DESIGN MANAGEMENT (Applicable only on Design- Build Projects)**

**6.1 PROCESS SCOPE & OBJECTIVES**

This process involves the design of power, lighting, control, and/or communications systems by McKenzie Electric for the customer. The objective of this process is to determine the customers' needs and produce a set of accurate and complete construction documents that can be used to install and/or construct the required systems.

**6.2 DESIGN QUALITY DEFINED**

Design quality is defined by the construction documents that translate the customer's needs and requirements into functional power, lighting, control, and communications systems that can be efficiently built and operated.

**6.3 RESPONSIBILITY FOR DESIGN QUALITY**

The project engineer is responsible for design quality. The project engineer will work closely with and under the direction of the project manager to assure all aspects and conditions of the contract documents are adhered to. The project engineer will be registered as an electrical engineer in the state where the project is located and affix his or her seal to studies, plans and specifications, and other design documents as required by the licensing laws of that state.

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**6.4 CLIENT NEED IDENTIFICATION**

The first step in the design process is the identification of the customer's needs and requirements. McKenzie Electric will meet with the customer and end users of the system(s) or facility to determine the project scope and system performance requirements. The project scope and system requirements will be documented and provided to the customer for review and comment.

**6.5 CODES & STANDARDS REVIEW**

Once the project scope and system requirements have been identified and agreed to, the next step is to determine what codes and standards are applicable to the project. Applicable codes and standards will be researched to determine specific requirements. The results of the codes and standards review will be documented.

**6.6 DESIGN CRITERIA DEFINITION**

Based on the project scope and system requirements along with the results of the codes and standards review, McKenzie Electric will define specific design criteria for the project. In this step, McKenzie Electric will convert the customer's system performance criteria into specific quantifiable and measurable design requirements. Design criteria will be documented and reviewed with the customer to ensure accuracy and completeness. Any conflicting or ambiguous requirements will be resolved prior to proceeding with the design.

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## **6.7 CONSTRUCTABILITY & VALUE ANALYSIS**

McKenzie Electric will identify viable design alternatives that meet the customer's design criteria. These alternatives will then be analyzed to determine the preferred alternative based on construction, operation, and maintenance considerations. Constructability reviews will be performed to determine how the design can be modified to improve construction efficiency. Value analyses will be performed to select equipment and systems. The goal is to select design alternatives that meet the customer's requirements.

## **6.8 DESIGN DOCUMENTATION**

### **6.8.1 System Documentation**

Design documentation for electric power, lighting, communications, and control systems is divided into the following systems:<sup>4</sup>

- Power Distribution Systems
- Lighting Systems
- Communication And Data Processing Systems
- Life Safety/Security Systems
- Lightning Protection Systems
- Grounding Systems
- Instrumentation And Control Systems

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<sup>4</sup>Adapted from Rule 21H-33 of the Florida Board of Professional Engineers entitled *Responsibility Rules of Professional Engineers Concerning the Design of Electrical Systems*.

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## **6.8.2 Power Distribution Systems**

Documentation of the power distribution system design includes the following:

- System one-line diagram.
- Conductor type, size and insulation type.
- Protective devices and interrupting capacities.
- Substation, switchboard, panelboard and motor control center (MCC) locations, arrangements, and ratings.
- Circuiting of all outlets and devices.
- Short circuit analysis.
- Load calculations.
- Legend

## **6.8.3 Lighting Systems**

Documentation of the lighting system design includes the following:

- Lighting fixture performance specifications and arrangements.
- Emergency and exit lighting.
- Lighting control and circuiting.
- Legend

## **6.8.4 Communication & Data Processing Systems**

Documentation of the communication and data processing systems design includes the following:

- System riser diagram.
- Conductor type, size, and insulation type.
- Equipment and device type and locations.
- Special power supply requirements.
- Description of system operation.
- Legend

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## **6.8.5 Life Safety/Security Systems**

Documentation of the communication and data processing systems design includes the following:

- System riser diagram.
- Conductor type, size, and insulation type.
- Equipment and device type and location.
- Special power supply requirements.
- Description of system operation.
- Legend

## **6.8.6 Lightning Protection Systems**

Documentation of the lightning protection system design includes the following:

- Air terminal height and spacing.
- Arrangement of down conductors.
- Grounding methods and locations.
- Ground test requirements.
- Legend
- Master label or other certification if applicable

## **6.8.7 Grounding Systems**

Documentation of the grounding system design includes the following:

- Type and location of all grounding electrodes.
- Bonding requirements.
- Ground test requirements.
- Conductor material type, size, and protection requirements.
- Attachment/Connection details.
- Legend

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## **6.8.8 Instrumentation And Control Systems**

Documentation of the instrumentation and control systems design includes the following:

- Functional diagram.
- Conductor type, size, and insulation type.
- Equipment and device type and location.
- Device mounting details.
- Special power supply requirements.
- Device air and impulse tubing.
- Description of system operation.
- Programming Code
- Legend

## **6.8.9 System Technical Specifications**

Specifications for the power, lighting, control, and communications systems will be prepared in accordance with Division 16 of the Construction Specification Institute's (CSI) *Uniform System For Construction Specifications, Data Filing, And Cost Accounting* (MasterFormat).

## **6.9 DESIGN REVIEW PROCEDURES**

### **6.9.1 Internal Design Reviews**

Internal design reviews will be performed by McKenzie Electric at regular intervals as required by the complexity and size of the project. The project manager will be responsible for scheduling, performing, and documenting the results of these reviews. Internal design reviews should include members of the design team, construction personnel, key suppliers and manufacturers, outside specialists, and others that must interface with the design process. The internal design review will include technical reviews, a review of the projected construction schedule, and budget.

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**6.9.2 Customer Design Reviews**

Customer design reviews will be scheduled in accordance with the agreement between the customer and McKenzie Electric. The project manager is responsible for scheduling, coordinating, and responding to the results of the customer design reviews.

**6.10 DESIGN CHANGE & MODIFICATION PROCEDURES**

The project manager is responsible for establishing and documenting design change and modification procedures with the customer. All design changes and modifications are to be reviewed with the customer and documented.

**7 PROCUREMENT & EXPEDITING**

**7.1 PROCESS SCOPE & OBJECTIVES**

This process involves the procurement of materials and equipment for incorporation into the work by McKenzie Electric. In addition, this process may involve procuring the services of qualified specialty subcontractors to assist McKenzie Electric in performing the work.

**7.2 SUPPLIER AND SUBCONTRACTOR ASSESSMENT**

**7.2.1 Materials & Equipment**

Only those suppliers of materials and equipment that are acceptable to the customer as defined in the contract documents are considered. Acceptable suppliers are then evaluated by McKenzie Electric based on past experience, commitment to quality and customer satisfaction, ability to meet the construction schedule, material and equipment installation characteristics, and after-sale service and support.

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**7.2.2 Subcontractors**

Specialty subcontractors are evaluated by McKenzie Electric based on expertise, past experience, commitment to quality and customer satisfaction, and ability to meet the construction schedule.

**7.3 REQUESTS FOR QUOTATION**

Only those suppliers and subcontractors approved by McKenzie Electric are asked to submit a quotation. Requests for quotation sent to suppliers and subcontractors include McKenzie Electric's standard agreement as well as a detailed written scope of work. Applicable drawings and specification sections are made available to suppliers and subcontractors to facilitate their quotation preparation. McKenzie Electric provides suppliers and subcontractors with as much time as possible to prepare complete and accurate quotations.

**7.4 PURCHASING POLICIES & PROCEDURES**

McKenzie Electric selects a supplier or subcontractor based on the criteria outlined in the request for quotation. In most cases, McKenzie Electric selects the successful bidder based on price since the successful supplier or subcontractor is selected from a prequalified pool of equal bidders. Following selection and prior to contract execution, McKenzie Electric reviews the successful bidder's quotation for completeness and accuracy and then meets with the successful bidder to review the scope of work, technical requirements, inspection and testing requirements, submittal requirements, and construction schedule. Once an agreement is reached on all technical and administrative issues, the contract is executed.

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**7.5 SUBMITTALS**

Shop drawings, catalog cuts, and test and inspection data required to be submitted to the customer for approval by McKenzie Electric will be thoroughly reviewed for completeness and technical requirements prior to submission. McKenzie Electric will stamp each submittal as having been reviewed along with the reviewer's name and date of review. The goal of this procedure is to avoid delays due to inadequate or erroneous submittals.

**7.6 OWNER-FURNISHED MATERIALS & EQUIPMENT**

McKenzie Electric will work with the owner to ensure that owner-furnished materials and equipment meet the technical requirements of the project. In addition, McKenzie Electric will provide the owner with schedule milestones and information so that the owner-furnished materials and equipment do not delay or otherwise effect the construction process. If the installation of materials and equipment are McKenzie Electric's responsibility, McKenzie Electric will inspect the materials and equipment when delivered and properly store them until needed. Records of the receipt and inspection of materials and equipment will be forwarded to the owner.

**7.7 IDENTIFICATION & TRACEABILITY**

Records will be kept of all materials and equipment incorporated into the work.

**8 TOOL & EQUIPMENT MAINTENANCE, CALIBRATION, & TESTING**

**8.1 PROCESS SCOPE & OBJECTIVES**

This process involves the maintenance, calibration, and testing of tools and equipment. The objective of this process is to ensure that the employee in the field has the tools and equipment necessary to work effectively, safely, and efficiently.

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**8.2 SELECTION OF TOOLS & EQUIPMENT**

Tools and equipment supplied by McKenzie Electric will be selected based on their suitability for the work to be performed. Wherever possible, McKenzie Electric will review tool and equipment selection both before and during the performance of the work to ensure that the proper selection has been made. In addition, McKenzie Electric will provide sufficient quantities of tools and equipment to allow employees to work productively.

**8.3 TRANSPORTATION & STORAGE OF TOOLS & EQUIPMENT**

Tools and equipment will be transported and stored in such a way that they will be protected from damage and deterioration.

**8.4 CALIBRATION AND TESTING OF TOOLS & EQUIPMENT**

Tools and equipment requiring calibration and/or testing will be calibrated and /or tested at regular intervals or just prior to use. Calibration and/or testing will be carried out by qualified technicians in a controlled environment in accordance with manufacturer recommendations. Records of tool and equipment calibration and testing will be kept and a dated stamp indicating the tool or equipment's calibration and/or test status will be attached.

**8.5 REPAIR OF TOOLS & EQUIPMENT**

When tools and equipment require repair they will be marked or tagged as soon as the damage or defect is detected to avoid accidental use. Repairs will be carried out in accordance with manufacturer recommendations and instructions by qualified technicians in a controlled environment. Following repair, the tools and equipment will be calibrated and tested as described in paragraph 8.4. Records of all tool and equipment repairs will be kept.

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## **8.6 OPERATING INSTRUCTIONS & PROCEDURES**

Operating instructions and procedures will be available with the tool or equipment or maintained on file at the project site for employee reference and use.

## **8.7 OPERATOR TRAINING & CERTIFICATION**

When tools and equipment require training for proper use, McKenzie Electric will provide training for employees by qualified instructors. Records of all formal training will be kept. If employee certification is required, McKenzie Electric will ensure that the employee is certified prior to using the tool or equipment.

## **9 MATERIALS & INSTALLED EQUIPMENT MANAGEMENT**

### **9.1 PROCESS SCOPE & OBJECTIVES**

This process involves managing materials and equipment from the time they are delivered to the site until they are incorporated in the work. The objective of this process is to ensure that the right materials and equipment are delivered and that they are protected from damage and deterioration until they are installed.

### **9.2 RECEIVING & INSPECTION**

At the time of delivery, all materials and equipment are inspected to ensure that they are what was ordered, they are intact and were not damaged during shipment, and that the proper quantity was delivered. Only after a successful inspection are materials and equipment accepted. If a problem is encountered during inspection, the materials and equipment are either rejected or corrective action is worked out with the supplier prior to acceptance. A record is kept of all material and equipment receipts and inspections.

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**9.3 STORAGE & PROTECTION**

Material and equipment delivered prior to when it is needed will be properly stored and protected to prevent damage or deterioration.

**9.4 INVENTORY CONTROL PROCEDURES**

For bulk materials, McKenzie Electric will establish inventory control procedures to ensure that the correct materials and equipment are used where required.

**9.5 MATERIAL & EQUIPMENT DOCUMENTATION**

Documentation such as installation instructions, testing and startup procedures, and operation and maintenance manuals will be cataloged and filed. This documentation will be provided to the owner in accordance with the contract documents.

**10 CONSTRUCTION MANAGEMENT**

**10.1 PROCESS SCOPE & OBJECTIVES**

This process involves the installation of materials, equipment, and systems at the site. The objective of this process is to ensure that the work is completed efficiently and in accordance with the construction documents.

**10.2 FIELD QUALITY DEFINED**

Quality in the field is defined as meeting the customer's needs and requirements as stated in the construction documents.

**10.3 RESPONSIBILITY FOR FIELD QUALITY**

The superintendent is responsible for quality in the field. However, McKenzie Electric believes that quality is built from the ground up at each level by the individual employee performing the work. Therefore, field quality is everyone's responsibility.

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**10.4 ORGANIZATION FOR FIELD QUALITY**

The superintendent is responsible for organizing for field quality and documenting responsibilities. The project organization and delegation of authority and responsibility for quality will vary from project to project depending on the project's complexity and size.

**10.5 WORK FORCE QUALIFICATIONS & TRAINING**

McKenzie Electric strives to employ only the best employees with the training, skills, and experience necessary to perform the work assigned. Each employee is responsible for the quality of his or her own work and has the authority to alter or correct the work when it does not comply with specified requirements.

**10.6 INTERFACE WITH OTHER PROJECT PARTICIPANTS**

McKenzie Electric will plan and coordinate its work with other project participants as required.

**10.7 CONSTRUCTION MEANS & METHODS**

McKenzie Electric will use construction means and methods that are appropriate for the project. The means and methods will be reviewed with the employee(s) performing the work prior to implementation.

**10.8 PROJECT PLANNING & SCHEDULING**

McKenzie Electric will plan and schedule work within the framework of the customer's schedule and the contract requirements. McKenzie Electric will work closely with the customer and other affected parties when scheduling required shutdowns and cutovers.

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**10.9 ACTIVITY PREPLANNING**

In order to ensure that employees have the necessary information, materials and equipment, and tools and production equipment to perform the work, McKenzie Electric will preplan its construction activities. Preplanning is the responsibility of the superintendent or the foreman and performed with the assistance of the employee(s) who will be assigned to perform the work. Preplans will be documented by the superintendent or foreman and distributed as required.

**10.10 SAFETY & ACCIDENT PREVENTION**

Safety and accident prevention is synonymous with quality at the site. McKenzie Electric is dedicated to providing a safe work environment. The superintendent is responsible for safety and accident programs at the construction site. These programs include regular review of construction means and methods for safety, inspection of the condition of tools and equipment, and the scheduling of regular safety meetings and training. McKenzie Electric believes that safety and accident prevention is everyone's responsibility.

**10.11 AS-BUILT CONSTRUCTION DOCUMENTS**

As-built construction documents will be maintained throughout construction at the site. At the end of the project, these as-built construction documents will be provided to the customer in accordance with the contract documents.

**11 INSPECTION, TESTING, & STARTUP**

**11.1 PROCESS SCOPE & OBJECTIVES**

This process involves the inspection, testing, and startup of materials, equipment, and the systems that they comprise. The objective of this process is to ensure that materials and equipment are supplied and installed in accordance with the technical

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specifications and systems operate as required.

**11.2 VERIFYING CONTRACT COMPLIANCE**

**11.2.1 Verification Processes**

The following three processes are used for verifying contract compliance:

- Work-In-Progress Inspection & Testing
- Final Inspection & Testing
- Third-Party Inspection & Testing

**11.2.2 Work-In-Progress Inspection & Testing**

Ongoing inspection and testing of work in progress is carried out throughout construction in accordance with manufacturer recommendations, specified requirements, and McKenzie Electric's quality assurance procedures. Records are kept of all work-in-progress inspection and testing.

**11.2.3 Final Inspection & Testing**

McKenzie Electric performs final inspection and testing on all completed work in accordance with manufacturer recommendations, specified requirements, and McKenzie Electric's quality assurance procedures prior to turning the completed work over to the owner. Records are kept of all final inspection and testing.

**11.2.4 Third-Party Inspection & Testing**

McKenzie Electric assists third parties such as the owner, owner's representative, architect and/or engineer, manufacturer, code officials, or others in the performance of required inspection and testing of work in progress and completed work. Records are kept of all third-party inspections and testing.

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**11.3 CORRECTION OF NONCONFORMING WORK**

Nonconforming material, equipment, and work in place will be corrected in one of the following three ways:

- Reworked or modified in order to meet specified requirements.
- Accepted with or without rework or modification by the owner, owner's representative, architect and/or engineer, or other authorized entity.
- Removed and replaced in total.

When nonconforming material, equipment, or work in place is accepted as is, McKenzie Electric will document the nonconformance and the fact that it has been accepted. Reworked, modified, or replaced material, equipment, or work in place must be inspected and tested in accordance with manufacturer recommendations, the technical specifications, and McKenzie Electric's quality assurance procedures.

**11.4 STARTUP & TESTING PROCEDURES**

Startup and testing procedures for materials, equipment, and the systems they comprise will be performed in accordance with manufacturer recommendations, the technical specifications, and McKenzie Electric's quality assurance procedures. A manufacturer's representative will be brought to the site to inspect the installation, perform final adjustments, perform required tests, and/or startup the equipment or system when required by contract, for technical reasons, or for warranty compliance.

**11.5 INSPECTION & TEST RECORDS**

All inspection and test records will be maintained by McKenzie Electric along with records of any corrective action taken. Copies of the inspection and test records will be provided to the owner, owner's representative, or architect and/or engineer in accordance with the contract documents.

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## **11.6 WARRANTIES & GUARANTEES**

McKenzie Electric will ensure that all requirements to put warranties and guarantees in force are met. Copies of all warranties and guarantees will be provided to the owner in accordance with the contract documents

## **12 ANSI/ASQC Q9001 CROSS REFERENCE**

The following table provides a cross-reference between ANSI/ASQC Q9001 and McKenzie Electric's quality assurance program.

| <b>ANSI/ASQC STANDARD Q9001-1994</b> |  | <b>QA PROGRAM<br/>REFERENCE SECTION</b> |
|--------------------------------------|--|---|
| <b>SECTION</b>                       | <b>SECTION TITLE</b>                                     |   |
| 4.1                                  | Management Responsibility                                | 2                                       |
| 4.2                                  | Quality System   | 3                                       |
| 4.3                                  | Contract Review  | 4                                       |
| 4.4                                  | Design Control   | 6                                       |
| 4.5                                  | Document And Data Control                                | 5                                       |
| 4.6                                  | Purchasing   | 7                                       |
| 4.7                                  | Control Of Customer-Supplied Product                     | 7.6                                     |
| 4.8                                  | Product Identification And Traceability                  | 7.7                                     |
| 4.9                                  | Process Control  | 10                                      |
| 4.10                                 | Inspection And Testing                                   | 11                                      |
| 4.11                                 | Control Of Inspection, Measuring, And Test Equipment     | 8                                       |
| 4.12                                 | Inspection And Test Status                               | 11                                      |
| 4.13                                 | Control Of Nonconforming Product                         | 11.3                                    |
| 4.14                                 | Corrective And Preventive Action                         | 11.3                                    |
| 4.15                                 | Handling, Storage, Packaging, Preservation, And Delivery | 9                                       |
| 4.16                                 | Control Of Quality Records                               | 9.5 & 11.5                              |
| 4.17                                 | Internal Quality Audits                                  | 2.4 & 11.2                              |
| 4.18                                 | Training   | 10.5                                    |
| 4.19                                 | Servicing  | 11.6                                    |
| 4.20                                 | Statistical Techniques                                   | N/A                                     |

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