

E Light Electric Services, Inc. Quality Assurance Program (QAP)

Site Specific to Enter Project Name Here

- I. Quality Structure on site is as follows:
 - A. Single point of contact for quality issues will be the Site Quality Manager or **Quality Representative**, dependent on the size of the project, who reports to the Corporate Quality Control and Commissioning Manager for E Light Electric Services, Inc.
 - B. Quality Manager will have a staff of quality inspectors that report to him to conduct inspections on a daily basis and make sure all deficiencies found are logged and remediated as soon as possible.
 - C. Quality Manager will hire or train qualified personnel to conduct inspections on a daily basis.
 - D. **Quality Manger will coordinate daily with the lead operations supervisor to ensure that Operations is informed of quality issues and the Quality Manager, and the lead operations supervisor shall make sure that quality issues are remediated and take steps to correct quality issues in the future using a Root Cause Analysis Work Sheet and Report. (Attached)**
 - E. **Quality Manager shall maintain Quality Tracking Reports and shall review the Quality Trackers at the end of each Plan of Tomorrow Meeting with the operations team. (Attached)**
 - F. Quality Manager shall share ideas, trends and finding, whether positive or negative, with other Quality Managers via E Light Electric Services collaboration site.
- II. E Light Electric Services, Inc. will follow the First Install Process for the **Enter type of System here** System as agreed to by the **Builders Name Here** lead operations supervisor and Quality Manager.
- III. E Light Electric Services, Inc. will follow all quality requirements per the Contract documents.
- IV. E Light Electric Services, Inc. Quality process will be adhered to as follows:
 - A. As any given portion of the project system is installed, the lead operations supervisor will notify the Quality manager of the installation.
 - B. The Quality Manager will post installations on the visual trackers for the project and will keep the visual trackers updated based on inspections and turn over to client.
 - C. The quality manager shall coordinate inspection of the installation per the contract documents.

- D. The quality manager will issue any deficiency reports to the lead operations supervisor for remediation. The Quality manager shall also ensure that the quality inspector staff are making minor corrections to work and not simply logging issues for later remediation.
 - E. Remediation crew will then follow through and remediate noted defects that are out of specification beyond the allowed tolerances noted in the contract documents. All defects will be flagged and mapped to help remediation crews identify any deficiencies. The quality manager shall personally speak to the lead operations supervisor to ensure understanding of the deficient items and to begin a root cause analysis to mitigate further issues.
 - i. NOTE: The first root cause analysis discuss should be informal and changes discussed should be implemented and a follow up discussion occur within 3 days. If a quality issue arises on the same issue after this, then a formal Root Cause Analysis process shall be implemented by the Quality Manager.
 - F. The lead operations supervisor shall ensure deficiencies have been corrected and once satisfied shall inform the Quality Manager that the remediation is complete.
 - G. E Light Electric Services, Inc. Quality group will then re-inspect to ensure that the defects have been remediated, QA/QC will then remove flagging and document remediation at this time.
 - H. E Light Electric Services, Inc. will then release, by section, the approved work to the client's QA/QC.
 - I. If defects are noted by the client, then E Light Electric Services, Inc. will remediate noted defects and notify the client's QA/QC that the noted defects have been remediated.
 - J. Once notified by the client's QA/QC that a given Block or Array has been released, E Light Electric Services, Inc. will move to the next process.
- V. Change Notification and Change Management will be handled by RFI process.
 - VI. Procured & Other Materials purchased by E Light Electric Services, Inc. will be submitted for approval by the client.
 - VII. Quality Control Documents and Records
 - A. A Daily Report will be submitted by E Light Electric Services, Inc. to the client for review. This format will be agreed upon at the beginning of the Project. The report shall be made into an iAuditor Template and shall be issued in

iAuditor format to the Builder and saved in the Project File on the Construction Drive under Quality

1. NOTE: This report will include date, auditor name(s), area audited, scope of audit, defects, remedial actions & root cause when available.
 - B. All Combiner Boxes, Inverters, Transformers, Panel Boards, Switchgear, and significant other equipment will be inspected and documented using iAuditor.
 - C. A QC deficiency tracker will be issued to the General Forman and Construction Manager daily showing the number of deficiencies found per task that day.
- VIII. Calibration Records will be maintained & turned over to the client for all inspection, measuring and testing equipment.
- IX. **Inspections and Electrical Testing**
- A. E Light Electric Services, Inc. will retain a 3rd party testing company to perform all testing if required by the contract documents or certified electricians will be used for electrical testing.
 - B. The testing process shall be established by meeting with the Quality Staff, Operations Staff, and the Builders Staff prior to significant construction activities. This meeting shall be coordinated and lead by the Quality Manager and minutes shall be kept and distributed to all members. The agenda shall be as follows:
 1. Introduction of Members
 2. Review and agreement on Contract Documents for Quality
 3. Review and agreement on all Forms to be used for
 4. Review and agreement on all testing and inspection processes
 5. Review and agreement on all turn over processes

Organization and Responsibility

- I. President and CEO
 - A. Responsible for approval of quality assurance program.
 - B. Responsible for appointment of quality assurance program administrator.
 - C. Responsible for annual review and approval of quality assurance program audit report.
- II. Renewable Director

A. Responsible for oversight of quality assurance program

- B. Reports Directly to the President and CEO
 - C. Responsible for review of the quarterly review of the quality assurance program report.
 - D. Responsible for participation in the annual audit of the quality assurance program
 - E. Responsible for annual audit of the quality assurance program to the CEO
 - F. Responsible for implementation of the quality assurance program
- III. Corporate Quality Control and Commissioning Manager.
- A. Responsible for quarterly review of the quality assurance program to be given to the President and CEO.
 - B. Reports directly to the President and CEO
 - C. Responsible for conducting monthly quality assurance inspections of all work sites and reporting findings to the project management and supervision team
 - D. Responsible for follow up inspections regarding deficiencies in quality.
 - E. Responsible for conducting the annual audit of the quality assurance program.
 - F. Responsible for training company personnel in the use of the quality assurance program.
 - G. Responsible for developing a corporate culture of quality awareness.
 - H. Responsible for the direction of the Quality Programs and Staffs of all corporate projects
- IV. Project Manager
- A. Responsible for managing the quality assurance program on assigned work site.
 - B. Reports directly to the President of Operations.
 - C. Responsible for oversight of the planning, execution, and completion of assigned work sites in accordance with the quality assurance program
 - D. Responsible for semi-monthly quality inspections of each assigned worksite.

- E. Responsible for ensuring that all reported quality deficiencies are investigated and corrected if necessary.

V. Quality Manager

- A. Responsible for the implementation of the quality assurance program on their assigned work site
- B. Reports directly to the Project Manager. The Quality Manager also has a parallel reporting responsibility to the Corporate Quality Control and Commissioning Manager.
- C. Responsible for daily quality inspections
- D. Responsible for investigating and correcting, if necessary and capable, all quality deficiencies
- E. Responsible for maintaining the Visual Trackers and the Quality Trackers for the project.

VI. Lead Operations Supervisor

- A. Responsible for the implementation of the corrections and revisions to processes as determined by Root Cause Analysis.
- B. Reports directly to the Project Manager
- C. Responsible for daily pre-inspections of work with the assistance of his staff
- D. Responsible for training operations staff on quality and ensuring that all work is performed according to contract documents and to E Light's expectations.
- E. Responsible for investigating and correcting all quality deficiencies.
- F. Responsible for writing and implementing installation plans and ensuring that each crew has an updated written installation plan in their work area.
- G. Responsible for leading the daily Plan of Tomorrow meeting and ensuring that the Quality Tracker is reviewed in each meeting.

List of Standard Operating Procedures

I. Electrical installations and Structural Installations

- A. All installations will be planned in advance using the Rapid Installation Procedures (Installation Plans)

1. Employees assigned to installations will be briefed on the planned installation and will be trained in advance in the proper installation techniques and procedures. The written installation plan shall be located in the work area daily so that crews can access and refer to it at any time.
 2. NOTE: Any manager or supervisor coming into a work area, shall ask for a copy of the Installation plan and check to ensure that the work is being installed according to the Installation Plan.
- B. All installations will be made in accordance with the contract specifications, municipal codes and regulations, county codes and regulations, state codes.
 - C. All installations will be made with quality products which are approved in advance by the general contractor or owner representative as defined contractually.
 - D. All installations will be made in accordance with manufacturer's instructions.
 - E. All installations will be inspected for correctness by a licensed journeyman electrician to ensure correctness and quality.
 - F. Supervisors shall make weekly inspections of installations to ensure quality and correctness.
 - G. The project manager shall make a minimum of two inspections per month to ensure installation correctness and quality.
 - H. The Corporate Quality Control and Commissioning Manager shall make an inspection at least once monthly of electrical installations to ensure correctness and quality.
 - I. The Renewables Director shall make an inspection at least once quarterly of electrical installations to ensure correctness and quality.
 - J. The President and CEO shall make visits to work sites annually to observe electrical installations and review correctness and quality.
 - K. All inspections shall include a review of safety procedures.
 - L. All job briefings and instruction shall include a review of safety procedures. A JHA shall be in the work area along with the installation plan.

II. Photovoltaic Installations

- A. All electrical installation operating procedures shall apply to photovoltaic installations.

III. Metrics and Testing Procedures

- A. The National Electric Code, current approved edition, shall be the base standard for all metrics.
- B. The Supervisors Preplanning manual shall be used as a guideline for preplanning, installation, and testing.
- C. All forms and documentation shall be submitted based on the procedures listed in the preplanning manual.
- D. All electrical testing shall be performed by a licensed journeyman electrician and shall be performed with listed test equipment rated Category III or greater using industry testing standards.
- E. All commissioning procedures shall be preplanned by the supervisor and approved by the project manager and corporate Quality and Commissioning Manager in advance of commissioning.
- F. All torque set fasteners shall be installed by trained personnel. A log shall be kept of all torque values applied and torque seal markings shall be placed on all torque set fasteners. The supervisor shall personally inspect and verify 10% of all torque set fasteners and initial the torque log showing acceptance. All major electrical equipment and cable #4 AWG or larger shall have Torque Verification record inspection performed and submitted using iAuditor to include pictures of the finished installation.
- G. All electrical terminations shall be inspected by a journeyman electrician to ensure correctness.
- H. All electrical equipment shall be tested for electrical correctness and operation prior to turn over to the owner. This testing shall be done in accordance with the electrical safety policy, the manufacturer's instructions, and industry standards.
- I. The project manager shall be responsible for ensuring all contractually required testing is performed and all logs are recorded with the work site files for archiving.

- J. All equipment with a Surge Protection Device (SPD) shall be verified for the correct SPD rating prior to energization.
- K. An energized work permit shall be requested for the following tests: Insulation resistance testing, VOC and Current Checks and IR Scans.
- L. When performing any test that requires an energized work permit, an energized JHA must be filled out daily.
- M. All insulation resistance tests must be completed with iAuditor, unless approved by the Corporate Quality Control and Commissioning Manager.

IV. Correction Procedures

- A. All deficiencies shall be reported to the QA/QC Manager immediately.
- B. All inspection reports noting deficiencies shall be given to the supervisor and the project manager immediately.
- C. The supervisor shall investigate the deficiency.
- D. The supervisor shall determine the cause of the deficiency.
- E. The supervisor shall make a plan to correct the deficiency. This plan shall be coordinated with the Quality Manager. If the same deficiency occurs again after the corrections have been put into place, then a form Root Cause Analysis investigation shall be conducted, and a report (Attached) completed. The findings shall be shared with the entire operations team and a follow up report concerning the corrections and measure of success shall be issued to the operations staff within one week after implementation.
- F. The project manager shall review the deficiency, the cause, and the plan to correct and approve a final plan to correct the deficiency.
- G. The project manager shall make a follow up inspection of the installation after the deficiency is corrected to ensure the corrected installation is correct and acceptable.
- H. The project manager shall report the deficiency, the cause and the correction plan to the President and CEO and the Corporate Quality Control and Commissioning Manager.
- I. The President and CEO shall review the deficiency and report the deficiency to the project managers so as to avoid similar deficiencies on other work.

sites.

- J. The Corporate Quality Control and Commissioning Manager shall record the deficiency on the Deficiencies Log and will instruct employees on how to avoid the deficiency in the future and shall post the information in the E Light Electric Ideas Radiator for sharing with other projects.
- K. The Corporate Quality Control and Commissioning Manager shall keep a log of deficiencies and shall review this log with the President and CEO quarterly.

- L. The President and CEO and the Corporate Quality Control and Commissioning Manager shall determine deficiency trends, identify significant deficiency causes and shall annually develop education programs and preventions programs to avoid deficiencies.
- V. Continual Quality Control
- A. All E Light Electric Services, Inc. employees are responsible for the quality of our product. We expect all our employees to take pride in every task they perform and to continually be aware of quality. E Light Electric Services Inc. is striving to be the best electrical contractor and our employees are expected to work together as a team to accomplish this goal.
 - B. All E Light Electric Services, Inc. employees are expected to observe their work environments and the work product and to evaluate them for quality. All E Light Electric Services employees are empowered to stop a work process and inform a supervisor if they observe procedures or product that does not meet the high-quality expectations of E Light Electric Services, Inc.
 - C. The management of E Light Electric Services, Inc. will work in a coordinated manner to continually develop a corporate culture of safety, training, and education of which quality awareness will be the foundation.
 - D. The STOP action program has been implemented to facilitate the continual improvement process.
 - E. The Corporate Quality Control and Commissioning Manager and the Director of Training will include safety and quality discussions in all training and education classes.
 - F. All management meetings will include a discussion about safety and quality.
- VI. Audit and Revision
- A. The Corporate Quality Control and Commissioning Manager shall conduct an annual audit of the quality assurance program.
 - B. The audit shall include a review of the:
 - 1. Effectiveness of the program
 - 2. The procedures used in the program.

3. The inspection processes used in the program.
 4. The Reporting processes used in the program.
- C. The audit shall be made by the quality assurance committee made up of the Corporate Quality Control and Commissioning Manager, The President and CEO, one project manager, one supervisor, one journeyman electrician and one apprentice.
 - D. The committee shall make recommendations which shall be reported to the Corporate Quality Control and Commissioning Manager.
 - E. President and CEO shall make an annual report concerning the quality assurance program following the committees audit and suggestions.

The Corporate Quality Control and Commissioning Manager shall prepare an annual report on the effectiveness of the Quality Assurance Program and shall make a report to the heads of all departments annually.

It is the intention of E Light Electric Services, Inc. to implement an electronic inspection and reporting process on the Project as a means to improve communications between E Light and the client. We will request a meeting to review the electronic method before implementation.