

Appendix 12-1:

Quality Assurance and Quality Control Plan



a **MasTec** company 

QAQC-SOLR-PLAN-001

SOLAR CONSTRUCTION QUALITY ASSURANCE AND QUALITY CONTROL PLAN

REVISION HISTORY

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1 PURPOSE

The intent of this Quality Assurance and Control (QAQC) Plan is to establish a formal QAQC program for Photovoltaic (PV) construction projects to drive compliance with project specifications and drawing requirements. This will enable the project team to deliver a project that meets or exceeds contractual design and construction standards, thus preventing defects that could affect quality, reliability and performance of the project.

This QAQC Plan is to provide a framework for attaining the required level of quality in construction by delineating individual QAQC responsibilities, providing appropriate management tools for their diligent use, establishing procedures for the execution of assigned tasks, establishing documentation protocols and ultimately to instill in each individual worker a commitment to consistently produce quality work.

2 SCOPE

This QAQC Plan is applicable to utility and/or construction and industrial (C&I) PV projects and the scope of work contractually assigned to Wanzek Construction, Inc., its subcontractors and vendors. This document is intended to provide the highest project level of framework for the corporate Quality Management System (QMS). The content outlined in this document is supported by processes, procedures, instructions, forms, records and references. Project-specific items will be added as needed to allow for needed customization.

3 RESPONSIBILITIES

3.1 ROLES

President and Vice Presidents – Must support this QAQC Plan by delivering a consistent message about the importance of Quality within the organization. Responsible for establishing direction of Wanzek's QMS. Top management must live out the company vision: Be the best, deliver excellence!

Director of Operations – Shall support the QMS by allocating appropriate resources to meet the requirements of this plan. Operations Directors must support and maintain records of required personnel training. Operations Directors shall support Wanzek's core belief of *Talent* by recruiting, rewarding and retaining top performers.

Director of Quality – Responsible for promoting compliance to the QMS policy throughout the organization. The Director of Quality is responsible for the development, continual improvement, final review and approval of the quality plan, procedures, processes and policies. The Director of Quality will ensure the content of the QAQC Plan is maintained and changes are planned and implemented when appropriate. The Director of Quality shall provide support and feedback to Quality Managers.

Quality Manager (QM) – Responsible for developing and revising policies and procedures that continuously improve the overall quality of installed products and/or services. The QM is also responsible for measuring the quality of services and products provided to our clients through random audits. The review and revision of all quality program content is a primary function of the QM. The QM shall review and approve all Inspection and Test Plans (ITPs).

Quality Control Management Team (QCMT) – Includes, but is not limited to, the Solar Quality Manager, Renewable Energy Wind Quality Manager, Renewable Services Quality Manager, Electrical Quality Manager and Industrial Quality Manager (all the Group Quality Managers). The QCMT is

responsible for developing policies and approving procedures that improve quality. The QCMT is ultimately responsible to ensure that proper training has occurred for all project Quality personnel. The QCMT is also responsible for measuring the quality of services and products provided to our clients. The content and continual improvement of the quality control program will be a function of the QCMT. The QCMT shall review and approve Inspection and Test Plans (ITPs). The QCMT shall assist the project teams with all quality-related items.

Project Manager (PM) – Responsible for the implementation of the QAQC Plan throughout the duration of the project. PMs are responsible for the development of project ITPs. PMs will work with the Director of Quality and the QM or QCMT to address quality-related items and assist with gathering information. PMs shall review and approve Non-Conformance and Corrective Action reports. PMs are responsible for the review and turnover of Quality documents to the client(s).

Assistant Project Manager (APM) – Responsible for implementation of the QAQC Plan in the field and ensuring client satisfaction. APMs will work with the PMs and the Field Quality Managers to address quality issues and assist with gathering information.

Procurement Manager – Act as a liaison between the leadership team, internal customers, subcontractors and vendors to meet or exceed expectations for quality, quantity, price, delivery and innovation. The Procurement Manager is responsible for the implementation of this QAQC plan as it pertains to subcontractors and vendors (see section 5.5). Additionally, Procurement Managers shall follow, develop, improve and maintain processes and systems utilized by Wanzek to perform procurement-related tasks and functions; support the implementation of industry best practices and a mindset of continuous improvement; review, analyze and monitor assigned vendor/subcontractor capabilities, quotes, bids and overall performance; facilitate the timely resolution of issues with vendors related to price, quality, delivery, condition, etc.; and monitor, update and improve systems, processes and documents used to perform procurement activities.

Field Quality Manager (FQM) – Responsible for managing the QAQC Plan in the field and ensuring client satisfaction. FQMs shall assist with development and implementation of project-specific plans and procedures related to quality. FQMs shall be responsible for reviewing all inspections and test reports. FQMs shall create inspection and test logs. FQMs shall report to the APM and PM on all quality-related metrics, reports and issues. FQMs shall monitor results and ensure any necessary responses/actions for third-party testing reports.

Quality Technician (QT) – Acts as the QAQC representative and shall follow the guidelines and requirements of the QAQC Plan. QTs will initiate, follow through and report on quality-related items to ensure that the contractual requirements that have been agreed to between the client(s) and Wanzek are met. QTs shall ensure that all required inspections and testing is completed properly. QTs shall update inspection and test logs. QTs shall complete assigned documentation, applicable checklists and report non-conforming conditions to the FQM, CMIII and the APM and/or PM as appropriate. QTs may be required to perform inspections and tests.

Construction Manager III (CMIII) – Responsible for implementation of the QAQC Plan in the field and ensuring client satisfaction. CMIIIs will be aware of and follow the guidelines and requirements of the QAQC Plan. CMIIIs will work with the APM and the FQM to address quality issues and coordinate

corrective action plans when required. CMIIIs shall arrange, coordinate and monitor third-party testing, as well as accept or reject the results.

Construction Manager I and II (CMI and CMII) – CMIs and CMIIIs are responsible for implementation of the QAQC Plan in the field and ensuring customer satisfaction. CMIs and CMIIIs understand and follow the guidelines and requirements of the QAQC Plan. The CMIs and CMIIIs will work with the CMIII, FQM and the Quality Technicians to address quality issues and execute corrective action plans, when required. The CMIs and CMIIIs will coordinate with the Quality Technicians to complete inspections and in auditing the crew Foreman's work to ensure compliance with contract specifications and that the QAQC Plan is being followed.

Foreman – Foremen will understand and follow the guidelines and requirements of the QAQC Plan. The Foremen will work with the Construction Manager I and II and Quality Technicians to ensure that the contractual requirements which have been agreed to between the client(s) and Wanzek are met and procedures are followed. Foremen will complete all inspections and tests, along with all the required documentation forms. Foremen will coordinate with the Quality Technicians in auditing the Leadsman's work to ensure compliance with contract specifications and that the QAQC Plan is being followed.

Leadman – Leadman will understand and follow the guidelines and requirements of the QAQC Plan. The Leadman will work with the Foreman and Quality Technicians to ensure that the contractual requirements which have been agreed to between the client(s) and Wanzek are met and procedures are followed. Leadmen will assist the Foreman with the completion of all inspections and tests, along with all the required documentation forms. Leadmen will coordinate with the Foreman and Quality Technicians in auditing the work to ensure compliance with contract specifications and that the QAQC Plan is being followed.

3.2 RESOURCES

Wanzek shall employ sufficient personnel to implement this QAQC Plan. Personnel shall be knowledgeable and properly trained in the work discipline to which they have been assigned. Wanzek shall provide qualified agencies, laboratories, consultants or contractors as necessary to implement the QAQC Plan.

4 DEFINITIONS

ACRONYM/TERM	DEFINITION
AHJ	Authority Having Jurisdiction
Benchmark	A formal or informal review process of a finished product, deliverable and/or task. It is a standard or point of reference against which future items may be compared to or assessed by.
Best Practices (BP)	<p>A compiled set of procedures that standardize the most efficient and effective way to complete a specific task. BPs include SOPs, MOPs, IWPs, Lessons Learned and Quality/Safety Alerts.</p> <ul style="list-style-type: none"> Standard Operating Procedure (SOP) – Set of step-by-step guidelines explaining the current company standard of how something should be done, operated, assembled or installed. An SOP is a guideline with multiple variables that are situational and may require further supervisor direction based on the circumstances.

ACRONYM/TERM	DEFINITION
	<ul style="list-style-type: none"> Mandatory Operating Procedures (MOP) – Set of step-by-step instructions explaining the mandated company process of how something will be done, operated, assembled or installed. An MOP is an instruction with no variables and therefore cannot be deviated from without prior permission from Senior Management. Integrated Work Procedure (IWP) – Set of procedural steps specifying how something should be done, operated, assembled or installed. IWPs may require the additional use of SOPs and MOPs to accomplish the task. Lessons Learned – The knowledge gained during a project that illustrates how project events were addressed or should be addressed in the future with the purpose of improving future performance. Quality Alert – Published document that highlights a quality defect and outlines required action to be taken to prevent the issue from reoccurring or to prevent the practice.
Certification	Statements by inspectors, officials, engineers or product manufacturers attesting that product, system or material meets stated specification requirements.
Non-Conformance Report (NCR)	<p>A record of the identification, containment and resolution of a non-conformance.</p> <ul style="list-style-type: none"> Non-Conformance – Any material or work that does not conform to the agreed specifications, drawings, best practices or quality standards established by the contract. Containment – Actions immediately taken to prevent the spread of issues or stop issues from causing further defects. Disposition – A statement describing the way a non-conformance is to be resolved. <ul style="list-style-type: none"> Use-as-is – A disposition of a non-conformance for an item that will satisfy its intended use, even though it does not meet all design requirements. Repair – A disposition of a non-conformance for an item acceptable for its intended use even though it is not yet restored to a condition that meets all specifications. Rework – A disposition of a non-conformance for an item that can be brought into conformance with the original requirements through re-machining, reassembling, reprocessing, reinstallation or completion of the required operations. Reject – A disposition of a non-conformance for an item unsuitable for its intended purpose and economically or physically incapable of being reworked or repaired. Corrective Action – Procedure for initiating, assigning, implementing and documenting formal remediation of non-conformances.
Observation	Official feedback provided to work crews for the purposes of heightened awareness of a non-compliant issue that, if not addressed, may result in an NCR. Observations are managed by the Project Document Management System.
OEM	Original Equipment Manufacturer
Phase Gate Review	A process to ensure and verify project teams plan and prepare for the start of a project and each major phase and to integrate risk management and action planning into such phase planning.

ACRONYM/TERM	DEFINITION
Pre-Activity Review	A process to ensure and verify the project teams' plans are effectively developed with the project Forman/Leadman. These plans are then communicated to craft workers and they are trained so the plans are implemented in the field.
Project Document Management System	Web-based or other database used to store all project-related documentation such as drawings, standards, specifications, material cut sheets and required QAQC documents.
Punchlist	A list of work that does not comply to contract specifications.
PV	Photovoltaic
Quality Assurance (QA)	To ensure the proper processes are used to measure and assure the quality of a project.
Quality Control (QC)	To ensure the work and materials used for a project meet a high level of quality and meet or exceed all applicable standards and client expectations.
QMS	Quality Management System
Quality Audit	A systematic examination and review to determine whether quality activities and related results comply with requirements and whether these requirements are implemented effectively and are suitable to achieve the project objectives.
Subcontractor	A company, organization or individual providing a service or product which may include labor, materials or other facilities or resources.

5 PROCESSES

5.1 PROJECT PLANNING

5.1.1 PURPOSE

Proper planning is critical to efficiently delivering a quality product or service. This section outlines minimum planning activities required for each project.

5.1.2 SCOPE

Every aspect of a project must be planned before work commences. This is not limited to self-performed work; subcontractors will be included in planning activities as is prudent.

5.1.3 METHOD

Project teams shall utilize applicable internal resources to ensure a consistent planning process. All planning meetings will be documented and archived in a known location.

At a minimum, the following reviews will be completed:

- Contract
- AHJ requirements
- Safety
- Scopes of work
- Proposed timeline
- Personnel required
 - Experience, training and qualification records
 - Availability

- Equipment, materials and tool lists
- Applicable IWP's
- QC documentation
 - Inspections, tests, calibrations
 - Benchmarks
 - Best Practices
- Applicable archived Lessons Learned
- Any additional customer requirements

Upon identifying gaps in understanding, appropriate measures must be taken to fill those gaps.

Requests for Information (RFIs) will be utilized to gather additional information from customers.

Pre-Project meetings are broken down into two categories; Phase Gate and Pre-Activity meetings.

Phase Gates are high level, multi-scope planning meetings that are executed at least two weeks prior to the start of a large project, or phase of a large project.

Pre-Activity meetings are more focused meetings that are held prior to commencement of a specific task. In the case of small, short duration projects, Pre-Activity meetings may be all that is required.

Project teams must present their plan to the management team which shall include representatives from the Quality and Preconstruction departments. Standardized Wanzek templates shall be used. The project team will display their knowledge and preparedness during the presentation. Members of the management team may ask for clarifications and assign action items.

Before the project team is mobilized, the pre-project meeting must be complete. All action items resulting from the meetings shall be addressed prior to commencing work.

Subcontractors are expected to complete their own planning for assigned scopes of work, with coordination and submission to Wanzek for approval prior to commencing work.

5.2 SITE QUALITY TRAINING

5.2.1 PURPOSE

To ensure all project personnel are aware of their applicable scope of work and responsibilities in accordance with this QAQC Plan, its appendices and annexed documents, personnel will receive all required and needed training to perform their job function.

5.2.2 SCOPE

The project's site management team and Wanzek Field Operations Manager will ensure that all employees and subcontractors receive training relevant to their quality responsibilities. Critical training shall be facilitated by the Group Quality Manager. The Group Quality Manager is

ultimately responsible to ensure that proper training and any required certifications have occurred or obtained for all project Quality personnel. Records of all training shall be maintained and audited.

5.2.3 METHOD

Wanzek' Project site team will use this QAQC Plan, its appendices and annexed documents (which includes a Wanzek Quality Orientation) as an aid in understanding how it will fulfill established quality requirements. Emphasis will be placed on the identification of actual or potential quality problems and the initiation of preventative and/or corrective measures.

5.3 DOCUMENT CONTROL

5.3.1 PURPOSE

To ensure that:

- Pertinent documents are available at points of use.
- Obsolete documents are promptly removed from use.
- Documents are updated in a consistent manner that ensures the most recent revisions are available to all team members.
- Documents are available to those who need them but protected from those who do not.

5.3.2 SCOPE

Documents from client(s), engineers, subcontractors, vendors, as-built documents, third-party codes/standards, inspection forms, submittals, RFIs, work instructions and benchmarks shall be guided by the measures outlined below. Not all documents will be contractual deliverables but should be maintained as part of Wanzek's best practices (BPs). Documents will be digital with hard copies made available as needed.

5.3.3 METHOD

Project managers are responsible for overseeing and auditing all documents but can delegate portions or all of responsibility to competent personnel. Wanzek's subcontractors and vendors are responsible for applicable section(s) of this procedure of their own to ensure suitable document control.

Wanzek shall utilize a Project Document Management System to store all required documents for project use (i.e. Procore). The system shall provide change tracking, be secure and accessible by all required personnel. During the planning stages of the project, all applicable project documents shall be uploaded to Wanzek's project management software.

Access to viewing, editing, downloading, etc. of documents housed in the management software will be controlled by Wanzek. Permissions will be granted on an as-needed basis by the Project Manager.

5.3.3.1 Transmittals

Documents received must be reviewed for completeness and clarity. Client(s), vendors, subcontractors or consultants, as appropriate, shall be promptly notified of any deficiencies

or discrepancies. Client(s), vendors, subcontractors or consultants that receive documents are required to acknowledge receipt within three (3) working days, or as per the terms of the contract.

Records shall be maintained, organized and available to all applicable parties. In general, these documents will be in digital form, but hard copies can be produced if needed.

5.3.3.2 Revisions and Current Documents

A log is kept of current documents. The log shall indicate acknowledgement from the client(s), vendors, subcontractors or consultants that information was received. Acknowledgements shall be followed up on. PMs will maintain a log within the project's account in the management software.

5.3.3.3 As-Built Documents/Redlines

Wanzek's master plan set shall also be used as the As-Built documents. For self-performed work by Wanzek, its subcontractors and vendors, each shall be responsible for redlining. The official as-built documents will remain with Wanzek until turned over to client(s) at the end of the project. Redlining shall be done as changes occur. If revisions to documents are received without the previous changes incorporated, the later revision must be redlined with the previous changes. The PM shall perform or delegate weekly inspections of the as-built documents to assure correctness and adherence to prior agreements.

5.3.3.4 Review of Shop Drawings/Submittals

Shop drawings/submittals shall conform to contract specifications. Submittals shall clearly indicate how subcontractor or vendor intends to comply with specifications. Submittals shall provide evidence of conformance to specified materials, manufacturer, model numbers and performance standards. No substitutions shall be installed unless prior authorization has been received. Submittals shall provide a specific procedure for presentation, consideration, review, approval, use and documentation of substitutions. Submittals shall confirm that the work complies with stipulated standards.

Wanzek shop drawings/submittal procedure shall provide for coordination between other subcontractors and suppliers. Attention shall be paid to conflicts with work provided by others, interface points and mechanical and electrical requirements and interface.

Wanzek's shop drawing/submittal procedure shall confirm that finishes conform to specifications. Using a submittal, documents will be forwarded to the appropriate party. A review/response period of no less than three (3) days shall be observed. Further action that is required will be clearly noted, a "respond by" date provided and a copy will be kept on file. Submittals that are rejected must be revised and resubmitted. Record copies will be available to the appropriate party.

Wanzek shall review the submittal log weekly. The report will be used to identify any past due items as well as near term items.

5.4 PROCESS CONTROLS

5.4.1 REQUEST FOR INFORMATION (RFI)

5.4.1.1 Purpose

- Securing clarification when requirements are not clear or are conflicting.
- Obtaining required information for construction activities that are not available in the contract documents.
- Communicating Non-Conformance Reports for dispositioning.

5.4.1.2 Scope

All issues relative to fulfillment of contract requirements are covered. RFI processes shall be employed between Wanzek and its consultants, subcontractors, vendors and client(s).

5.4.1.3 Method

PMs (and/or their delegates) are responsible for the execution of this process. Wanzek consultants, subcontractors and vendors shall have an equivalent process of their own. RFIs must be very detailed and include supporting information such as pictures, drawings, test results, etc. RFIs shall be created, submitted and reviewed in a program that allows for tracking and archiving of pertinent data such as submission date, response date, response content, etc. A log of all RFIs shall be maintained.

5.4.2 PLAN OF THE DAY (POD) MEETING/REPORT

5.4.2.1 Purpose

To establish an effective, daily communication process for project activities.

5.4.2.2 Scope

The following is a minimal list of the items that will be discussed at the Plan of the Day (POD) meeting and be included in the POD minutes:

- Site safety and weather
- Project milestones
- Activities completed to date
- Activities completed the prior day
- Activities passed by QAQC
- Activities planned for each crew for the current day
- Activities planned for the next day
- Delays and/or constraints

5.4.2.3 Method

The PM (and/or delegate) is responsible for the execution of this process. The PM shall coordinate with project team members a specific daily time to conduct the POD meeting.

Upon completion of the POD meeting, information discussed shall be recorded in the POD minutes and issued to all applicable parties.

5.4.3 BENCHMARKING

5.4.3.1 Purpose

To ensure and verify that project teams successfully execute each deliverable activity of a project and establish a purposeful and consistent template from which to duplicate. Benchmarks merge risk management and action planning with the execution phase of a project. Benchmark, can be defined as a formal or informal review process of a finished product, deliverable and/or task; it is a standard or point of reference against which future items can be compared or assessed. **Each Benchmark shall involve key stakeholders to establish an agreeable example for the given deliverable and is meant to satisfy any contractual requirements of a First Article Inspection (FAI), Golden Block, Hold or Witness points (of an ITP), or any and all similar obligations prescribed by the project contract.**

5.4.3.2 Scope

Work performed by, or under the direction of Wanzek may be subject to benchmarking. The scope of benchmarking requirements may be defined internally and/or based on agreements reached with the Client(s) or Client's project constituents via the Submittal process (see section 5.3.3.4).

Benchmarking shall be established for any major task that is repetitive, such as trenching, inverter placement, CBX install, module install, etc.

5.4.3.3 Method

The Benchmarking process shall be carried out in accordance with document QC-ALL-BM-01-Benchmark Procedure (see annexed documents). The process begins in the planning stage of the project with or without client(s) inputs. Previous, applicable benchmarks will be reviewed and a benchmark matrix outlining minimum benchmarks required for the project will be established. Benchmarks will commence with the first rendition of a repetitive task. FQMs shall be responsible for execution of the benchmarking process in the field. The FQMs, QCMT and PMs shall review the benchmark and coordinate meetings with the Client(s). Finalized, agreed upon benchmarks become the standard for the rest of the project; they shall be maintained by the site project team. Proprietary information will be protected.

5.4.4 WORK INSTRUCTIONS

5.4.4.1 Purpose

To provide task specific guidance to all tradespersons completing work on a project.

5.4.4.2 Scope

Work instructions shall be provided or developed by Operations for every project job task. Having good work instructions improves safety, efficiency and quality. Subcontractors shall provide work instructions for their scope of work for review prior to commencing work.

5.4.4.3 Method

Wanzek has an extensive library of internal work instructions that have been developed over years of work. During the planning phase of the project it shall be determined which work procedures are required to perform the scope of work.

In cases where an internal work procedure does not exist, one will be requested from the OEMs or from the Client(s) in the case of owner provided material. If no such document is available or is not provided, one will be developed. Wanzek will seek out experienced individuals from within the organization to assist in the development of the required procedures. Operations Managers will oversee development and approve final drafts of work instructions.

Best Practices shall be collected and integrated back into work instructions each time a scope of work is repeated to ensure the most efficient, up-to-date information is included in our work instructions.

Examples of task specific work instructions/procedures include, but are not limited to:

- Trenching
- Pile driving
- Rack assembly
- Module installation
- Combiner Box (CBX) installation
- Wire management
- Tool maintenance, calibration and logging
- Inverter/transformer pad construction/installation
- System grounding/bonding

5.4.5 QUALITY CONTROL INSPECTIONS

5.4.5.1 Purpose

To validate completed work to contractual specifications.

5.4.5.2 Scope

All work performed requiring validation prescribed by the project contract.

5.4.5.3 Method

The Project Manager (or assigned Delegate) identifies each construction item that requires separate quality controls per the contract. An Inspection and Test Plan (ITP) is developed to map and track each item requiring Quality inspections. The ITPs are a matrix of what to measure, how often to measure (including Hold Points for customer quality inspections [see 5.4.3 Benchmarking]), what pass/fail criteria are and what to do when failures exist. Site-specific ITPs are in the appendix of this document.

The Project's assigned Inspectors are required to actively carry out inspections and tests per the ITP throughout the active construction of the power plant. The inspections are created, completed and stored in the Project's Document Management System (see SOP for inspections in the list of annexed documents).

5.4.6 RECEIVING AND SITE LOGISTICS

5.4.6.1 Purpose

To ensure that receiving inspection and testing requirements are met as required by applicable code, standard, or regulatory body and as prescribed in the project contract documents.

5.4.6.2 Scope

All work, including directly and indirectly purchased material and equipment within the scope of work described by the project contract, is covered by this procedure. Inspection and testing of materials may be performed by Wanzek, a subcontractor or a vendor as applicable to ensure conformance to contractual specifications and approved submittals.

5.4.6.3 Method

The Project Manager (or assigned delegate, typically the Materials Manager or Technician) is responsible for the execution of this process. Wanzek subcontractors and vendors are responsible for this process or an equivalent one of their own for work covered by the contract for their services.

Receiving inspections shall be performed to assess the condition of the item(s) being received including verification of quantities, model numbers, serial or mark numbers and conformance with the contract, submittal(s), or other document which authorized its purchase. Visual or non-destructive testing for damage or deterioration shall be performed as required.

Projects shall maintain product identification and material traceability according to the requirements of the contract. Tracking Logs and Receiving Forms shall be set up to support this process. All material manufacturer documents and receiving records shall be filed on site and recorded in the tracking logs. Where appropriate, the client(s) shall participate in the inventory and inspection of received goods. The inventory inspection shall validate count, conformance with specifications, damage (if any) and place of storage or use upon offloading. Major quality deficiencies shall be noted on the appropriate receiving inspection form and communicated to the Transportation Company and Vendor(s) along with a Non-Conformance report.

5.4.6.4 Material Review Area (MRA)

This is an area located on the project site designated for material that has damage, defects, or has been incorrectly supplied and does not meet the required specifications of the project. All material in the MRA should be clearly isolated from good material (with barriers/signage) and will be evaluated for disposition.

5.5 SUBCONTRACTORS AND VENDORS

5.5.1 PURPOSE

To encourage Wanzek subcontractors and vendors to perform work to the standards set forth in this plan.

5.5.2 SCOPE

All subcontractors and vendors working under the direction of Wanzek. Wanzek verifies the qualifications of subcontractors and vendors to ensure that they are capable of completely fulfilling their assigned responsibilities. Quality requirements are defined, verified and documented before they are approved for a project.

5.5.3 METHOD

Subcontractors shall provide written procedures for each scope of work they will perform. The provided documentation shall be reviewed by Wanzek management prior to subcontractor mobilization. Wanzek shall verify that the subcontractor has provided sufficient documentation on how the subcontractor will complete and verify its work. Subcontractors will participate in the Wanzek benchmark program.

Subcontractor field reports, inspection and test reports shall be furnished to Wanzek within a timeframe stated in contract documents. All applicable inspections and test reports shall become part of the Turnover Package to the Client(s). Wanzek will audit the work of its subcontractors to ensure compliance and may elect to perform inspections separate from those performed by the subcontractor to verify compliance.

5.5.3.1 Vetting of Subcontractors and Vendors

The Procurement Manager and Project Manager qualify subcontractor and vendor capabilities to ensure that they are capable of completely fulfilling their assigned quality responsibilities before approving and signing the contract, purchase order or work order.

Subcontractors and vendors must meet all Wanzek quality requirements by either 1) working under the Wanzek QAQC Plan, or 2) operating their own quality program if it meets or exceeds Wanzek quality requirements.

5.5.3.1.1 Required Credentials

The Project Manager defines quality-related credentials for each project task that affects project quality including required:

- Organization and personnel licenses
- Personnel training
- Organization and personnel certifications
- Organization and personnel experience

5.5.3.1.2 Required Capabilities

- Senior person designated as Quality Manager
- Knowledge of Company quality standards

- Demonstrated capability to complete work to Company quality standards
- Demonstrated skills and knowledge
- Demonstrated experience
- Demonstrated results
- Effective self-inspection process
- Access to codes, standards and product instructions
- Equipment availability
- Production capacity

For critical components, the Procurement Manager and/or Project Manager shall determine if a source quality inspection is necessary to validate vendor quality and delivery capabilities.

5.5.3.1.3 Assessments

When the subcontractor/vendor qualification assessment identifies minor non-conformances to the subcontract requirements, the Procurement Manager and/or Project Manager may approve a provisional subcontract. The provisional subcontract supplements the subcontract with requirements for actions that address correction of the non-conformances. All non-conformances must be corrected before work in the affected area begins.

5.5.3.2 Purchase Order Requirements

The Procurement Manager, Project Manager and Field Quality Manager shall ensure that materials, equipment and services are purchased only from qualified vendors off the Approved Vendors List (AVL). The Procurement Manager holds subcontractors and vendors to the same quality requirements that must be met by Wanzek. The Procurement Manager ensures that subcontracts and purchase orders clearly specify quality requirement expectations including:

- Compliance to Wanzek's quality program
- Conformance to contract specifications
- Compliance to project quality standards
- Quality Management practices including:
 - Performance of self-inspections
 - Control of quality non-conformances and responsive corrections
 - Prevention of non-conformances
 - Controls that ensure completion of post-construction remedial work
 - Participation in quality training

- Preparation of submittals
- Participation in project planning meetings
- Participation in activity planning meetings
- Handling, storage, packaging and delivery as applicable
- Product or material identification for traceability

5.5.3.3 *Project Purchase Order Approvals*

The Project Manager (or assigned delegate) ensures that contracts and purchase orders are issued only to qualified subcontractors and vendors. The Project Manager must review, approve and sign each purchase order.

The subcontractor or vendor must agree to the purchase order terms and specifications and then sign the contract or purchase order.

5.6 THIRD-PARTY INSPECTING AND TESTING

5.6.1 PURPOSE

To outline reporting procedures for third-party inspection and testing.

5.6.2 SCOPE

Any work completed by a third-party testing or inspection company.

5.6.3 METHOD

Perform and document inspection and field testing. Reports will be submitted to Wanzek within the time specified but under no circumstances more than five (5) calendar days following completion of the test, indicating observations and results of tests and indicating compliance with Contract Documents.

Reports indicating non-conformance with project specifications shall be submitted to Wanzek within 24 hours of completion of the failed test. Wanzek will compile all reports and submit them to client(s) with the Final Turnover Package.

Suitable safety precautions and protections must be taken per OSHA, NESC or other governing body during field testing. Only trained and qualified personnel shall operate test equipment.

5.7 MEASURING AND TEST EQUIPMENT

5.7.1 PURPOSE

To ensure that all measurements and tests produce accurate results.

5.7.2 SCOPE

This procedure covers all measuring and testing equipment used by Wanzek and Wanzek's subcontractors.

5.7.3 METHOD

Wanzek and its subcontractors shall determine the necessary measuring and testing equipment based on applicable testing standards, usual and customary industry practice and the measurement and testing requirements of the contract documents.

All measuring and testing equipment shall be calibrated in accordance with applicable testing standards and equipment manufacturer recommendations:

- Use standards that are traceable to national and/or international standards
- Have appropriate re-calibration intervals
- Employ the use of a sticker or other means necessary that indicate the next re-calibration date of the measuring or testing equipment
- All calibration certificates associated with tooling shall be filed. An electronic copy shall be stored by Wanzek management for future reference.
- All measuring and testing equipment shall be identified and stored in a suitable manner to protect from damage or distortion.

Prior to use, date of last calibration is to be verified by the FQM or designee. In those instances where contract documents require additional measures, the measure specified (or approved equivalents) are to be followed. Additionally, if the accuracy of the instrument is suspect for any reason, then the instrument shall not be used until proper calibration is confirmed.

5.8 NON-CONFORMANCE AND CORRECTIVE ACTION

5.8.1 PURPOSE

To ensure components and/or work suspect of being damaged, insufficient, or otherwise contractually unsatisfactory, are properly documented, reviewed and corrected.

5.8.2 SCOPE

All work performed and all components received. The Project Manager (or assigned delegate) is responsible for the execution of this procedure. Any failing line item on an inspection must be tracked, the party responsible for correcting the issue must be notified and follow-up actions must be taken to correct the issue.

5.8.3 METHOD

Non-conforming work or components discovered during inspections or tests shall be recorded in a Non-Conformance Report (NCR) form via Wanzek's Project Management software (i.e. Procore). Applicable supporting images, documentation, statements and test results shall be included while documenting the issue. Work or components which are deemed non-conforming shall be identified by the placement of a red tag on the work or component indicating that it is non-conforming and may not be used.

If the deficiency is related to work performed, the crew and supervisor responsible for that work shall be notified immediately. In the case that the issue is related to a vendor, the vendor must be notified. The Project Manager shall review all cases of non-conformance and determine what

course of action must be taken. If the cause is not readily known, a root cause analysis (RCA) shall be performed and the results must be forwarded to the Quality Department. The RCA shall include a corrective and preventative action plan. The Quality Department will review the issue and determine if a quality alert, or other further action is required.

All Non-Conformance reports with all applicable attachments will become part of the Turnover Package to the Client(s).

(see also NCR in section 4 Definitions)

5.9 CONTINUOUS IMPROVEMENT

5.9.1 PURPOSE

To solve issues found during quality inspections is not sufficient. Systematic prevention of recurrences is essential for improving quality.

Wanzek will make changes to resolve issues. Solutions may involve a combination of enhanced process controls, training, an upgrade of personnel qualifications, improved processes or use of higher-grade materials.

Follow-up ensures that a problem is completely resolved. If problems remain, the process has a potential to be repeated.

5.9.2 SCOPE

All project processes, procedures, instructions, controls, plans, tests, materials and equipment where opportunities to improve quality, reduce risk, increase value or optimize performance will be reviewed at project/activity planning phases and again at project closeout.

5.9.3 METHOD

In planning work, prior experience, lessons learned, best practices, audit records and available human resources shall be used to prevent non-conformance. Ensuring that personnel are well prepared to complete a given task is the best way to prevent issues from arising.

A Continuous Improvement Team consisting of at a minimum the QCMT, FQM and Director of Quality will be convened to identify preventative action improvement priorities with respect to frequency, severity and detectability of corrective action items found during and after completion of work activities. Additionally, the Project Manager and Directors of Engineering, Procurement and Operations may be included as part of the Continuous Improvement Team as required. This Team will also review company quality performance and customer feedback.

More specifically, the Continuous Improvement team will assess and/or make changes to:

- Client(s) corrective action items
- Wanzek quality inspection results
- Wanzek corrective/preventative action reports.
- Lessons Learned reports
- Management field audits

- Client(s) satisfaction surveys
- Material specifications
- Personnel qualifications
- Subcontractor qualifications
- Vendor qualifications
- Company standards
- Inspection processes
- Benchmark compliance

5.9.4 IMPLEMENTATION

The Continuous Improvement team initiates preventative action training to address quality improvement items. Personnel and subcontractors performing or inspecting work participate in the training.

Heightened awareness during quality inspections verifies and documents conformance with the preventative action improvement items. The Construction Manager and FQM will inspect areas which are highly susceptible to non-conformance during regular quality inspections and records observations on the inspection form.

The Continuous Improvement team reviews the results and evaluates the effectiveness of the improvements on quality inspection records and monthly audits. When the Team determines that the improvement actions are effective, then the item is no longer treated as Preventative Action. The improvement action then becomes an added Best Practice to the procedure or process.

5.10 HANDOVER AND TURNOVER OF DOCUMENTATION (HOTO)

5.10.1 PURPOSE

To provide a method for identification, collection, accessing, filing, storage, maintenance and disposition of quality records. These records are maintained to demonstrate conformance to the project's contractual documentation requirements. Maintaining records provides a method of preparing handover/turnover packages and/or books.

5.10.2 SCOPE

All project generated quality documentation.

5.10.3 METHOD

All quality inspections, test reports, certifications, qualifications, etc. will be stored in a secure cloud-based construction management software suite. Quality Control inspections shall be completed as work is being performed; completing Quality Control documentation later is not permissible. At the project level FQMs are responsible for ensuring the completeness and accuracy of QC documents. CMs and PMs will periodically audit the documents for errors and content on a set schedule. Incomplete or erroneous documents will be rejected and re-assigned

to the responsible party for corrections. Division Quality Managers will randomly audit documentation and provide feedback to project teams and management.

Documents will become records when they are determined to be complete and correct. Documents will be maintained as “soft” (electronic) records for project duration. At project handover/turnover, all contractual records, organized by transformer or other work area location, will be made available to the client(s). A hard copy of project records may be provided to the client(s) at the discretion of the Project Manager or as required by contract.

Handover and Turnover record matrices are typically prescribed by the project’s contract but may additionally be prescribed by other “authorities having jurisdiction” (i.e., local, state or national agencies). See appendix “F.” These records shall include but are not limited to:

- Wanzek QC inspections
- Subcontractor inspections
- Factory Acceptance Tests (FATs)
- Site Acceptance Tests (SATs)
- Third-party inspections and test reports
- Personnel qualification records
- Material Certifications of Conformance (C of Cs)
- Redline drawing package
- Submittal book
- RFI book

6 REFERENCES

[QAQC-CORP-PLCY-001 Wanzek QAQC Policy](#)

APPENDIX LIST

- A. Applicable Industry Standard Agencies
- B. Construction ITP (specific to project)
- C. Commissioning ITP (specific to project)
- D. List of IWPs (specific to project)
- E. Solar Benchmark Matrix (specific to project)
- F. HOTO document and report matrix (specific to project)

ANNEXED DOCUMENTS AND FORMS

Benchmark Procedure

Benchmark Training Video

IWP – Procore-Based Benchmarking

Lessons Learned Form

SOP – Completing Quality Inspections in Procore

Wanzek Quality Manual

Wanzek Quality Orientation

APPENDIX A – APPLICABLE INDUSTRY STANDARD AGENCIES

ACRONYM	DEFINITION
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
CSA	Canadian Standards Association
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
NEMA	National Electrical Manufacturers Association
NETA	InterNational Electrical Testing Association
NFPA70	National Fire Protection Association (NEC – National Electrical Code)
NPDES	National Pollutant Discharge Elimination System (branch of EPA – Environmental Protection Agency)
OSHA	Occupational Safety and Health Administration
SIEA	Solar Energy Industries Association
UL	Underwriters Laboratories