



**RESEARCH SUPPORT BUILDING AND INFRASTRUCTURE  
MODERNIZATION PROJECT**

**QUALITY IMPLEMENTATION PROCEDURE (QIP)**



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## **A. Introduction**

The Research Support Building and Infrastructure Modernization Project Quality Implementation Procedure's (QIP) is based upon and reflects the project's understanding and approach to the requirements and intent of DOE Order 414.1C, "Quality Assurance". Through a graded approach to quality assurance, the Research Support Building and Infrastructure Modernization Project strives to efficiently apply resources to activities and facilities, which will result in achieving the greatest benefit. While ensuring that the project is executed in a manner which protects the environment and the health and safety of both the public and SLAC employees, management also strives to eliminate unproductive activities that add to costs, or are unnecessarily burdensome.

Not all items, processes, activities, and services have the same effect on health and safety, reliability, environmental protection, or program objectives. Therefore, the Research Support Building and Infrastructure Modernization Project uses a graded approach to determine the applicability of the QIP requirements to specific activities and the rigor with which they should be applied. Considerations include:

- Environment Health and Safety
- Compliance with SLAC Policies and Regulations
- Research Support Building and Infrastructure Modernization Project Mission and Programmatic Impact
- Laboratory Protection – Cost/Investment

The objective of the Research Support Building and Infrastructure Modernization Project graded approach is to ensure that quality affecting activities are managed through adequate systems that are commensurate with the scale, cost, complexity, and hazards of the work being performed. Research Support Building and Infrastructure Modernization Project management and cognizant engineers are responsible for identifying the activities that are subject to these requirements, and for carrying out an analysis to justify the degree of rigor to be applied. The Research Support Building and Infrastructure Modernization Project QA (Quality Assurance) Manager's role is to serve in a consulting and assessment capacity with respect to QA issues.

## **B. Quality Assurance Policy for the Research Support Building and Infrastructure Modernization Project**

All Research Support Building and Infrastructure Modernization Project staff members are responsible for acquiring a sufficient understanding of these quality assurance principles in order to efficiently and effectively implement the specific requirements as it applies to their work. The cognizant engineer of an item, component, system, or process will be the key person for ensuring that an

appropriate level of documentation is generated and properly maintained to reflect adequate implementation of the principles herein.

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## **1.0 QA Program**

### **1.1 Purpose and Scope**

The purpose of this Quality Implementing Procedure (QIP) is to detail the quality assurance plan by which the Research Support Building and Infrastructure Modernization Project will produce facilities within the technical scope, cost and schedule requirements. This document contains policies for:

- Designing in quality and reliability.
- Promoting early detection of problems to minimize failure costs and impact on schedule.
- Developing appropriate documentation to support construction and operational requirements.
- Establishing methods to identify critical systems and to release these systems based on demonstrated performance.
- Assuring that personnel are trained as needed before performing critical activities, especially those activities that have environment, safety or health consequences.
- Defining the general requirements for design and reviews including environment, safety, and health issues.

This Quality Implementing Procedure (QIP) was prepared to meet the SLAC Office of Assurance Quality Implementing Procedure Requirements, revision in effect on date of approval, and the applicable requirements of DOE Order 414.1C, “Quality Assurance”. This Quality Implementation Procedure (QIP) meets the contract requirement of the DOE with Stanford University for a documented Quality Assurance Program.

### **1.2 Organization**

The Research Support Building and Infrastructure Modernization Project staff reports to the Project Manager for the Research Support Building and Infrastructure Modernization Project. Figure 1 shows the line organization to the division level.

### **1.3 Responsibilities and Authorities**

#### **1.3.1 Project Manager**

The Project Manager has the overall project management authority. The Project Manager is responsible for project planning, for achieving project cost/schedule/quality objectives, for ES&H

compliance, and for coordinating the activities of the project. In addition, the Project Manager approves staffing plans and actions.

The Project Manager also approves this Quality Implementing Procedure (QIP) and associated project-specific quality assurance procedures. Other responsibilities and duties of the Research Support Building and Infrastructure Modernization Project Director are described in the Research Support Building and Infrastructure Modernization Project Execution Plan. Specific QA responsibilities of the Project Director are also described in this QIP and/or QA procedures.

### **1.3.2 Deputy Project Manager/Chief Engineer**

The Deputy Project Manager and Chief Engineer are responsible for ensuring the implementation of QA/QC practices and procedures in accordance with the Quality Implementing Procedure (QIP). The other responsibilities key project personnel are described in the Research Support Building and Infrastructure Modernization Project Execution Plan.

### **1.3.3 QA Manager**

The QA Manager for the Research Support Building and Infrastructure Modernization Project is responsible for:

- Maintaining the Research Support Building and Infrastructure Modernization Project Quality Implementing Procedure (QIP).
- Providing consultation to the cognizant engineers to implement QA-related activities (for example, the QA Manager may provide guidance on developing inspection plans, developing vendor control programs, etc.).
- Providing or coordinating project-specific QA training for Research Support Building and Infrastructure Modernization Project members.
- Reviewing completion of QA-related milestones as provided in project schedules.
- Working with the Project Manger and Chief Engineer to avoid situations where completion of critical planned QA activities are compromised due to cost, schedule or other constraints.
- Recommending to the Research Support Building and Infrastructure Modernization Project Manager that work be stopped based on an investigation that indicates that work is of inadequate quality.
- Performing QA audits as requested by the Research Support Building and Infrastructure Modernization Project Manager.



- Participating individually or as part of a team in vendor surveys, vendor qualifications, and source inspections.

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## **1.4 Stop Activity Authority**

### **1.4.1 Relating to Work of Inadequate Quality**

Any individual involved in the project who becomes aware of an activity or workmanship that he or she believes to be of inadequate quality should bring the condition(s) to the attention of the their supervisor. It is the responsibility of the supervisor to investigate the condition(s) believed to be of inadequate quality, to communicate the problem to the Project Manager, and to take appropriate corrective actions based on the condition(s). Project management has the authority to stop work of inadequate quality if deemed appropriate. The role of the Project QA Manager with respect to making recommendations to stop work of inadequate quality has been previously described in Section 1.3.3.

### **1.4.2 Relating to Hazardous Operation or Conditions**

The policy on stop activity authority relating to hazardous operations or conditions is provided in Chapter 2 of the SLAC ES&H Manual. This policy is interpreted to include stop activity authority for any project supervisor or any member of the project team. Issues relating to stop activity based on potentially hazardous operations or conditions shall be communicated to the ES&H Office.

**ORG CHART GOES HERE**

**FIGURE 1.**

## **2.0 Personnel Training and Qualification**

### **2.1 Training and Job Proficiency**

The training program for project staff consists of required and recommended training commensurate with the scope, hazards, and complexity of their job functions to assure proper understanding of the specific principles, techniques, and requirements of their assigned tasks. The program also includes job-specific and task-specific ES&H training and certification. On-the-job training as appropriate, and/or a demonstration of initial proficiency conducted and/or witnessed by the employee's supervisor, is also required. Professional personal development courses are part of the training requirements.

Training is provided by qualified instructors using formal classroom sessions, required reading assignments, hand-on workshops, and other applicable training methods or combinations of methods. Periodic retraining (or ongoing training), including courses and seminars given outside SLAC, is conducted to maintain each employee's job proficiency and to improve performance.

The responsible supervisor, or manager, establishes, by means of a position description, the minimum requirements, with respect to education, experience, and other initial qualifications, for positions that require performance of quality-affecting activities. The selecting supervisor/manager makes a determination of the candidates' initial qualifications as compared with the minimum requirements. The Personnel Department verifies and documents, relevant education and experience.

Employees matrixed from all divisions are treated identically in the development of individual training plans as they relate to ES&H classes. ES&H training for subcontractors and employees of agencies that provide skilled persons for short-term employment by SLAC shall be coordinated through the Project ES&H Safety Manager.

### **2.2 Monitoring Training Requirements and Status**

The SLAC ES&H Training Database identifies the required training for all Project personnel, status of training, and completion dates of the training. The database is monitored by the Project ES&H Office. Required courses are assigned automatically by the database based on the identified workplace hazards. Supervisors are responsible for ensuring that their staff complete all required training.

### **3.0 Quality Improvement**

It is Project Management’s intent that all of our personnel be continually alerted to this project’s Quality Assurance Program objectives of preventing conditions and situations that may compromise the successful accomplishment of the technical, scientific, ES&H, and quality assurance goals and obligations of the project. There should be a continually improving level of quality in meeting these goals and obligations with the participation of everyone in the early identification, documentation, and remedy of problems that might results in excess costs or schedule delays, among other consequences.

Project management encourages a “no fault” attitude regarding the identification of problems that compromise either facility safety or reliability.

#### **3.1 Corrective Action**

Action will be taken, as appropriate, to rectify and prevent recurrence of significant conditions adverse to quality or environment, safety, and health. Quality related information will be reviewed and data analyzed to identify items or processes needing improvement. The decision to initiate any corrective action will also be based upon an evaluation of the seriousness, and the adverse cost and schedule impact of the problem relative to the cost and difficulty of its correction.

The primary responsibility for eliminating or minimizing defective elements and nonconforming articles, and for correcting conditions which have, or would initiate these problems rests with the individual group responsible for performing the tasks or producing the articles. The cognizant engineer or scientist is responsible for seeing that all appropriate corrective actions are adequate and taken in a timely manner. If the cognizant engineer, scientist, or QA Manager believes that a correction is not adequate or timely; the problem will be documented and brought to the attention of the Project Manager for resolution.

#### **3.2 SLAC Occurrence Reporting**

Incidents which are required to be reported in accordance with DOE G231.1-1, “Occurrence Reporting and Performance Analysis”, are a source of data regarding quality improvement opportunities. Occurrence reporting, investigation, and resolution are conducted in accordance with the provisions of the SLAC Workbook for Occurrence Reporting.

#### **3.3 Segregation of Nonconforming Items by User**

Items that do not meet requirements shall be segregated and placed into a designated holding area until their proper disposition can be determined. When segregation is not possible or impractical, other precautions are to

be taken to preclude inadvertent use or start-up of such equipment. Locking-out, tagging, or suitably marking are suggested means for controlling these cases.

### **3.4 Disposition and Tracking of Quality Problems**

The Chief Engineer shall expedite the disposition of quality problems and track and verify the completion of the authorized improvement or corrective actions.

Corrective action includes efforts to correct similar conditions at SLAC and to preclude recurrence of the deficiency or problem. A root cause, or lessons-learned analysis may be performed commensurate with the significance of the problems.

The Research Support Building and Infrastructure Modernization Project QA Manager shall bring to the attention of the Project Manager all quality-related deficiency problems with significant impact on the Research Support Building and Infrastructure Modernization Project for development of a corrective action plan.

### **3.5 Improvement Teams**

Improvement teams may be appointed by the Chief Engineer or Project Manager to work on resolving significant problems or on improving operations. These teams may be composed of persons from several groups. These teams could work on generic problems such as difficulties with the timeliness of procurements, or the lack of coordination of design activities. These groups will be facilitated by a facilitator appointed by the Research Support Building and Infrastructure Modernization Project Manager.

## **4.0 Documents and Records**

### **4.1 Document Control**

The primary purpose of this quality assurance element is to help prevent the inadvertent use of incomplete, erroneous (unchecked), or superseded information. Also, the options of formally controlled distribution of documents helps assure that the right information has been provided to the right people at the right time.

Documents subject to control under this section are technical documents and include, but are not limited to, the following:

- Drawings
- Specifications
- Technical Procedures

- Statements of Work
- Test Plans

#### **4.1.1 Preparation**

Documentation shall be initiated and prepared in accordance with the procedures, standards, and requirements of the parent organizations, such as the Mechanical Design Group, Facilities Division, ES&H Division, and the LCLS Directorate from which project personnel have been matrixed.

All project quality-related documents shall be uniquely identified, including revision and date. The documents shall be initialed/signed by the originator and the reviewer/checker, who is usually the lead engineer. Critical documents may also be reviewed and signed by the Chief Engineer or Project Manager, but no fewer than two sets of approvers, must appear on the document prior to formal distribution.

#### **4.1.2 Distribution**

Distribution will be accomplished in accordance with the originator's instructions and general needs of other personnel. File copies will be retained by cognizant staff and Master Records Lists will be continually updated. It will be the document user's responsibility to assure himself that he or she has the latest version of a document by checking it against one of these list, if necessary.

Depending upon the working relationships of the recipients, number of recipients, frequency of revision, and operational importance of the document, the originator or other responsible authority may elect to assure its distribution with more positive controls such as numbered documents sent out to named individuals and even return receipts for safety or other critical information. Although the authority for positive control of document distribution may be delegated to administrative staff through appropriate work instructions, the responsibility for the positively-controlled distribution of such documented information rests with the cognizant engineer or other person responsible for the information or data at issue.

#### **4.1.3 Revisions**

Technical changes and major revisions to controlled documents are reviewed and approved by the same organization that originally reviewed and approved the documents. The updated documents shall be clearly identified with sequenced revision numbers and

dated with the effective date of the new information. Distribution of the document must be made promptly after approval of the revision.

Again, it shall always be the user's responsibility to ensure that he or she has the current revision of the document before using the information. The user should always check the appropriate Master Records List, Drawing List, or even with the originator, as necessary. At all levels, only the most current revision of a document is retained in the active files.

## **4.2 Records Management**

The documented evidence of the quality of completed work will be retained for use during the course of an activity as well as for historical records. Sufficient records will be required and maintained to furnish objective evidence of actions affecting quality. The quality assurance records will be legible and traceable to the phase of the activity, and to the item, process or operation they apply to. The records shall be retrievable for use in evaluation of acceptability and acceptability and for verification of compliance with the QA program requirements.

Computer files shall be regularly backed up and proper storage techniques used to prevent loss or damage to quality-affecting records.

## **5.0 Work Processes**

Research Support Building and Infrastructure Modernization Project Management is responsible for planning, authorizing, and specifying the conditions under which the work for which they are responsible is to be performed. As part of this responsibility, management specifies which work is sufficiently complex, involves sufficient hazard, has a potential ES&H impact, or is of sufficient programmatic importance to be performed to written procedures, instructions, or drawings. Procedures, instructions, and/or drawings are then prepared for those activities and are required to be used.

Prior to use for quality-affecting activities, procedures and instructions are reviewed for applicable technical and administrative content including:

- Approval signatures and effective date
- A unique title or other identifier
- Purpose and scope
- References (sources of requirements)
- Procedure and responsibilities

### **5.1 Special Process Procedures**

None.

## **5.2 Drawings and Specifications**

Drawings and Specifications are quality-record documents and will be prepared and maintained in accordance with Engineering standards and procedures.

## **5.3 Identification and Control of Materials, Parts, and Components**

Except for instances where differences between nominally identical items would have insignificant impact on operations or maintenance, all items, materials, and components shall be uniquely identified. After installation, even identical items shall, in general, be uniquely identified by their installed location when practicable. The methodology and need for the proper and adequate identification of an item shall be determined by the cognizant engineer.

The item may be stenciled, engraved, a placard attached, or otherwise encoded as appropriate to the circumstances. Identification shall be accomplished in accordance and be compatible with the Configuration List and all other applicable industry standards and existing Engineering standards and procedures. If properly cross-referenced to permanent documents and records, vendor identification, already placed on the item, should be used. If it is not self evident, a cross-referencing formula to existing nomenclature and identification shall be documented and approved by the Chief Engineer.

## **5.4 Handling, Storage, and Shipping**

Handling, storage, cleaning, packaging, shipping, and preservation of items shall be controlled, as appropriate, to prevent damage or loss and to minimize deterioration. These activities shall be addressed as applicable by the cognizant engineer in specifications, drawings, procedures, instructions or other documents, as appropriate to the items affected. Manufacturers' written recommendations, instructions, or manuals shall be requested and followed for purchased materials and equipment.

Items received by the cognizant engineer that are no longer in the control of third parties for further processing, handling, or storage are maintained in designated storage areas or buildings. Storage logs should be maintained to show item identification, location, date or storage, and status (ready for installation, ready for next assembly, etc.).



## **6.0 Design**

The design shall be defined, controlled, and verified. Applicable design inputs shall be appropriately specified on a timely basis and correctly translated into technical specifications, drawings, and engineering notes. These design output documents shall be proposed, completed, reviewed, and approved in accordance with other sections of this QIP and SLAC engineering standards, procedures, and practices. Designs shall be verified through activities such as independent technical reviews, building of prototypes, and prototype testing as necessary.

### **6.1 Design Interface**

Design interfaces and corresponding responsibilities are defined so that design efforts are effectively coordinated among participating organizations. Changes to approved design inputs, including reasons for the changes, are identified, approved by the appropriate group, documented, controlled, and made retrievable.

### **6.2 Design Outputs**

Design outputs, such as drawings, specifications, results of scientific investigations, computer programs, etc., are established in formal written documents that have unique identification and revision status and are approved prior to issue. Design output documents related to the design input in sufficient detail to permit design adequacy verification and evaluations. These documents show evidence that the required reviews and approvals have been accomplished prior to release for use in other design activities. Design records are incorporated into the project records management system.

### **6.3 Design Verification**

Technical design reviews are performed by review committees made up of persons who possess the necessary expertise to critically evaluate the designs. Generally, these reviews are held for the Conceptual Design, Preliminary Design and Final Design. The reviewers are recognized experts. All technical reviews are documented as well as the Research Support Building and Infrastructure Modernization Project response to the reviewers' recommendation.

Some designs may be verified by the use of alternative calculations and analyses to verify the correctness and accuracy of the original calculations and analysis. The appropriateness of assumptions, input data used, computer program or other calculation method used are subjected to

independent technical reviews in accordance with the appropriate procedure.

#### **6.4 Computer Programs**

Not applicable to this project

#### **6.5 Configuration Control**

The Research Support Building and Infrastructure Modernization Project Execution Plan specifies the basis for establishing the technical baselines and the controls for obtaining the approval of design changes. The control of design documents such as drawings and specifications is specified in Section 4.0 of this QIP.

### **7.0 Procurement**

Procurements from vendors under a purchase order or subcontract are accomplished in accordance with the SLAC procurement policies.

Advance procurement planning is an essential and integral part of the procurement process and includes determination of the anticipated QA/QC activities for a particular procurement. The guidelines for preparing advance procurement plans are contained in the project Acquisition Strategy.

#### **7.1 Selection and Evaluation of Vendors**

Potential suppliers of critical, complex, or costly items or services shall, prior to the award of a contract, be evaluated in accordance with predetermined criteria, to ascertain that they have the capability to provide items or services that consistently conform with the technical and quality requirements of the procurement. The determination of which suppliers shall be evaluated will be made by Research Support Building and Infrastructure Modernization Project technical personnel, in conjunction with the project QA Manager and the Contract and Procurement Buyer/Contracts Specialist.

The evaluation may be based upon the results of one, or a combination of, the following methods: a review of the supplier's quality history with SLAC; a survey of the supplier's facility for the purpose of reviewing the adequacy of the quality system; a review of the supplier's quality history in providing the same or similar items or services to other national or international laboratories, universities, or companies.

#### **7.2 Procurement Documents**

It is essential that documents included in the procurement package be controlled per Section 4.0 of this QIP and that, unless they are clearly

marked “obsolete” or stamped “preliminary”, they shall be current and approved by the proper authority.

The cognizant engineer is responsible for assuring that applicable design bases and other technical and quality requirements are included or referenced in a specification, statement of work, purchase order or separate enclosure for purchased items and services. The quality assurance requirements specified for a given procurement are based upon considerations of safety, programmatic importance, complexity and intended application of the item or service.

Procurement documents shall be reviewed and approved by the appropriate group leader as necessary for ensuring correct identification of items and their conformance to the required technical quality specifications.

Changes to procurement documents shall be reviewed and approved by the same organizationally responsible persons that approved the original procurement document. The Purchase Office has the responsibility to ensure that the contents of the procurement documents are accurately and correctly transferred to the relevant contract or purchase order.

### **7.3 Inspection, Testing and Surveillance**

When necessary for the evaluation of the quality of an item or service, the vendor or SLAC organization, as appropriate, is requested to provide inspection and/or test reports. The cognizant technical representative reviews these reports and determines the acceptability of the data contained in the reports.

The inspections will be conducted in conformance with Quality Assurance and Compliance Design Assurance and Construction Inspection Procedure (SLAC-I-770-OA22C-001-R003).

### **7.4 Certificates of Conformance**

When certificates of conformance are required from vendors, the requirement is specified in the procurement documents. Mill certificates of chemical and physical analysis are required for raw materials and fasteners used in fabrication of items affecting quality. Certificates of conformance may be requested from vendors producing items to project specifications or drawings when other quality verification methods are not employed.

### **7.5 Nonconformances**

Any items not meeting the purchase order specifications will be segregated from accepted items. The cognizant engineer may need to stop

payment for such items and should initiate action for their return to the vendor.

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## **8.0 Inspection and Acceptance Testing**

### **8.1 Inspection**

Inspections of the work in progress and the final acceptance will be conducted by the Building Inspection office in ES&H.

### **8.2 Test Control**

Tests required to verify conformance of an item to specified requirements and/or to demonstrate that items will perform as intended in service are planned and documented in test plans, procedures or instructions. The characteristics to be verified or tested and the methods to be employed are specified. Test results are to be documented as specified in the test specification documents. Results of tests performed to verify designs are reviewed and evaluated by the cognizant scientist or engineer. Results of tests performed to verify conformance to specified requirements are reviewed and evaluated by the cognizant scientist or engineer.

### **8.3 Control of Measuring and Test Equipment**

The test and measurement equipment for this project will be provided by the department that is doing the inspection, usually ES&H construction inspection department. This equipment will be calibrated and records of calibration will be maintained by the inspecting department.

## **9.0 Management Assessment**

### **9.1 Self Assessment**

The QA Performance objectives that are outlined in this Quality Implementing Procedure shall be regularly monitored by the Project QA Manager on behalf of Project Manager; the assessments resulting from this ongoing surveillance shall be routinely reported to the Project Manager. In addition, the project ES&H Office will conduct random surveillance of project activities to assure that environment, safety, and health requirements are being met by line management and subcontractors. The ES&H Manager has stop-activity authority in this role, and will report directly to the Project Manager to assure that appropriate corrective actions are implemented for any deficiencies that are discovered.

In particular, the Research Support Building and Infrastructure Modernization Project Management shall rely upon and evaluate line management and supervisor's routine observations and survey of their group's accomplishment of assigned quality-affecting activities. Line management and supervisors shall take an active role in seeking excellence and improving performance; they shall encourage personnel to

look for ways to improve performance and correct problems as an integral part of the normal work routine.

The Research Support Building and Infrastructure Modernization Project will participate in formal self-assessments in accordance with SLAC ES&H Manual Chapter 33, “Line Management Self-Assessment”.

## **9.2 Project Reviews**

The Research Support Building and Infrastructure Modernization Project Manager is committed to an on-going of project reviews. Results of project reviews will be used to identify, correct, and prevent management problems that hinder the achievement of the projects objectives.

## **10.0 Independent Assessment**

### **10.1 Audits of the Research Support Building and Infrastructure Modernization Project**

The SLAC Office of Assurance is responsible for conducting independent assessment activities throughout SLAC. Thus, Office of Assurance plans, schedules, conducts, reports upon, and tracks corrective action implementation resulting from assessments of the Research Support Building and Infrastructure Modernization Project.

### **10.2 SLAC Citizen Committees**

Items with environment, safety, and health impact are subject to citizen committee review. The SLAC Safety Overview Committee reviews plans and assures that approvals are obtained from the cognizant citizen committees. These committees review project proposals for environment, safety and health problems. The SLAC citizen committees and their function are detailed in Chapter 31 of the SLAC ES&H Manual.