SUPERCONDUCTING
SUPER
COLLIDER

MATERIAL SPECIFICATION

NO. SSC-MAG-Q-600

TITLE: SSC QUALITY ASSURANCE PROGRAM PLAN

ISSUE DATE Draft 6/8/87

REV. NO. _____

REV. DATE _____

- PREPARED BY _____
  V. N. Karpenko - SSC Division Head, Magnet Division

- APPROVED BY _____
  M. Tigner, SSC - Director

REVISION RECORD

REVISION NO.	DATE	PAGE	SUBJECT	APPROVAL

1. Scope:

This document establishes a phased Quality Assurance Program for the Superconducting Supercollider (SSC) Project. The QA Program is designed to assure the safe realization of SSC quality objectives.

1.1 Project Phasing

SSC Project tasks are structured in major milestone phases as generically shown in Fig. 1-1. Project quality assurance requirements will be implemented by phase as depicted in Fig. 1-1 to provide the necessary project flexibility of action and practical, economically sound output quality.

1.2 Applicability

The requirements of this plan, as classified by project phase, apply to all SSC project participants including the SSC Project Office, associate laboratories, industrial contractors, subcontractors, suppliers, architect and engineers, vendors, and consultants.

2. Applicable Documents

2.1 Precedence

The following specifications in effect as of the date of SSC contract or purchase order form a part of this plan to the extent specified herein. In the event of a conflict between this document, its reference and SSC contracts, purchase orders or engineering drawings, the later shall take precedence.

2.2 Specifications

DOE - 5700.6A Quality Assurance Guidelines
ASME NQA-3 - Quality Assurance
MIL-STD-105 - sampling by Attributes
MIL-STD-45662 - Calibration System Requirements
MIL-I-45208 - Inspection System Requirements

Fig. 1-1.

3. Quality Assurance Program Management

3.1 Organization

The structure of the SSC Project Organization is shown in Fig. 3-1. Project responsibility and authority for SSC quality assurance, delegated by the SSC Director, is exercised by a project quality staff function, reporting at the Division level to the Construction Director.

The QA and Safety staff will establish SSC Project quality policy, as defined in this plan, and perform an overview/audit function to measure project quality assurance performance. Overview activities include quality elements of all SSC Project participants to assure early management awareness of project quality status and the prompt, effective implementation of corrective action.

3.2 QA Program Implementation

QA Program Requirements - Each SSC Project participant shall be required to submit a Quality Assurance Program Plan describing the general methods to be used to meet the requirements of this document and MIL-I-45208A. The plan shall be arranged in a format essentially conforming to the paragraph headings of this document and shall wherever possible make maximum use of existing procedures. The plan shall be submitted for SSC Project Office review and approval as specified in the applicable contract or purchase order Data Item Description (DID).

3.2.1 Design Control - Project requirements for SSC designed items include the SSC quality and safety elements listed below as integral parts of the documents in the SSC Project Specification Control System. (Ref. SSC-MAG-A-01). Implementation of these requirements is the responsibility of the SSC organizational unit, associated laboratory, contractor, supplier, A & E or consultant performing the tasks.

- QA Program Management
- Organization
- Design Control
- Measurement Standards
- Procurement Control
- Material Control
- Production Processing and Fabrication
- End Item Inspection and Testing
- Handling Storage and Delivery
- Nonconforming Material Control
- Inspection Status Control
- Government Furnished Property Control
- Records
- Audits

Fig. 3-1.

3.2.1 Participant Design Control - Where a SSC organizational unit does not retain design control, the associate laboratory or subcontractor responsible for design activities is required to use SSC, or equivalent, design control procedures. Design controls include requirements for:

a) Drawings, Documentation and Changes - Documented procedures shall be maintained to assure the adequacy, completeness and change status of design drawing and specifications. Changes to design documentation shall include provisions for change effectivities and provisions shall be implemented for the identification and replacement of obsolete documentation.

b) Drawing Controls - Design or manufacture drawing practices, i.e., format, nomenclature, numbering, shall be documented and include provisions for release, revision control, and verification of compliance.

c) Design Work Instructions - Documentation developed to translate design requirements into material or process specifications, production or industrial engineering instructions shall be controlled for accuracy, completeness and change status by documented requirements.

3.2.3 Measurement Standards - All SSC Project participants using measuring or test equipment in their project activities shall maintain a documented control system that assures measurement equipment is:

- Calibrated against certified measurement standards on a periodic basis to assure continued accuracy.
- Replaced, repaired or adjusted before it becomes inaccurate.

a) SSC participant's measurement standards system shall meet the requirements of Military Standard Document MIL-STD-45662. Where SSC Project participants subcontract or purchase goods and services, these measurement standards requirements shall apply to subcontractors or suppliers.

3.3 Procurement Control

All procurements for SSC material or services shall be subject to the controls necessary to assure attainment of product quality requirements. Each SSC project participant shall implement a documented procurement control program covering:

1) Selection of qualified suppliers.
2) Transfer of all applicable design, technical, and quality requirements.
3) Verification of procured item or service conformance.
4) Nonconformance corrective action.

3.3.1 Source Selection - The selection of procurement sources and the degree of control exercised shall be dependent upon the criticality and complexity of the procurement item, the subcontractor or suppliers demonstrated capability to perform and the suppliers quality performance data available. The source selection process, whether based on an on-site survey, SSC participant rating system or supplier quality data/history, shall be conducted in accordance with documented procedures with selection results recorded.

3.3.2 Purchasing/Contract Data - Requirements for the use and control of purchase requisitions, purchase orders shall be documented. Procurement control requirements shall include methods for assuring that all design, technical and quality data is transmitted to the selected source and that it is the proper configuration.

3.3.3 Receiving Inspection - All material shall be subject to inspection upon receipt in accordance with documented procedures. The degree of inspection shall be dependent upon the quality performance of the procurement source, criticality and complexity of the procured item and its end use. The frequency, extent and results of receiving inspection shall be recorded and maintained on file. Nonconforming material that cannot be made conforming or is not accepted by authorized board disposition shall be rejected and returned to source.

3.3.4 Nonconformance Corrective Action - Procurement control procedures shall include provisions for the review, analysis and reporting of nonconforming conditions resulting from receiving inspection. This effort is to be focused on the initiation and implementation of corrective action by the procurement source. Documented requirements shall be included for associated laboratory, contractor or supplier notification, time allowance and corrective action verification.

3.4 Production Processing and Fabrication

SSC Project participants performing hardware processing or fabrication operations shall provide documented controls for the facility, equipment and the processing operations. Controls include documented work instructions, adequate production equipment, and required facility environments. Work instructions (any combination of work orders, travelers, instruction sheets, etc., that accomplishes the intent) shall include the acceptance criteria for the operation or hardware involved. Work instructions shall include all examination, measurement or tests, sampling inspection, nondestructive or process monitoring. Critical or complex process methods shall, as necessary, require training and personnel or equipment qualification.

3.5 End Item Inspection and Testing

Completed end items shall be subjected to documented tests and inspections designed to measure conformance with design requirements and the overall product quality.

3.6 Handling, Storage, and Delivery

SSC Project participants shall provide documented controls for the in-process handling of SSC material parts, components, and completed end items to preclude damage or deterioration. Provisions shall include requirements for suitable protection, warning, precautions, and sufficient inspections to assure that SSC material is adequately handled, packaged, delivered, and stored.

3.7 Nonconforming Material Control

SSC Project participants shall establish and maintain a documented system for controlling nonconforming SSC material including provisions for its identification, segregation, and disposition. Repair or rework of nonconforming material shall be in accordance with procedures acceptable to the SSC Project. The acceptance of nonconforming material shall be a perogative of the SSC Project and may involve a monetary adjustment. All nonconforming material shall be identified to prevent unauthorized use, shipment and intermingling with conforming material. The SSC Project participant shall have the capability to report nonconforming material cost and losses, i.e., scrap, rework, replacement, etc., to the SSC Project Office when requested.

3.8 Inspection Status Control

SSC Project participants shall establish and maintain a documented method for positively identifying SSC material or its accompanying documentation and its inspection status, i.e., awaiting inspection, test, or subsequent operation and its acceptability status, etc. The inspection indication, stamp, signature, or number, shall be traceable to persons responsible for the inspection decision.

3.9 Statistical Sampling

Use of sampling plans to determine frequencies of inspection less than 100%, and the selection of AQLs for inspection of SSC material, components or processing operations, shall be in accordance with the requirements of MIL-STD-105 and require SSC Project Office approval prior to use.

3.10 Government Furnished Property (GFP) Control

Material or property furnished by the SSC Project Office or purchased by SSC Project participants under a Government Purchase Order/Contract shall be considered Government Furnished Property and subject to the following documented controls.

a) Examination upon receipt, consistent with practicability to detect damage in transit;
b) Inspection for completeness and proper type;
c) Periodic inspection and precautions to assure adequate storage conditions and to guard against damage from handling and deterioration during storage;
d) Functional testing, either prior to or after installation, or both, as required by contract to determine satisfactory operation;
e) Identification and protection from improper use or disposition; and
f) Verification of quantity.

Where GFP is found to be damaged or discrepant, the SSC Project Office shall be notified for disposition action.

3.11 Records

The SSC Project participant shall maintain and use any records or data essential to the economical and effective operation of his/her quality program. These records shall be available for review by the SSC Project and copies of individual records shall be furnished by the SSC upon request. Records are considered one of the principal forms of objective evidence of quality. The quality program shall assure that records are complete and reliable. Inspection and testing records shall, as a minimum, indicate the nature of the observations together with the number of observations made and the number and type of deficiencies found. Also, records for monitoring work performance and for inspection and testing shall indicate the acceptability of work or products and the action taken in connection with deficiencies. The quality program shall provide for the analysis and use of records as a basis for management action.

3.12 Audits

SSC Project participants shall establish and maintain documented methods for assessing the effectiveness of the SSC quality operations. Assessment techniques may vary at participant's option, but should include either management overview, audit or supervisory reports that allow timely problem identification and corrective action. The SSC Project Quality Assurance staff shall periodically audit SSC Project participant's quality operations for conformance with approved quality plan (Ref. ¶3.2) and the implementation of corrective action.