AERB SAFETY GUIDE NO. AERB/SG/QA-2

QUALITY ASSURANCE IN THE PROCUREMENT OF ITEMS AND SERVICES FOR NUCLEAR POWER PLANTS

Issued in June 1996

Atomic Energy Regulatory Board
Mumbai 400 094

1996

Price :

Orders for this Guide should be addressed to :

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FOREWORD

Assurance of safety of public and occupational workers and the protection of the environment are the two important objectives to be met in the pursuance of activities for economic and social progress. These activities include the establishment and utilisation of nuclear facilities and the use of radioactive sources which have to be carried out in accordance with relevant provisions in the Atomic Energy Act 1962 (33 of 62).

Since the inception of nuclear power development in the country, maintaining high safety standards has been a matter of prime importance. Recognising this aspect of nuclear power development, Government of India constituted the Atomic Energy Regulatory Board (AERB) in November 1983 vide standing order No. 4772 notified in the Gazette of India dated 31.12.1983. AERB has been entrusted with the responsibility of laying down safety standards and framing rules and regulations in respect of regulatory and safety functions envisaged under the Atomic Energy Act of 1962. Under its programme of developing Codes and Safety Guides, AERB has issued 4 Codes of Practice covering the following topics:

- Safety in Nuclear Power Plant Siting
- Safety in Nuclear Power Plant Design
- Safety in Nuclear Power Plant Operation
- Quality Assurance for Safety in Nuclear Power Plants

These Codes establish the objectives and the minimum requirements that shall be fulfilled to provide adequate assurance of safety during operation of Nuclear Power Plants in India.

The Safety Guides are issued to describe and make available methods of implementing specific parts of relevant codes of practice, as acceptable to AERB. Methods and solutions varying from those set in the guides may be acceptable if they provide at least comparable assurance that the nuclear power plant can be operated without undue risks to the health and safety of the plant personnel and general public.

The Code and Safety Guides will be modified, as and when necessary, in the light of experience as well as the current state-of-the art in science and technology. An appendix, when included, is a part of the document whereas annexures, footnotes, list of participants and bibliographies are included only to provide information that might be helpful to the user. In preparation of the Codes

and Guides, emphasis is on protection of site personnel and public from undue radiological hazards. Other aspects like industrial safety and non-radiological protection have not been specifically considered.

However, for other aspects not covered in this Guide, applicable and acceptable national and international Codes and Standards shall be followed. Industrial safety shall be assured through good engineering practice. This Safety Guide provides guidance for assuring quality in the procurement of items and services important to nuclear power plant safety. While elaborating the requirements stated in the Code of Practice on Quality Assurance (QA) for Safety in Nuclear Power Plants, this guide provides necessary information to assist managers in the establishment of the QA programme, for procurement of items and services important to nuclear power plant safety.

This Safety Guide has been prepared by the staff of AERB and other professionals. In the preparation, relevant International Atomic Energy Agency (IAEA) documents under the NUSS programme, specially the guide on Quality Assurance in the Procurement of Items and Services for Nuclear Power Plants (50-SG-QA3) has been utilised extensively. It has been reviewed by experts and amended by advisory committees before issue. AERB wishes to thank all individuals and organisations who have contributed in the preparation, review and amendment of this Safety Guide. List of persons who have participated in the committee meetings and their organisations is included for information.

-- Sd --
Dr. A. Gopalakrishnan
Chairman, AERB

DEFINITIONS

Audit

A documented activity performed to determine by investigation, examination and evaluation of objective evidence the adequacy of, and adherence to, established procedures, instructions, specifications, Codes, Standards, administrative or operational programmes and other applicable documents, and the effectiveness of implementation.

Disposition

An action to determine how a departure from specified requirements is to be handled or settled.

Documentation

Recorded or pictorial information describing, defining, specifying, reporting or certifying activities, requirements, procedures and results.

Examination

An element of inspection consisting of investigations of materials, components, supplies or services to determine conformance with those specified requirements which can be determined by such investigations.

Inspection

Quality control actions which by means of examinations, observation or measurement determine the conformance of materials, parts, components, systems, structures as well as processes and procedures with pre-determined quality requirements.

Non-Conformance

A deficiency in characteristics, documentation or procedure which renders the quality of an item unacceptable or indeterminate.

Objective Evidence

Qualitative or quantitative information, record or statement, or fact, pertaining to quality of an item or service which is based on observation, measurement or test and which can be verified.

Plant Management

The members of site personnel who have been delegated responsibility and authority by the Operating Organisation for directing the operations of the plant.

Quality

The totality of features and characteristics of a product or service that bear on its ability to satisfy a defined requirement.

Quality Assurance

Planned and systematic actions necessary to provide adequate confidence that an item or facility will perform satisfactorily in service as per design specifications.

Quality Control

Quality Assurance actions which provide a means to control and measure the characteristics of an item, process or facility in accordance with established requirements.

Records

Documents which furnish objective evidence of the quality of items or activities affecting quality.

Repair

The process of restoring a non-conforming item to a condition, such that the capability of that item to function reliably and safely is unimpaired, even though that item still may not conform to the original specification.

Responsible Organisation (RO)

The organisation having overall responsibility for siting, design, construction, commissioning, operation and decommissioning of a facility.

Rework

The process by which a non-conforming item is made to conform to a prior specified requirement by completion, re-machining, reassembling or other corrective means.

Services

The performance by a supplier of activities such as design, fabrication, inspection, non-destructive examination, repair or installation.

Specification

A written statement of requirements to be satisfied by a product, a service, a material or process indicating the procedure by means of which it may be determined whether specified requirements are satisfied.

Verification

The act of reviewing, inspecting, testing, checking, auditing, or otherwise determining and documenting whether items, processes, services or documents conform to specified requirements.

CONTENTS

1. INTRODUCTION

1.1 General

1.1.1 This Safety Guide forms part of the Atomic Energy Regulatory Board's (AERB's) programme for establishing Codes, Guides and other Standards for assuring safety in the operation of land based stationary Nuclear Power Plants (NPPs) based on thermal reactors in India. The methods for complying with principles and objectives stated in this guide can be usefully applied to other nuclear facilities. It provides guidance on the establishment of Quality Assurance Programme in Procurement[1] of items[2] and services for Nuclear Power Plants.

1.1.2 This Guide supplements AERB's Code of Practice [1], herein referred to as the Code, which specifies requirements for the control of procurement of items and services important to the safety of nuclear power plants, for the purpose of achieving quality. Manufacture of Items and Services will be covered in AERB's Safety Guide on Manufacture of Items and Services for NPPs, AERB/SG/QA-3.

1.1.3 The establishment and implementation of controls over the procurement process provide a basis for ensuring an appropriate level of confidence that the activities undertaken during procurement of items and services have been performed in accordance with the principles of quality assurance expressed in the Code, and that the required quality of items and services has been achieved.

1.1.4 The purchaser shall establish control over procurement and ensure that the quality criteria, quality level and other quality requirements specified for the particular item or service are taken into account.

1.1.5 The most important factor to be considered in determining the extent of quality assurance effort is the effect on safety, of an error in service or the malfunctioning of an item. The other factors for consideration include:

a) The complexity, uniqueness or novelty of the item or service;

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[1] The activities performed by a purchaser or his designated representative for obtaining an item or Service, beginning with the preparation of specified requirements, and concluding with the purchaser's acceptance of such items or Service.

[2] A general term covering structures, systems, components, parts or materials.

b) The need for special controls, administrative methods, inspection and testing[3], for the processes and equipments;
c) The degree to which functional compliance can be demonstrated by inspections and tests;
d) The quality history and degree of standardisation of the item; and
e) The accessibility of the item after installation in the plant for maintenance, in-service inspection and replacement.

In all cases, the procurement documents, to the extent necessary, shall require suppliers to provide a QA programme consistent with the pertinent provisions of the Code.

Under some circumstances, items or services may be supplied by the purchaser to the supplier, an example being free issue of materials by the purchaser to the supplier[4] or supplier to sub-contractor. The procurement process shall ensure that such items or services, supplied by purchaser to supplier or supplier to sub-contractor, are subjected to the same requirements that are imposed upon the supplier in order to ensure the quality of the item or Service.

1.2 Scope

This Safety Guide provides the requirements and recommendations related to the establishment, implementation and administration of the various procurement activities associated in all constituent phases of a NPP like supply of total system, items including spares and replacement parts and services. The phases of a NPP may include design, construction, commissioning, operation and decommissioning. Procurement process for these phases involve one or several activities such as design, purchase, manufacture, handling, packaging, transportation, storage, cleaning, erection, installation, testing, inspection, maintenance, repair and modification. The requirements and recommendations of this Safety Guide shall be implemented as appropriate by the Responsible Organisation, plant designers and suppliers, architects, engineers, plant constructors, plant operators and other organisations participating in nuclear power activity.

[3] The determination or verification of the capability of an item to meet specified requirements by subjecting the item to a set of physical, chemical, environmental or operational conditions.

[4] An individual or an organisation under contract for furnishing items or services. This includes various levels or kinds of supplies e.g., as undertaken by vendors, sellers, contractors, sub-contractors, fabricators and consultants.

The manner and extent of implementing the requirements and recommendations of this Guide will depend upon:

a) Regulatory requirements [1,2];
b) Type of contract;
c) Quality requirements; and
d) Scope of work of participating organisations.

1.3 Responsibility

1.3.1 The Responsible Organisation shall provide for the establishment, implementation and control of activities to be undertaken during the procurement of items and services for NPPs. The Responsible Organisation may delegate to other organisations the work of establishing and implementing all or part of the Quality Assurance programme for procurement, but shall retain the responsibility for overall effectiveness, without prejudice to the supplier's obligations to provide quality items or services in accordance with the requirements of the procurement documents, and/or his legal responsibilities.

1.3.2 Purchaser's responsibility

The purchaser's responsibilities are:

a) to establish and implement a procurement control process consistent with the requirements and recommendations of this Safety Guide;
b) to incorporate QA programme requirements appropriate to the scope of work, into procurement documents;
c) to evaluate the supplier’s QA programme to ensure that it is appropriate and satisfies the requirements for the items or services being procured; and
d) to ensure that the QA requirements collectively satisfy all the procurement requirements through appropriate interfacing where more than one supplier is involved, but separate procurement actions are initiated by a single purchaser. An example of this is the case where one supplier has responsibility for design, manufacture, shop assembly and shop test, another supplier has responsibility for field assembly and a third supplier has responsibility for field tests.

1.3.3 Supplier's Responsibility

The supplier's responsibilities are:

a) to establish and implement a documented QA programme that complies with procurement document requirements;
b) to enable the purchaser to satisfy himself of the adequacy of the supplier's Quality Assurance programme and its implementation; and
c) to incorporate appropriate Quality Assurance programme requirements in documents for procurement from his sub-supplier.

2. PLANNING FOR PROCUREMENT

2.1 Planning should result in the identification of methods to be used in procurement activities, the sequence of actions, milestones and time indicating the completion of these activities, and the preparation of applicable procedures. These shall be completed before the start of each activity.

2.2 The control of procurement of items and services, for QA considerations includes planning and provides, as a minimum, for the integration of the following procurement activities:

a) Procurement document preparation, review, distribution and change control;
b) Selection of suppliers;
c) Bid evaluation and award of contract;
d) Purchaser evaluation of supplier performance;
e) Verification (surveillance, inspection or audit) activities by purchaser;
f) Control of non-conformance, and follow up on corrective actions;
g) Control of acceptance of item or service;
h) Control of QA records; and
i) Audit of procurement activities.

Each of the above activities shall be controlled to the extent commensurate with importance of items or services to safety. Subsequent sections of this Safety Guide discuss these activities and their control in accordance with the Code. Procurement activities shall be capable of being verified and the effectiveness of their control determined by audit. The appropriate controls and requirements of this Safety Guide shall apply to all levels of procurement namely purchaser, supplier and sub-supplier.

3. PROCUREMENT DOCUMENT PREPARATION, REVIEW, DISTRIBUTION AND CHANGE CONTROL

3.1 The purchaser shall establish procedures to ensure that applicable regulatory requirements, the design basis and other requirements including specific issue dates and applicable addenda, all of which are necessary to assure adequate quality, are included, or invoked by reference, in procurement documents.

3.2 Content of the procurement documents

Procurement documents shall be issued by purchaser and shall include reference to regulatory requirements and the following:

a) Scope of work to be performed;
b) Technical requirements;
   i) Technical requirements such as those specified by reference to Codes, specifications, drawings, procedures and instructions, including revisions thereto that describe the items or services to be furnished
   ii) Test, inspection and acceptance requirements, and any special requirements for such activities as designing, identification, clean room conditions, manufacturing, packaging, handling, transporting and storage
   iii) Archive samples where specified in the design document.
c) QA requirements: Identification of the QA requirements applicable to the items and services being procured. The procurement document shall require suppliers to provide a QA programme and Quality Control plans;
e) Access: The conditions for access to the suppliers facilities and records by purchaser or his authorised representative for inspection or audit;

e) Documentation requirements;
   i) Identification of documents such as instruction, procedures, specifications, and QA records to be prepared and submitted for review or approval by the purchaser. The purchaser shall prescribe to the supplier those quality assurance records for which retention responsibility remains with the supplier, alternately the purchaser should take over the record from the supplier and retain for periods specified

ii) Provision for control of distribution, retention, maintenance, storage and disposition of QA records.

f) Certification requirement of equipment, procedures, performers and verifiers of tasks to the extent applicable;

g) Non-conformance: Requirements for reporting and approving disposition of non-conformance; and

h) Extension of requirements to lower tier suppliers: Provisions for extending applicable requirements of procurement document to lower tier sub-contractors and sub-suppliers, including purchaser's access to facilities and records at all stages as per contract obligation.

3.3 Procurement Document shall be controlled in accordance with the provisions for document control in the Code. The control measures shall include the identification of all individuals or organisation responsible for preparing, reviewing, approving and issuing the documents. Reviews of the procurement documents shall be made to ensure that documents transmitted to the suppliers include appropriate provisions for ensuring that items or services meet the specified requirements. In particular:

(a) Reviews shall be performed before release for bid and award of contract in accordance with requirements of the Code and recommendations of this Safety Guide;

(b) Changes made as a result of the bid evaluations or pre-contract negotiations shall be incorporated into the contract documents. The review of such changes and their effects shall be completed before the award of contract. Review shall ensure that technical requirements are consistent with design basis for that item/system as approved by AERB;

(c) Reviews shall be performed by personnel who have access to pertinent information, adequate training and understanding of the requirements and intent of the procurement documents, and who are independent from the personnel who originated the document although they may be from the same organisation;

(d) Results of reviews shall be documented to provide objective evidence of accomplishment; and

(e) Changes to procurement documents shall be subject to the same degree of control as imposed for the original documents.

4. SHORTLISTING OF SUPPLIERS OF ITEMS AND SERVICES

4.1 The purchaser should adopt a process for supplier shortlisting. Purchaser should endeavor to establish a data bank of suppliers based on

their performance feedback from past supplies. The shortlisting process should be as per documented procedure and should include amongst others the following:

a) Evaluating the capability of the supplier as regards facilities, processes personnel and the QA programme;
b) Evaluating the capability of the supplier by investigating samples of his current production;
c) Evaluating the supplier's history of providing a product which performs satisfactorily in actual use with the purchaser or others. Historical data should be relevant to the requirements and representative of the supplier's current capability. If there has been no recent experience with the supplier, he should be evaluated based on his current capabilities for an equivalent item or service; and
d) Evaluating the supplier's current QA records.

4.2 Pre-qualification bid could also be one of the methods adopted for shortlisting.

5. BID EVALUATION AND AWARD OF CONTRACT

5.1 Documented procedure shall be followed for evaluating quality aspects of bids for award of contracts.

5.2 The purchaser shall establish procedures to ensure that the bid conforms to the procurement document requirements.

The bid evaluation shall be made by individuals or organisations designated to evaluate the following as applicable to the type of procurement:

a) Technical requirements;
b) QA requirements;
c) Supplier's production capability;
d) Supplier's personnel attributes such as availability of appropriate personnel;
e) Supplier's history of performance;
f) Alternatives to the Procurement document requirements;
g) Exceptions from the Procurement document requirements;
h) Research and Development Efforts;
i) Availability of spare parts;
j) Financial position; and
k) Capability to meet delivery schedules.

5.3 Contract shall be awarded only after ensuring that:

a) selection of supplier has been done as per documented procedure; and
b) all differences noticed during bid evaluation are resolved and documented. A written commitment as required should be obtained from the supplier.

6. PERFORMANCE EVALUATION OF SUPPLIER DURING EXECUTION

6.1 General

The purchaser shall monitor and evaluate the supplier's performance to the specified requirements of the procurement document. The purchaser, his designated representative or other parties authorised by the purchaser shall establish procedures for verifying supplier's performance. These procedures should provide for :

a) Establishing a mutual understanding between purchaser and supplier, of the provisions and specifications and intent, of the procurement documents;
b) Reviewing supplier's planning techniques and processes used to fulfill contract requirements;
c) Reviewing documents that are generated during activities fulfilling procurement requirements;
d) Establishing a method for the exchange of documented information between purchaser and supplier; and
e) Documenting the results of evaluation.

6.2 Purchaser and Supplier Co-ordination

Depending on the complexity or the scope of the items or services, the purchaser should initiate pre and post-award activities. These activities may take the form of meetings or other forms of communication. These are necessary to establish a mutual understanding with regard to:

a) procurement document requirements;
b) the intent of the purchaser in monitoring and evaluating the supplier's performance;

c) the planning, manufacturing techniques, tests, inspections, procedures and processes to be employed by the supplier; and
d) sampling, witness and hold points.

In some special cases, it may be necessary for representative of AERB also to have access to suppliers facilities and records for inspection or audit. The purchaser shall appropriately coordinate with suppliers and arrange for access to AERB.

These activities should be implemented as early as practicable in the procurement process.

6.3 Control of documents generated by the supplier

The purchaser and supplier shall ensure to the extent of their respective responsibilities, that procedures for control, handling and approval of supplier generated documents are implemented and that submission times for these documents are met in accordance with the procurement documents.

6.4 Control of changes with respect to procurement documents

The purchaser and supplier shall ensure, to the extent of their respective responsibilities, that procedures to control changes in procurement documents are established, implemented and documented in accordance with sub-section 4.1.2 (Document change control) of the Code.

7. VERIFICATION BY PURCHASER

7.1 General

Purchaser shall establish and implement procedures for verification, such as inspection and audit, to determine conformance of procured items and services to specified requirements. Verification shall be accomplished by qualified personnel assigned to check, inspect, witness or audit the activities of the supplier and should be conducted at such a stage as to enable deficiencies to be identified as early as practicable. Purchaser's verification is not intended to relieve the supplier of his responsibility for ensuring that quality requirements are achieved.

7.2 Planning

The planning of verification activities shall take into account the relative importance to safety, the complexity and the quantity of the item or service procured, and the supplier's quality performance.

The verification at source planning shall, relative to manufacturing sequence and assembly processes, identify the appropriate inspections, audits, tests, pre-requisites and inspection sequence, hold and witness points, acceptance criteria and documentation required.

The receiving inspection planning shall identify the characteristics to be verified and the documentation to be reviewed at the receiving inspection. Characteristics to be considered during receiving inspection shall include, but not be limited to cleanliness, dimensions, and chemical, physical and functional properties.

Planning of verification of services shall identify and document methods for their verification and acceptance criteria. These services include design, inservice inspection, and maintenance.

7.3 Implementation

Verification at source shall be implemented in accordance with plans to perform inspections, examinations or tests at pre-determined hold or witness points. When conformance to procurement requirements is verified by audit, such audits shall be conducted in accordance with approved procedures.

When planning requires receiving inspection by the purchaser, it shall be implemented and co-ordinated with the verifications at source that have been performed. During receiving inspection, emphasis should be placed on ensuring that items have not sustained damage in shipment. If sampling is used for receiving inspection, it should be conducted in accordance with established procedures or recognised standards. Receiving inspection procedures shall include provisions for receipt of records such as drawings, certification, test results, etc. conforming to specified requirements.

7.4 Personnel Qualifications

Personnel responsible for performing verification activities shall be authorised on the basis of general education, experience and proficiency required for performing the specific assigned task. Personnel performing specialised verification such as non-destructive examination should be certified.

7.5 Reporting

The purchaser shall establish procedures for reporting of verification undertaken to management. These procedures should include reporting of source surveillances and inspections, audits, waivers and corrective actions.

In addition, the purchaser shall ensure that these reports are evaluated to determine the supplier's QA programme effectiveness.

8. CORRECTIVE FUNCTIONS

8.1 Non-conformance Control

The purchaser and supplier shall establish and document procedures for the identification, control and disposition of documents, items and services which do not meet the procurement requirements. Procedures for non-conformance control and disposition shall contain provisions to cover matters such as the following, as applicable :

a) Review of non-conformances;

b) Submission of non-conformance notice to purchaser by supplier as directed by the purchaser's procurement documents. These submissions should include supplier recommended disposition, as appropriate, i.e. accept without modification, repair, rework or reject with the applicable technical justification;

   Some typical examples of non-conformance to the procurement requirements which should be submitted to the purchaser are as given below :

   i) Deviation from a technical or material requirement;
   ii) Deviation from a requirement in supplier documents that have been approved by the purchaser; and
   iii) Inability to correct non-conformance by continuation of the original manufacturing process or by re-work.

c) Decision of the purchaser and under agreed circumstances, of the Responsible Organisation regarding supplier's recommended disposition;

d) Verification of disposition; and

e) Maintenance of records of supplier non-conformances and modification to the applicable documents, thus providing "as built" information.

8.2 Corrective Action

This is necessary to ensure that timely corrective actions are taken for conditions adverse to quality that occur during procurement process. In such cases the supplier's/purchaser's procedures shall establish a system to:

a) identify and document non-conformances;
b) review and evaluate all relevant aspects of non-conformances to determine the cause, extent and measures needed to correct and prevent recurrence;
c) report the non-conformances and corrective actions to appropriate levels of management; and
d) ensure that corrective action is implemented and maintained as necessary.

9. ACCEPTANCE OF ITEM OR SERVICE

The purchaser shall establish method of acceptance of an item or service being procured. Documentary evidence that the purchased item conforms to procurement document shall be available at the NPP site before installation or use.

The methods used to accept an item or service from a supplier include source verification, receiving inspection, supplier's certificate of conformance, post installation test at NPP site, or a combination thereof.

9.1 Acceptance by verification at source

Acceptance by verification at source should be considered when the item or service:

a) is vital to safety;
b) is such that the quality characteristics are difficult to verify after delivery;
c) is complex in design, manufacture or test; and
d) is supplied by the supplier who has been selected on the basis of his potential and is yet to prove his capability.

9.1.1 The verification activities at source should include, but not be limited to verifying the following as applicable.

a) Documentation providing verification of approvals, materials, applicable inspections and tests are submitted;
b) Procedures and processes have been approved and complied with and the applicable qualification, process records and certification are available;
c) Items or services have been inspected, examined and tested as required and applicable inspection, test and certification records are available; and
d) Non-conformances have been disposed off as required;
e) Components and assemblies have been cleaned, preserved, packed and identified in accordance with specified requirements.

9.1.2 Upon acceptance by verification at source, documentary evidence of acceptance shall be sent to the receiving destination of the item, to the purchaser and to the supplier. When acceptance by verification at source is used, receiving inspection shall verify that no damage has occurred to items during transport. In case of damage, non-conformance procedure shall be applied to this item.

9.2 Acceptance by receiving inspection

Acceptance solely by receiving inspection is satisfactory when the items are:

a) relatively simple and standard in design, manufacturing and test;
b) adaptable to standard or automated inspection and/or test of the end product to verify quality characteristics after delivery; and
c) such receiving inspection does not require operations that could adversely affect the integrity, function or cleanliness of the item.

Receiving inspection shall be co-ordinated with review of supplier documentation when procurement documents require such documentation to accompany the item or to be furnished before receiving inspection, as appropriate.

9.3 Acceptance by supplier certificate of conformance

When procurement actions do not involve direct inspection by the purchaser, the purchaser may accept an item or service from a supplier on the sole basis of supplier's certificate of conformance stating that the specified requirements have been met; and in addition supplementary documentation such as material certificates or reports of tests performed as required by the procurement documents should be scrutinised.

Acceptance by this method is satisfactory, when the item or service is of simple design and involves standard materials, processes and tests.

Certificates of conformance shall meet as a minimum, the following criteria:

a) The certificate shall identify the purchased material or equipment;
b) The certificate shall identify the specific procurement requirements met by purchased material or equipment such as codes, standards and other specifications. This may be accomplished by providing at the point of delivery, a copy of relevant procurement documents, together with the certificate. The certificate shall include any approved changes, waivers or deviations applicable to the item;
c) The certificate shall be attested by a person who is responsible for the QA function and whose function and position are described in the supplier's QA programme; and
d) The procedure to be followed in preparing the certificate, and the administrative procedures for review and approval of the certificates shall be described in the purchaser's or supplier's QA programme.

9.4 Acceptance by post-installation test at the NPP site

Acceptance by post-installation test is considered adequate when performed after the accomplishment of at least one of the methods described in sections 9.1, 9.2 and 9.3 above and when:

a) it is difficult to verify the quality characterisation of the item without being installed and in use; or
b) the item requires an integrated system check-out, or a test with other items to verify its quality characteristics; or
c) the ability of the item to perform its intended function cannot be demonstrated except when the item is put to use.

Post installation test requirements and acceptance documentation shall be specified in procurement documents. Any additional requirements should be mutually established by the purchaser and the supplier.

9.5 Acceptance of services only

In cases involving procurement of only services, such as inspection, engineering, consulting services, installation, repair and overhaul or

maintenance work, the purchaser may accept the service by any or all of the following methods:

a) Technical verification of the data produced;
b) Inspection, surveillance and/or audit of the activity;
c) Review of objective evidence for conformance to the procurement document requirements such as certificates, stress reports, etc.; and
d) Any of the methods described in sections 9.1 to 9.4.

10. COMMERCIAL GRADE STOCK ITEMS

Items of equipment including whole systems, if having a proven record, could be procured from commercial grade stock, provided,

a) Procurement documents provide sufficient information from catalogue or supplier specification to enable correct items to be supplied;
b) Confirmatory testing or analysis to demonstrate adequacy of the item to perform satisfactorily its intended function is possible to be carried out; and
c) Where proposed for safety function, the design authority technically evaluates the safety significance and Responsible Organisation (RO) also determines the critical characteristics required for safety function and this characteristic is included in the acceptance criteria in the procurement documentation and subsequently confirm before use that they have been obtained.

11. PROCUREMENT OF SPARES

Spares form a major procurement item in any nuclear power programme during operating phase. The Operating Organisation should arrange to purchase appropriate quantities of spare plant items at the same time of the original procurement of item. The spares shall meet the same QA requirements as the original plant items but with additional requirement for ensuring adequate protection during long term storage. The factors to be considered while deciding the quantity of the spares include the number and importance of major plant items that could be subject to failure; the special nature of any manufacturing process that would preclude subsequent manufacture of a plant item, the uncertainities in future supply of spares currently available; anticipated delivery times and shelf life of the spare. Some times due to plant modifications, it may be necessary to deviate from the original specification of the spares. These deviations from original specification, however minor, should not be

permitted until the change has been reviewed and accepted by plant management for consideration.

12. CONTROL, STORAGE AND PRESERVATION OF ITEMS

Measures shall be established by the purchaser for identification and control of items throughout manufacturing, transportation, handling, packing, storage, installation, erection and commissioning as per applicable section of the Code. The cleaning, packing, stripping, handling, storage and preservation of items shall be controlled as per section 6.8 of the Code.

13. QA RECORDS

Documented procedure shall be established and implemented by the purchaser and the supplier, for the control of records pertaining to the procurement activities to meet the requirements of section 6 (QA Records) of the Code.

14. AUDIT OF PROCUREMENT ACTIVITIES

Audit shall be performed by Purchaser's authorised personnel. This shall be done in accordance with the QA programme of the purchaser to verify compliance with procurement activity requirements described in this Safety Guide.

REFERENCES

[1] ATOMIC ENERGY REGULATORY BOARD, Code of Practice on Quality Assurance for Safety in Nuclear Power Plant, AERB/SC/QA which is presently the document as issued on June 30, 1988.

[2] ATOMIC ENERGY REGULATORY BOARD, Code on Safety of Nuclear Power Plants: Design, No. AERB/SC/D issued on December 23, 1989.

LIST OF PARTICIPANTS

Advisory Committee on Codes and Guides for Quality Assurance for Nuclear Power Plants constituted by AERB

Dates of the Meetings	:	April 05, 1990
		April 20, 1992
		August 11, 1992
		August 18, 1992
		August 28, 1992
		July 30, 1993

Members participating in the meetings:

Shri R.S. Kumar (Chairman)	N.P.C
Shri M. Das	N.P.C
Shri M.S. Ghate	B.A.R.C
Shri S.N. Ogale	Larsen & Toubro Ltd.
Shri S.P. Singh	A.E.R.B
Shri S.K. Warrier	A.E.R.B
Shri A.K. Asrani (Member-Secretary)	A.E.R.B
Smt. Usha A . Menon (Co-opted)	A.E.R.B

SENIOR ADVISORY GROUP

ADVISORY COMMITTEE ON NUCLEAR SAFETY CONSTITUTED BY AERB

Date of Meeting : June 25, 1994

Members and Alternates participating in the meeting:

Shri S.K. Mehta (Chairman)	B.A.R.C
Prof. V.N. Gupchup	Univ. of Bombay
Prof. M.S. Kalra	IIT, Kanpur
Shri A. Kakodkar	B.A.R.C
Shri Ch. Surendar	N.P.C
Dr. D.V.Gopinath (could not attend)	Advisor, HPD, B.A.R.C
Shri R.S. Kumar (alternate)	N.P.C
Shri A.K. Asrani (alternate)	A.E.R.B
Shri S.P. Singh (Member-Secretary)	A.E.R.B
Smt. Usha. A. Menon (Co-opted)	A.E.R.B

LIST OF SAFETY CODE AND GUIDES ON QUALITY ASSURANCE FOR SAFETY IN NUCLEAR POWER PLANTS

Safety series No.	Title	Year of publication
SC/QA	Code of Practice on QA for Safety in NPPs	1988
SG/QA-1	QA in Design of NPPs	Under Preparation
SG/QA-2	QA in the Procurement of Items & Services for NPPs	1996
SG/QA-3	QA in the Manufacture of Items for NPPs	Under Preparation
SG/QA-4	QA during Site Construction of NPPs	Under Preparation
SG/QA-5	QA during Commissioning & Operation of NPPs	1993