

# Quality Assurance Program for Nuclear Fuel and Core Components Topical Report BQ 89-50-A Revision 1

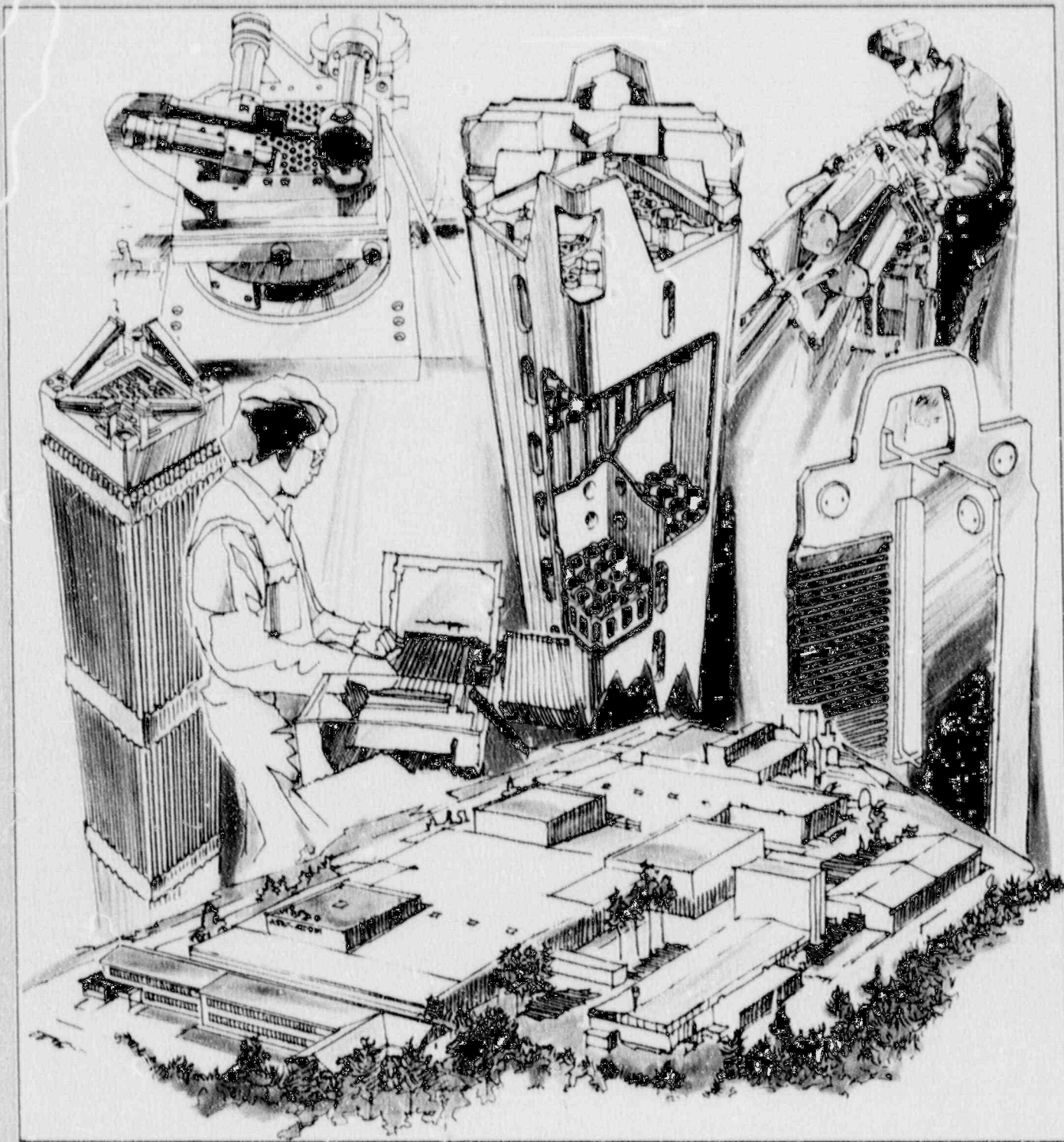


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Title

**Topical Report**  
**ABB Atom Quality Assurance Program for**  
**Nuclear Fuel and Core Components**

Abstract

This Topical Report describes the quality assurance program of the ABB Atom Fuel Division applicable to the development, design and fabrication activities affecting the quality of ABB Atom Fuel Division supplied nuclear fuel and core components. The report includes a description of the ABB Atom Fuel Division organization, including quality assurance organization as well as a description of the QA program compliance with each of the 18 criteria of 10 CFR Part 50, Appendix B. Provisions of applicable Regulatory Guides are incorporated within the QA program. There are no significant exceptions or deviations from NRC regulations or associated guidance.

Changes to the commitments contained in this Topical Report will be reported to the NRC in accordance with 10 CFR 50. 55 (f) (3).

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## 1.

## ORGANIZATION

ABB Atom has implemented a quality assurance program that meets the requirements of 10 CFR 50 Appendix B "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Facilities". The ABB Atom nuclear fuel and core components are designed, fabricated and shipped in accordance with these quality assurance requirements. The same quality assurance program and administrative procedures will be applied by ABB Atom Fuel Division and ABB Atom Inc.

The organization of the ABB Atom Fuel Division is shown in Figure 1. The authority and responsibility of each organizational unit are established and documented in administrative instructions and job descriptions.

The policy of the ABB Atom Fuel Division is to furnish nuclear fuel and core components which as a minimum meet safety and quality requirements from Authorities in the country where the equipment shall be used, as well as requirements prescribed in applicable national or international codes and standards referred to in customer contracts. The Vice President and General Manager of the ABB Atom Fuel Division is directly responsible for the achievement of this policy. This introductory statement is included in the ABB Atom Quality Assurance Manual for nuclear fuel and components.

ABB Atom will retain the overall QA responsibility for nuclear fuel and core components that are manufactured at any location, whether it be at the ABB  
 : Atom Fuel Manufacturing Plant in Västerås, Sweden, the ABB Combustion  
 : Engineering Fuel Manufacturing Plants in Hematite, Missouri or Windsor,  
 : Connecticut or elsewhere. If they are manufactured by ABB Combustion  
 Engineering, ABB CE will be required to implement a quality assurance  
 program acceptable to ABB Atom. ABB Atom will perform audits,  
 inspections, and reviews to assure implementation of their QA program by  
 all suppliers and contractors. The frequency of audits will vary with the  
 volume of work performed by subcontractors and their previous performance.

The ABB Atom Fuel Division is responsible for carrying out all activities concerning fuel and core component orders. These activities include coordination of calls for bids and contracts through its commercial organization, design, procurement, fabrication, inspection, testing, handling, storage and shipping. For management of each fuel and core component order the Marketing Manager assigns a Project Responsible within the Market organization who is responsible for the interface between ABB Atom and its customers.

The ABB Atom QA program for Nuclear Fuel and Components has been established by authority of the President, ABB Atom and the Vice President and General Manager Fuel Division is responsible for effective implementation of the program.

The QA program is documented in a Quality Assurance Manual for Nuclear Fuel and Components which is prepared within the Quality Assurance unit, reviewed by the Production, Reactor Core Engineering, Product Engineering, Marketing and Quality general managers and issued by the Vice President and General Manager of the fuel Division.

The responsibility for following up, by internal audits, that the QA program is fully implemented, is assigned to the Manager, Quality Assurance, who is free from direct pressures of cost and scheduling and has the written authority to stop non-satisfactory work or otherwise control further processing or delivery of nonconforming products.

The Manager for Quality Assurance reports directly to the General Manager of the Quality Department who reports directly to the Vice President and General Manager of the Fuel Division, in the same way as the General Managers for Reactor Core Engineering, Product Engineering, Production, Marketing and ABB Atom Inc do.

Figure 1 provides the general organizational commitments of ABB Atom for the supply of nuclear fuel and core components and associated services. ABB

Atom will keep the NRC informed of changes that impact these organizational commitments.

Organizational units within ABB Atom Fuel Division are also responsible for performing activities that assure the quality of nuclear fuel and core components and associated services.

Organizational units within the ABB Atom Fuel Division have quality related responsibilities as described below.

- : The Quality Assurance unit is responsible for verifying, through internal reviews and audits including performance audits, the implementation of the quality assurance program and reporting the degree of compliance to management. Such verification is performed to provide necessary information to assure that the quality assurance program is established and effective. Further, the QA unit has the authority and responsibility for audit and surveillance of suppliers and subcontractors, and development and maintenance of specific quality assurance documents.
- : The Quality Control units within the Quality Department are responsible for quality inspection and documentation of products manufactured or produced within the Fuel Division or procured by the Fuel Division. In addition the QC units have the following authorities and responsibilities:
  - review of important quality-related documents such as procurement requests
  - approval of inspection procedures and certificates of compliance prior to release for shipment
  - stopping nonconforming work or shipment of nonconforming products
  - issuing nonconformance reports to be dispositioned by Product Engineering.
  - education and training of QC personnel

- participation in weekly production planning and status meetings.

: Reactor Core Engineering and Product Engineering are responsible for development, design and testing of nuclear fuel and core components, and for follow-up of those products during reactor operation. The responsibilities also include fuel design analyses, core component analyses, core management, transient and safety analyses and associated computer codes. Product Engineering is responsible for preparation and issuance of complete product specifications for nuclear fuel and core components and for determining all processes that are to be controlled as special processes including relevant qualification of processes and personnel and the issuance of qualification reports. The responsibilities also include:

- Appointment of level III NonDestructiveExamination (NDE) personnel employed by the Process Development unit within Production. (Level I and II NDE personnel report to the managers of the Quality Control units.)
- Ensuring that suitable processes and methods are used for manufacturing and inspection, both internally and at subcontractors.

Production is responsible for manufacture of nuclear fuel and core components. Experimental or prototype production, tools and spare parts are also included. This responsibility includes material control, generation and control of manufacturing data and production planning and control.

: Qualification work on NDE and (special) manufacturing processes and procedures is performed by the Process Development unit within Production and the results are reviewed and approved by Product Engineering.

: ABB Atom Inc. BWR Fuel is responsible for all marketing activities and for providing technical information related to BWR reload fuel and core component sales in the US including marketing and sales, licensing, manufacturing, core management and transient and safety analyses. These responsibilities also include:

- co-ordination of activities of ABB Atom Fuel Division, ABB Atom Inc. BWR Fuel, ABB Combustion Engineering Nuclear Fuel and others as required.
- implementation of ABB Atom Fuel Division QA program and administrative procedures within ABB Atom Inc. BWR Fuel.
- managing and supervising reload fuel design analyses, core component analyses, core management, transient and safety analyses carried out in ABB Atom Inc's office.

All quality related documents must be reviewed and approved by appropriate functions within the ABB Atom Fuel Division as specified in the Quality Assurance Manual.

## 2

### QUALITY ASSURANCE PROGRAM

The quality assurance program described in this Topical Report is applied to all activities affecting quality of nuclear fuel and core components including the related software produced by or procured by ABB Atom. This program is tailored to insure that all applicable quality requirements are met for each order. For products and services that are purchased from suppliers or provided by other ABB Atom departments, this QA program provides measures for identifying the QA requirements to be imposed on and met by these outside organizations. Contractor QA programs are reviewed and formally approved by ABB Atom prior to start of work on quality related items.

This Topical Report describes the commitments of ABB Atom Fuel Division to all quality assurance related Regulatory Guides as shown in Table 1.

As indicated above, QA requirements shall be applied to software and computer codes. Careful documentation of the bases for these codes is maintained along with documentation of benchmarking, verification and determination of applicability to specified problem areas. Procedures prescribe required configuration control activities including documentation and control of changes in computer codes.



The ABB Atom Fuel Division has administrative instructions and procedures that comply with the commitments of this Topical Report and that provide for special equipment, environmental conditions and processes as necessary. These instructions and procedures are documented and controlled in accordance with the document control system described in Section 6. The Fuel Division QA program is described in the Quality Assurance Manual, Nuclear Fuel and Components (initial issue June 1975) and is implemented by use of written administrative instructions and procedures that are reviewed by Quality Assurance for consistency with the QA program requirements and company policies. These implementing procedures are mandatory.

Procedures provide for the prompt notification to the Quality Manager, Reactor Division of potentially reportable 10 CFR 21 situations for evaluation.

The scope, status and adequacy of the QA program are assessed annually by management audits. On behalf of the president of ABB Atom, the QA organization within the Reactor Division will perform audits of the QA organization within the Fuel Division and vice versa.

All personnel having duties with an impact on quality are trained and qualified. This training and qualification is documented and controlled. Personnel qualification programs include documentation and capability demonstrations, either using formal, written tests (e.g. for NDE personnel) or through demonstration of skill and include maintenance of proficiency based on retraining and satisfactory provisions for education and/or experience, as applicable. Records identifying the activities the individual is qualified to perform, the basis for this and the validity period, are retained for auditors, NDE and other inspection personnel. To control continued proficiency within work area, re-examination and/or re-certification is used.

ABB Atom will comply with 10CFR50.55a and with General Design Criterion 1 of Appendix A of 10CFR50 where applicable.

## 3

## DESIGN CONTROL

Procedures are established for design control to assure that regulatory requirements and design basis for nuclear fuel core components and related software are correctly translated into specifications, drawings, procedures and instructions. As applicable, design documents include appropriate quality standards.

The allocation of responsibility for preparation, review, approval and issuance of design documents is described in section 6 below. Design control activities include nuclear, mechanical, thermal, hydraulic, radiation, transient and accident analyses, associated computer codes, system and component descriptions, compatibility of materials, maintenance, repair and quality standards.

Design documents controlled by the design control procedures include design input, design criteria, design analyses, specifications, procurement specifications, calculations, computer codes, system descriptions, and drawings.

Errors and deficiencies in approved design documents, including design methods that could adversely affect product quality, are documented and action is taken to assure that all errors and deficiencies are corrected. Deviations from specified quality standards are identified and procedures are established to ensure their control.

Design interface activities are controlled by administrative procedures and instructions describing the responsibilities of the affected parties for review, approval, issuance, distribution and revision of design documents that involve various design organizations including the user of the product.

Product specifications, drawings, material specifications, technical specifications and inspection lists are used to specify technical and quality requirements of nuclear fuel and core components and related software. These documents are reviewed to verify accuracy and completeness and to assure that the proper quality requirements, including specification, test and documentation requirements, have been included therein. Document review

and approval is performed in accordance with established document control procedures.

Quality Assurance has no direct involvement in the review and approval of design documents. Instead, in depth technical audits are performed, with technical experts included in the audit team. These experts have different first level management than the organization that has performed the design.

Design verification is performed using one or more of the following verification methods:

- design review
- alternative calculations
- qualification testing

The design verification method is selected based on the complexity of the design and on the type of design document being verified and is performed by individuals or groups other than those who performed the original design. In cases, when the designer's supervisor is the only available technically qualified person, the supervisor will perform the design verification. In these cases, the justification is documented and approved in advance by the supervisor's management.

Design verification other than qualification testing is completed prior to release for manufacturing, and includes a review by Production and Quality Control.

Computer codes used in design are verified and their use is controlled. Procedures prescribe requirements for computer code development, verification, determination of applicability to the problem, configuration control and documentation including specification of their use in user manuals.

Qualification tests may be used to verify portions of a design in conjunction with other verification methods. These tests are controlled as described in section 11 below. Testing is performed under most severe conditions. Strength

testing is done with loads exceeding design loads, endurance and dry-out tests are performed with a conservative choice of test parameters etc.

Design changes are controlled in accordance with written procedures assuring that design changes are approved by the same organization that performed the original design approval.

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#### PROCUREMENT DOCUMENT CONTROL

Procedures are established for the review of procurement documents and changes of such documents to provide assurance that quality requirements are complete and correctly stated, inspectable and controllable, there are adequate acceptance and rejection criteria, and that the procurement documents have been prepared, reviewed and approved in accordance with the quality assurance program requirements as stated in the QA Manual, Nuclear Fuel and Components. These reviews and approvals are performed by qualified engineering, production and quality control personnel and are verified by signatures.

The quality assurance requirements request the supplier to reveal his QA program for review and audit. The supplier QA program must meet the requirements of USNRC 10 CFR 50, Appendix B.

The procurement documents also include

- requirements for access to the supplier's facility
- provisions for source inspection
- provisions for control and approval of supplier nonconformances
- requirements for preparation and delivery or archiving of documentation
- requirements for documents which have to be reviewed, approved and/or verified by ABB Atom.

Procedures are established to assure that procurement documents identify applicable regulatory, technical, administrative and reporting requirements, drawings, specifications, codes and industrial standards, test and inspection requirements, and special process instructions that must be complied with by the supplier.

Procurement is performed from approved suppliers as described in section 7.

## 5

### INSTRUCTIONS, PROCEDURES, AND DRAWINGS

Activities affecting the quality of nuclear fuel and core components such as design, manufacturing and quality assurance are documented in company instructions and procedures. The review and approval of these instructions and procedures are controlled by the document control system (section 6 of this report). All quality related activities are carried out in accordance with these instructions and procedures.

The Quality Assurance Manual for Nuclear Fuel and Components describes the applied quality assurance program, while the above mentioned company instructions give more detailed information about administrative routines in force. These instructions are included in a specific Instruction Handbook for the Fuel Division.

Procedures are established to assure that instructions, procedures and drawings include quantitative and qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

All of these documents, including product specifications and drawings, provide the necessary acceptance criteria. These documents, when reviewed and formally approved by the responsible department, provide authorization to commence fabrication.

## 6

## DOCUMENT CONTROL

Company instructions and procedures specify the rules for preparation, review, approval, control and issuance of all documents which affect quality to assure technical adequacy and inclusion of the appropriate quality requirements prior to implementation. Documents in this category are instructions, procedures, specifications, product specifications, drawings, operation procedures, procedures for performing special processes, inspection procedures, QA Manual, Topical Reports, nonconformance reports and related documentation, audit reports and associated documents, material certificates, test reports, completed shop traveller forms, and all other completed documents related to product quality.

These document control measures provide for the following:

- identification of the proper documents for performing each activity that affects quality
- identification of personnel who are authorized to prepare, review, approve and issue documents
- ascertaining that proper document revisions are used in each activity which affects quality
- assurance that changes of documents are made only after review and approval by the same organization that performed the initial review and approval
- control of obsolete or superseded documents to prevent inadvertent use
- assurance that properly approved current documents are available at the location where the work is to be performed prior to commencing the work

assuring that a master list of approved documents identifying the current revisions of documents for each project is maintained.

7

#### CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

Company instructions and procedures contain rules for assuring that purchased items and services conform to procurement document requirements.

Prior to placing an order with a new supplier, a technical evaluation is performed by the responsible engineering function and a quality system evaluation is made by the quality assurance function. The results of these evaluations including identified deficiencies are documented and reported to management. Necessary corrective actions must be taken by the supplier prior to the start of the affected activities. These evaluations are aimed at establishing whether or not the supplier is capable of complying with the quality requirements of the procurement documents. Suppliers are periodically re-audited to verify continued acceptable compliance with procurement document requirements. An Approved Suppliers List for materials, parts, and services is maintained and utilized. Orders can only be placed with suppliers that appear on the Approved Suppliers List.

: Following order placement with a supplier, performance audits are performed  
: by quality assurance engineers as necessary, and process/product related  
: audits by Product Engineering engineers to assure that the specific technical  
requirements of the procurement documents are met.

ABB Atom relies on suppliers' certificate of compliance and evaluates the usefulness of these certificates.

Prior to release for shipment to ABB Atom, all documents that are required to demonstrate that the items conform to procurement document quality requirements are reviewed by the Quality Control function. A quality release is issued by an authorized Quality Control engineer only on the following bases:

- supplier quality documentation identifies the purchased item and the specific procurement requirements are met by that item
- accepted and approved nonconformance reports exist for those nonconformances from the procurement requirements dispositioned as "accept as is" or "repair".

If the above conditions are met, the quality release is documented and reported for issuance of a written release to the supplier.

Written procedures govern the process of issuing quality and shipping releases, their distribution and their control.

As an alternative to release prior to shipment, receiving inspection and release for use is performed by ABB Atom QC upon receipt of items.

Such receiving inspection is performed to verify that the item and specified documentation complies with the procurement document requirements. The inspection status of the item is identified and traceability to the item is established.

Nonconforming items are segregated and handled as described in section 15 of this report.

## 8

### IDENTIFICATION AND CONTROL OF MATERIAL, PARTS, AND COMPONENTS

Identification requirements are established in technical specifications and specified in procurement documents for materials, parts and components.

Procedures are established and documented which provide for the identification and control of materials, parts and components at any stage from receiving of material through fabrication and shipment. These procedures include rules for identification marking of items specifying the location and the method of identification to be used in order to prevent the quality of the items from being adversely affected. Identification marking will be either on the item or on records traceable to the item to preclude use of incorrect or defective items. Identification of items can be traced to appropriate documentation such



as design documents, procurement documents and/or inspection records. Identification of items is verified and documented prior to release for further use or for shipment.

Identification and control requirements are imposed on suppliers. Verification that materials, parts and components are properly identified and accompanied by the required documentation is performed prior to release for fabrication.

## 9

**CONTROL OF SPECIAL PROCESSES**

Procedures are established to control special processes used in manufacturing, inspecting and testing of nuclear fuel and core components. These procedures provide assurance that special processes such as welding, heat treatment, cleaning, straightening, final surface treatment, fuel rod drying, non-destructive examination etc., are accomplished under controlled conditions in accordance with applicable codes, standards and specifications.

Process Development, a unit within Production, is responsible for developing and qualifying special processes. For each project a Qualification Plan, which lists all approved special processes, is issued by Product Engineering. The results of the qualification are also reviewed and approved by Product Engineering. Decisions for suitable methods for inspection are made by QC unit managers and for suitable processes by Production unit managers through approval of inspection procedures and operating procedures respectively.

Special processes and personnel performing such processes are qualified to assure adequate control and performance. Non-destructive examination personnel are trained and certified according to the requirements of ASNT SNT-TC-IA. Records of process and personnel qualification data are maintained and periodically reviewed for currency.

Special processes are accomplished in accordance with documented procedures. Recorded evidence of verification is maintained and controlled.

10

## INSPECTION

Procedures are established to control nuclear fuel and core component design, procurement, fabrication, and shipment activities through inspection. An inspection list is included as a part of the technical and material specifications issued by Product Engineering for each order of nuclear fuel or core components produced. The inspection list specifies all inspections to be performed on material and items, including scope of inspection and minimum requirements for inspection documentation. A production flow plan is also developed for each order which specifies operating and inspection procedures. If applicable, mandatory hold points are included. The production flow plan is checked by the Quality Control function.

The inspection procedures include instructions for inspection activities. They specify inspection and test methods to be employed, equipment to be used, sequence of operations, sensitivity of measurements, acceptance and rejection criteria and reporting rules.

Inspections for product acceptance are performed by QC personnel who are trained and qualified and the qualifications are documented and controlled.

Inspection results are documented in inspection reports and evaluated for acceptability, dated and signed by QC-inspectors. In case of a deviation from requirements, a deviation report is issued and the item put on hold until the discrepancy has been resolved by Product Engineering. Actions taken to resolve the discrepancy are recorded on the deviation report.

11

## TEST CONTROL

Measures are established to control testing of nuclear fuel and core components mainly during the development, design and fabrication phases but may, as appropriate, be extended to other tests such as final qualification testing of procured items.

Test programs are developed to identify required tests, test methods and the allocation of responsibility for performing the various phases of the testing activities.

Test procedures and/or instructions include:

- instructions for performing the test, specification of type and accuracy of test equipment to be used
- specification of test prerequisites, such as calibrated instrumentation, training and qualification of personnel, status of completion of item to be tested, and whether controlled environmental conditions are required, requirements and acceptance/rejection limits (included or referenced), mandatory hold points, methods of documenting test data along with the results.

These procedures and/or instructions may be provided in various controlled forms, such as test procedures, test specifications, drawings and test instructions.

Test results are documented, evaluated and their acceptability determined by qualified personnel within Reactor Core Engineering and Product Engineering.

12

#### CONTROL OF MEASURING AND TEST EQUIPMENT

Procedures are established and documented to provide assurance that tools, gauges, instruments and other measuring and test equipment used for the acceptance and verification of nuclear fuel and core component quality are controlled, maintained and calibrated at scheduled intervals. Procedures also describe organizational responsibilities for establishing, implementing and assuring effectiveness of the calibration program.

Written procedures detail the requirements for the periodic calibration of measuring and test equipment and the use of reference standards with known valid traceability to national standards. If no national standard exists, the basis for the calibration is documented.

In general, calibration standards have an accuracy at least four times better than the equipment being calibrated. Exceptions exist for some special instruments, such as vacuum, conductivity etc. In all cases calibration plans are reviewed and accepted by QC unit managers. Transfer standards have an accuracy equal or better than the standard being calibrated.

Measuring and test equipment is labelled with coloured tapes to indicate the due date of next calibration. The tape's colour indicates the year, and a number on the tape the month for next calibration.

The status of all items under the calibration system is recorded, maintained and controlled. Records of the calibration results include information about the date of the last calibration, the department or agency which performed the last calibration and the date the next calibration is due. Measuring and test equipment is calibrated at specified intervals based on the required accuracy, purpose, degree of usage and stability characteristics of the equipment.

When a measuring or test equipment is found to be out of calibration, the control and calibration program requires that an evaluation be made and documented regarding the validity of previous inspection and test results and the disposition of those items previously inspected and tested using the suspect measuring equipment.

Procedures include provisions for corrective actions when discrepancies are identified. Damaged and inaccurate measuring and test equipment is removed from use until repaired, recalibrated or replaced.

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#### HANDLING, STORAGE, AND SHIPPING

Procedures are established to control cleaning, packaging, storage, shipping, and handling of nuclear fuel and core components. These activities are performed by appropriately trained individuals.

These procedures include rules for handling, cleaning, storage, packaging, shipping and preservation of items in accordance with specified requirements to preclude damage, loss or deterioration during manufacture, storage

and shipping. These procedures may be in various formats, such as operation and inspection procedures, shipping instructions, drawings and cleaning process specifications.

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#### INSPECTION, TEST, AND OPERATING STATUS

Procedures are established and documented to indicate the inspection, test and operating status during manufacture of nuclear fuel and core components. The procedures control the application and removal of status indicators through use of shop traveller cards or container labels. Status is verified by operator and inspector signatures on the shop traveller cards or container labels. These procedures also control changes of operation sequence.

These measures provide assurance that only items that have been inspected and tested and found to be acceptable according to the design requirements or those with properly approved deviations will be used for manufacture or shipped for use in a nuclear power plant.

15

#### NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

It is ABB Atom's policy that it is every employee's duty to identify and report nonconformances.

Procedures are established to control the identification, documentation, segregation, review and disposition of nonconformances to prevent inadvertent use. These procedures include provisions for marking and segregation of nonconforming items from those having been accepted. These procedures also include notification to affected organizations if the nonconformance is dispositioned other than scrap. Product Engineering has the authority for the disposition and approval of nonconformances. The procedures also include provisions to assure that repaired and/or reworked items are re-inspected and retested in accordance with requirements at least as stringent as the original inspection requirements.

All nonconformances are resolved or corrected before shipment. All deviation reports are included in the final documentation. Deviation reports deal-

ing with nonconformances that are important to the functioning of the product are presented to the customer for approval.

Documentation of nonconformances includes identification of the nonconforming items, description of the nonconformance, the disposition of the nonconformance, and documented approval of this disposition. Nonconformance and rejection reports are periodically reviewed and analyzed by the QC, Production and Product Engineering Managers. These managers are also responsible for verifying that appropriate corrective actions are implemented.

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**CORRECTIVE ACTION** Procedures are established for identification and correction of conditions adversely affecting quality.

For corrective actions resulting from nonconformance reports, internal audit reports, and customer audit reports the quality assurance function participates in verifying that appropriate corrective actions are implemented.

If conditions adverse to quality are found to be significant, a thorough investigation is conducted to determine the cause. Corrective actions are taken to preclude recurrence. Upper management is notified if significant conditions are identified.

Nonconformances are reported as described in Section 15. The Quality Control units are responsible for issuing of periodic status reports regarding rejections and product nonconformities.

Monthly corrective action meetings are held to review and analyze nonconformance reports and status reports to determine the need for any further preventive action. Production, Quality Control and Product Engineering Managers participate in these meetings and are responsible for verifying that appropriate preventive actions are implemented.

17

**QUALITY ASSURANCE RECORDS**

Procedures are established and documented to provide for the identification, maintenance and retention of quality assurance records generated within the ABB Atom Fuel Division or received from suppliers. The record retention procedures control those design, fabrication and inspection documents that are essential to demonstrating product quality.

Such documents include results of reviews, inspections, tests, audits, and material analyses, monitoring of work performance, qualification of personnel, procedures and equipment and other documents such as drawings, specifications, procurement documents, calibration procedures and reports, nonconformance reports and corrective action reports.

The record procedures define the responsibility assignment for indexing, distributing, identifying, classifying and retaining of quality assurance records. Records are filed as stated in the Fuel Division Archive Plan, which is a controlled document and specifies actual retention times for the various quality assurance records. Long term retention of quality assurance records is accomplished by either the maintenance of a single record storage facility constructed to protect contents from possible destruction or a duplicate set of records stored in a separate remote location.

Each Quality Control unit manager is responsible for collecting all QA records as specified by Product Engineering in product and/or component specifications and review these for correctness and completeness for each delivery. The complete documentation is handed over to the Document Centre within Quality Assurance.

When required by contract, copies of records are forwarded to the customer for retention.

18

**AUDITS**

ABB Atom has established and documented procedures for a system of periodic, planned internal and external (vendor) quality assurance audits of activities affecting the quality of nuclear fuel and core components. Audits are

performed in order to verify effective implementation of the quality assurance program as described in the QA Manual. Both programmatic and in depth technical internal audits (performance audits) are conducted by appropriately trained quality assurance personnel. The audit team leaders are certified in accordance with the requirements of ANSI N45.2.23 as endorsed by Regulatory Guide 1.146. When necessary, experts from other organizational units are included in the audit team for in depth technical internal audits. The auditors are independent of the function being audited. The audits are performed in accordance with written procedures and checklists.

Internal audits are planned and scheduled to assure that all applicable elements of the quality assurance program will be audited at least once every calendar year. Vendor audits are scheduled based on the result of the last audit instead of annually, with a minimum frequency of every third calendar year.

Audit results and proposals for corrective action are documented in audit reports and distributed to management. Verification of corrective actions taken is performed and documented by the QA function. This verification includes reaudit of deficient areas, where appropriate.



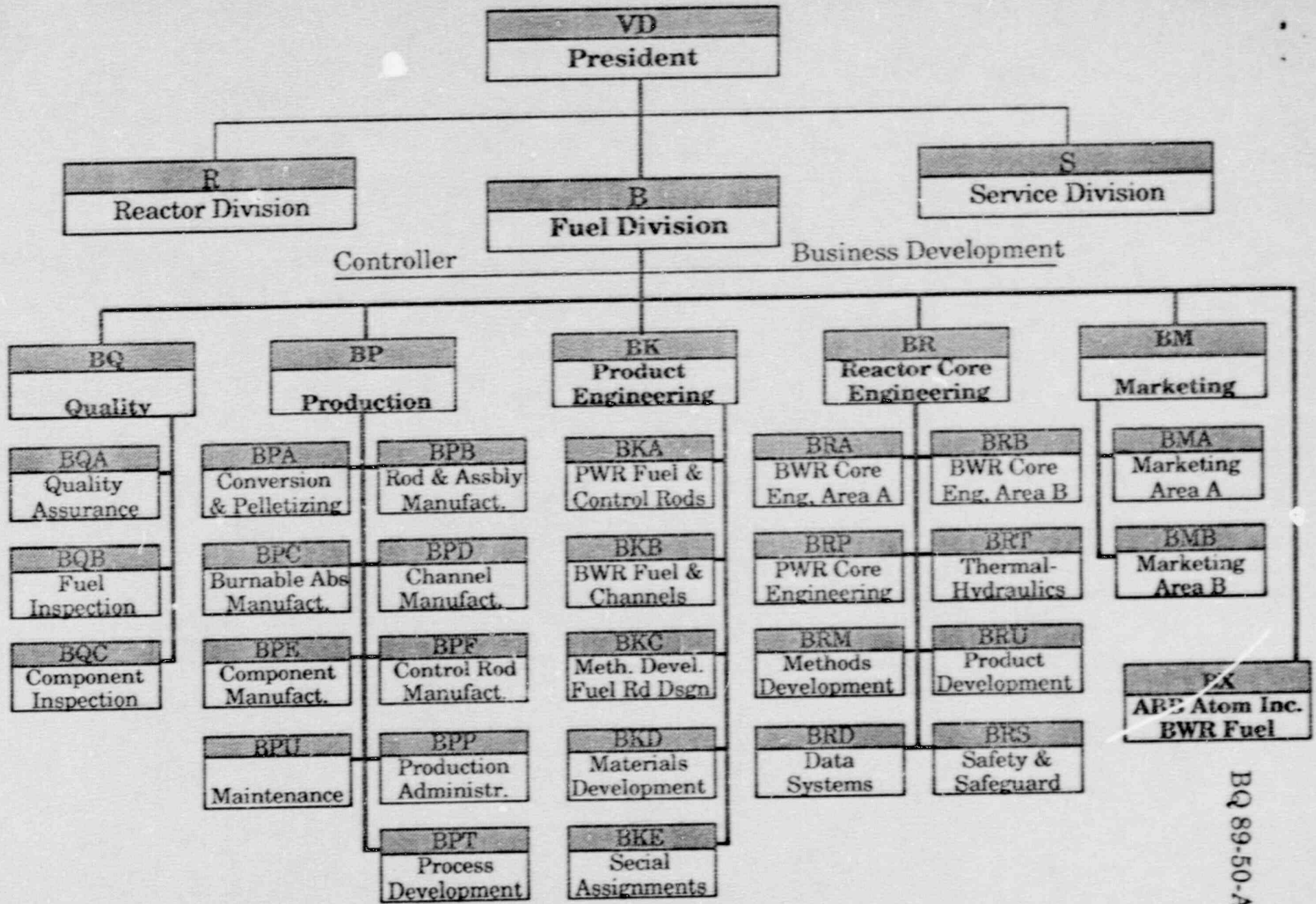


Fig. 1 : ABB Atom Fuel Division organization

## ABB Atom Positions on Regulatory Guides

Provisions of the following Regulatory Guides are incorporated within the QA Program, as applicable:

- 1.28 Quality Assurance Program Requirements (Design and Construction) (rev. 3, Aug. 1985).
- 1.29 Seismic Design Classification (9/78, rev. 3).
- 1.37 Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants (3/73).
- 1.38 Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of items for Water-Cooled Nuclear Power Plants (rev. 2, May 1977).
- 1.58 Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel (rev. 1, Sept. 1980).
- 1.64 Quality Assurance Requirements for the Design of Nuclear Power Plants (rev. 2, June 1976).
- 1.74 Quality Assurance Terms and Definitions (Febr. 1974).
- 1.88 Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records (rev. 2, Oct. 1976).
- 1.123 Quality Assurance Requirements for Control of Procurement of items and Services for Nuclear Power Plants (rev. 1, July 1977).
- 1.144 Auditing of Quality Assurance Programs for Nuclear Power Plants (rev. 1, Sept 1980).
- 1.146 Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants (Aug. 1980).

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