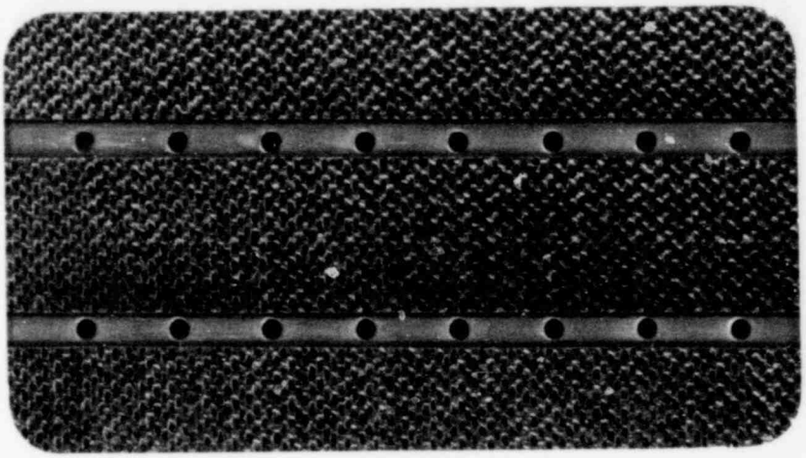


WESTINGHOUSE CLASS 3

WCAP-7800
Revision 5A

NUCLEAR FUEL DIVISION
QUALITY ASSURANCE PROGRAM PLAN

November 20, 1979

APPROVED:

J. S. Moore
General Manager
Nuclear Fuel Division

1621 099

WESTINGHOUSE ELECTRIC CORPORATION
Nuclear Energy Systems
P. O. Box 355
Pittsburgh, Pennsylvania 15230

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SEP 10 1979

Mr. T. M. Anderson, Manager
Nuclear Safety Department
Westinghouse Corporation
P.O. Box 355
Pittsburgh, PA 15230

Dear Mr. Anderson:

SUBJECT: NRC ACCEPTANCE OF WESTINGHOUSE NUCLEAR FUEL DIVISION QA TOPICAL REPORT

We have evaluated Revision 5 to Westinghouse's Topical Report No. WCAP-7800, "Nuclear Fuel Division Quality Assurance Program Plan" and the revised pages to Revision 5 submitted with your January 5 and December 6, 1978 letters respectively. Revision 5 described an updated QA program to reflect conformance with current regulatory and industry QA guidance related to nuclear fuel manufacturing and also contained recent organizational changes to NFD.

Based on our review and evaluation of the topical report through Revision 5, we find that all applicable requirements of Appendix B to 10 CFR Part 50 are included in the QA program requirements. Therefore, your topical report is acceptable, and you may implement it upon issuance of the report. We do not intend to repeat our review of this topical report when it is referenced in an application.

To use the Westinghouse topical report in future license applications, applicants need only reference this topical report in Chapter 17 of the Safety Analysis Report. In addition, this QA program may be implemented immediately on all ongoing activities within the contractual restraints of existing contracts for nuclear power plants. In this regard, identify in your transmittal letter those existing contracts that will be covered by Revision 5 to WCAP-7800.

Should regulatory criteria or regulations change such that our conclusions about this topical report are invalidated, we will notify you. You will be given the opportunity to revise and resubmit it should you so desire. Programmatic changes by Westinghouse to this topical report are to be submitted to NRC for review prior to implementation. Organizational changes are to be submitted no later than 30 days after announcement.

Please include a copy of this letter and the enclosed topical report evaluation in your report, renumber the report WCAP-7800, Revision 5, and resubmit 38 copies to the NRC.

Should you have any questions regarding our review or if we can provide assistance, please feel free to contact Mr. James Conway on (301) 492-7741.

Sincerely,

Walter P. Haass

Walter P. Haass, Chief
Quality Assurance Branch
Division of Project Management

Enclosure:
Topical Report Evaluation

1621 100

TOPICAL REPORT EVALUATION

Report Number: WCAP-7800, Revision 5, Nonproprietary
Report Title: Nuclear Fuel Division Quality Assurance Program Plan
Report Date: September 1979
Originating Organization: Westinghouse Electric Corporation
Reviewed by: Quality Assurance Branch

SUMMARY OF TOPICAL REPORT

Topical Report WCAP-7800, Revision 5 describes the quality assurance (QA) program which Westinghouse applies to the design, procurement, and manufacturing activities, within Westinghouse's scope of work, for nuclear fuel assemblies and associated reactor core components. WCAP-7800, Revision 5 commits Westinghouse to comply with the requirements of Appendix B to 10 CFR Part 50 and to follow the regulatory positions provided by the NRC in Regulatory Guides 1.28 (June 1972), 1.38-Revision 2 (May 1977), 1.58 (August 1973), 1.64-Revision 2 (June 1976), 1.74 (February 1974), 1.88-Revision 2 (October 1976), and 1.123-Revision 1 (July 1977) as well as ANSI Standard N45.2.12 (Draft 3, Rev. 4, February 1974) as documented in Appendix III in the report.

Westinghouse has provided for our evaluation a detailed organizational description of those individuals and groups involved in carrying out activities required by the QA program and a delineation of duties, responsibilities, and authority of those organizational elements involved in the QA program. WCAP-7800, Revision 5 contains a description of the measures used to carry out the Westinghouse QA program activities and describes how applicable requirements of Appendix B will be satisfied by the administration and implementation of these measures in QA manuals and procedures.

SUMMARY OF REGULATORY EVALUATION

We have evaluated the QA program and the organizations responsible for QA functions as described in WCAP-7800, Revision 5. We find that QA policy and direction originate at an acceptably high management level and are effectively communicated to other parts of the organization. Those performing QA functions have responsibility and authority commensurate with their duties in implementing the QA program. We also find that measures have been established, to be implemented by written procedures and instructions, which address each of the criteria of Appendix B in an acceptable manner.

Based on our review and evaluation of WCAP-7800, Revision 5, we conclude that:

1. The organizations and persons performing QA functions within Westinghouse have the required independence and authority to effectively carry out the QA program without undue influence from those directly responsible for costs and schedules.

2. The Westinghouse QA program contains requirements and controls which, when properly implemented, comply with the requirements of Appendix B to 10 CFR Part 50.

3. The Westinghouse topical report WCAP-7800, Revision 5, "Nuclear Fuel Division Quality Assurance Program Plan," provides an acceptable description of the QA program for use in the design, procurement, and manufacturing activities associated with nuclear fuel assemblies and associated reactor core components.

TABLE OF CONTENTS

TABLE OF CONTENTS (cont)

TABLE OF CONTENTS (cont)

1621 105

LIST OF ILLUSTRATIONS

SECTION 1

QUALITY ASSURANCE PROGRAM PLAN

The Nuclear Fuel Division's (NFD) Quality Assurance Program, as outlined in this plan, has been established to define, implement, and audit for adequacy all activities necessary to assure that NFD's products will perform satisfactorily in service.

This plan has been prepared in accordance with NFD's policy to outline the program provisions which demonstrate compliance to 10CFR50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants (see addendum 1). The NFD Quality Assurance Program Plan complies with the NRC Quality Assurance Criteria, 10CFR50, Appendix B, and follows the regulatory position provided in NRC regulatory guides and the requirements of ANSI Standard N45.2.12 to the extent identified in appendix III of this plan.

The Product Assurance department is responsible for defining the content and changes to the Quality Assurance Program. This program and changes thereto, as described in this document, are reviewed by department managers and approved by the NFD general manager. The Quality Assurance Program is implemented by procedures contained in departmental manuals identified in appendix I. Typical events and related documents representing the work sequence from contract receipt to product use are shown in appendix II.

Each manual specifies the functional group responsible for approval. Product Assurance is responsible for review and approval of the quality-related procedures contained in these manuals. These procedures are enforced at all times throughout the development, design, fabrication, inspection, transportation, and handling of the relevant NFD products and provide for the utilization and control of appropriate equipment, tools, materials, special controls and skills, and maintenance of favorable environmental conditions.

This program is applicable to all NFD fuel assemblies and core components (control rods, burnable poison assemblies, plugging devices, primary and secondary source assemblies) that are provided to utilities. Respective organizations executing quality-assurance-related functions are defined in section 2 of this document.

This program plan recognizes the need for review and approval of the principal suppliers' and subcontractors' quality assurance programs and for conducting audits of the implementation of those programs. Sections 4 and 7 address these needs in further detail.

1621 107

This program provides for the review, control, and audit of the materials, processes, and activities used by NFD which affect product quality. Within this program, indoctrination and training of personnel who perform quality-related activities is accomplished through such methods as Corporate training and development programs, qualification programs, and the knowledge and use of departmental policies and procedures. Proficiency is maintained by periodic retraining, reevaluation, and recertification. Through the auditing activities, described in section 18, regular and independent management assessment of the scope, implementation, and effectiveness of the total ongoing program is provided.

NFD reserves the right to amend this plan and any documents related to the plan when necessary to reflect revised needs or program improvements. NFD will notify the NRC of (1) programmatic changes (except those that are editorial in nature) to this plan prior to implementation of the changes, and (2) organizational changes to section 2, in a timely manner.

In accordance with NFD's Quality Assurance Policy, compliance with the statements of this Quality Assurance Program Plan is mandatory for all affected NFD departments and personnel. Differences in opinion between Product Assurance personnel and other department personnel are resolved through normal management channels.

SECTION 2

ORGANIZATION AND RESPONSIBILITIES

NFD has responsibility for the design and manufacture of nuclear fuel assemblies and associated reactor core components such as control rods, burnable poison assemblies, source assemblies, and plugging devices. NFD is also responsible for specifying and procuring appropriate shipping containers. The functional organization of NFD which has been established to implement these responsibilities and the relationship of the departments responsible for quality assurance activities are shown in figure 2-1.

The basic responsibilities of the departments as related to this program are described in the following paragraphs.

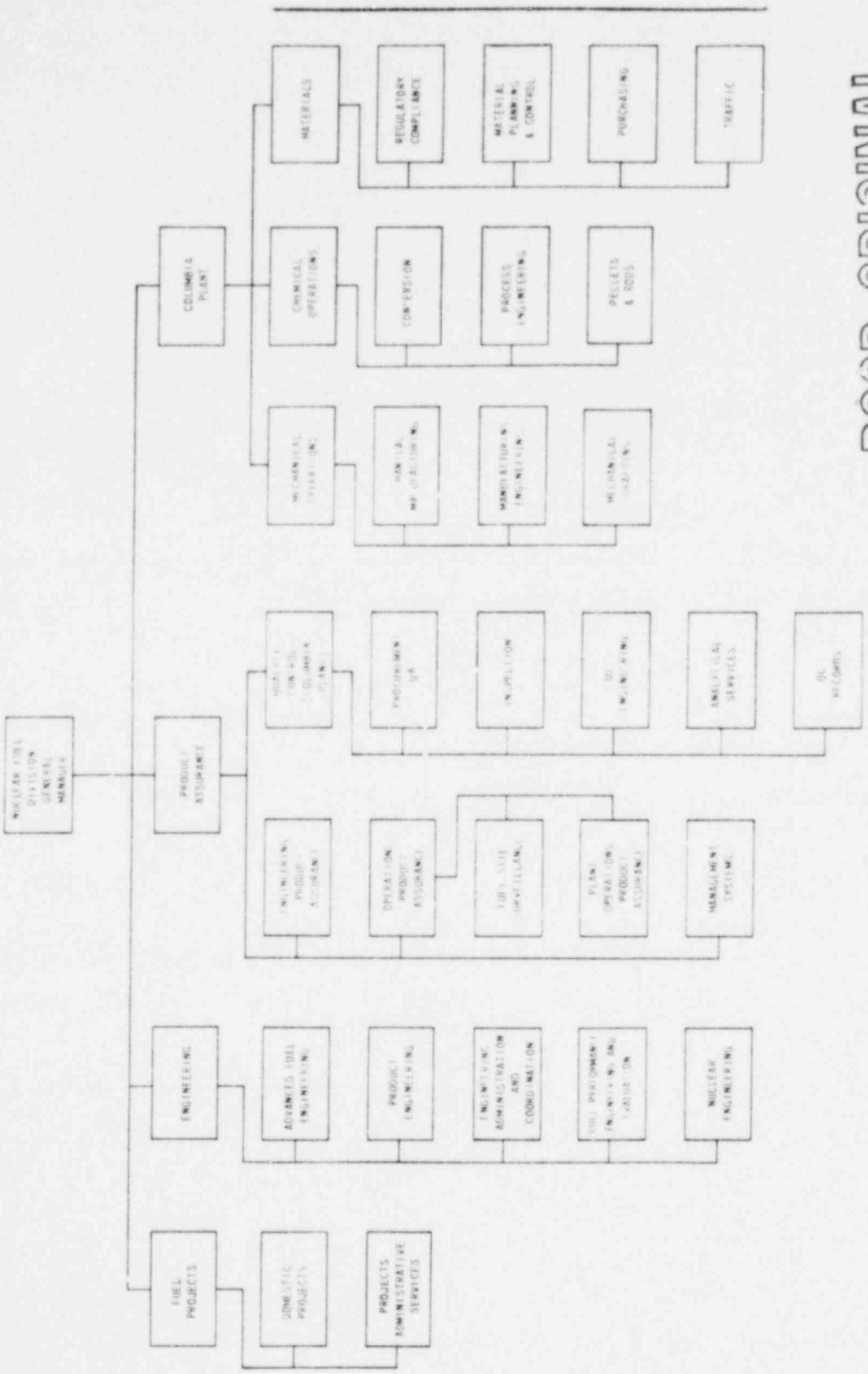
2-1. PRODUCT ASSURANCE DEPARTMENT

The Product Assurance department reports directly to the NFD general manager, independent of Engineering, Manufacturing, and Fuel Projects, and has the necessary organizational freedom and authority to identify quality problems; to initiate and recommend or provide solutions, through established channels; and to verify implementation of solutions.

The Product Assurance department is responsible for the development and maintenance of the Quality Assurance Program and for the generation of product policies and procedures required to guide the program. Functional departments within NFD prepare procedures required to implement this program. These procedures are reviewed, approved, and audited by Product Assurance.

The qualification requirements for the NFD Product Assurance manager are as follows:

- A bachelor's degree in a technical field
- At least 10 years experience in engineering or manufacturing
- At least 5 years experience in management of technical or manufacturing organizations
- Knowledge of applicable quality-related codes, standards, and regulatory and statutory requirements



POOR ORIGINAL

Figure 2-1. Quality Assurance Functional Organization for the Nuclear Fuel Division

1621 110

Engineering Product Assurance has responsibility for review and approval of procedures contained in the Engineering and Fuel Projects manuals, and has the lead responsibility for conducting audits of these activities to verify compliance.

Operations Product Assurance has responsibility for review and approval of procedures contained in the Quality Control and Manufacturing manuals, and has lead responsibility for audits of these departments. Fuel Site Surveillance is responsible for surveillance at the reactor sites and for providing assistance to utilities during initial core loading and reload operations. Plant Operations Product Assurance is responsible for representing NFD in customer and regulatory audits of the Columbia, S.C., manufacturing plant and for recommending and monitoring any resulting followup actions.

Management Systems is responsible for providing guidance and consultation in the development of NFD's information processing systems, and for maintaining the Product Assurance Department Manual.

Quality Control is responsible for review and approval of drawings and specifications; for surveillance and approval of suppliers; and for inspection of supplier and plant materials, parts, components, and assemblies for conformance with design specifications, with authority to accept or reject and to place hold or stop-work restrictions on items or processes when warranted.

Quality Control is also responsible for training and qualification of inspection personnel; for participation, with Manufacturing, in the qualification and certification of special processes and personnel; and for certification of end products as compliant to design and customer requirements.

The term "quality assurance" as used herein is intended to cover the total plan of systematic actions necessary to provide confidence that all structures, systems, and components will perform satisfactorily in service. The term "quality control" is intended to encompass the specific phases of the quality assurance effort related to the control and measurement of specified characteristics of materials, structures, components, and systems for conformance with predetermined requirements. Responsibility for quality control functions at the Columbia plant lies with the Columbia Quality Control section, within the Product Assurance department, with responsibilities as described above.

2-2. FUEL PROJECTS DEPARTMENT

The Fuel Projects department has responsibility for the overall administration of utility contracts and for providing information required by the functional departments for each specified contract. Documents which transmit such information as related to product quality are controlled by detailed procedures.

1621 111

2-3. ENGINEERING DEPARTMENT

The Engineering department is responsible for the design and development of fuel assemblies and core components, and for specifying the configuration of these items to Manufacturing and Quality Control. These design, development, and specification functions are performed in accordance with approved detailed procedures. Engineering is further responsible for verification of design adequacy by reviews, calculations, overchecks, testing, and other means, accomplished by personnel other than those directly responsible for the specific activity. Engineering design activities are described in detail in section 3.

The Plutonium Fuels Development Laboratory (PFDL), which is within Advanced Fuel Engineering, manufactures and supplies mixed oxide fuel rods for use in commercial fuel assemblies. All design, procurement, manufacturing, and control and inspection activities are governed by and comply with the requirements of this Quality Assurance Program Plan.

Administrative and technical responsibilities for the Laboratory effort are as follows:

- The PFDL manager is responsible for the administration of the total Laboratory activities and resident personnel, and for all technical direction other than that involving Quality Control activities and personnel. The PFDL manager is also responsible for policies and procedures in the PFDL Manufacturing Manual, which are approved by the Engineering department and Product Assurance.

- Operations Product Assurance is responsible for technical direction of PFDL inspectors and for the Quality Control Engineering effort, including responsibility for policies and procedures in the PFDL Quality Control Manual and the implementation of Quality Control Instructions (QCIs) pertinent to control and inspection tasks.

2-4. MANUFACTURING DEPARTMENT

The Columbia plant is responsible for the procurement of materials and the fabrication of fuel assemblies and core components. Procurement and fabrication functions are performed in accordance with approved procedures.

2-5. RESPONSIBILITY INTERFACES

The authority and responsibilities of the manager of each department are defined in written descriptions and interface documents. Close association and interchange of information among the functional groups exist at all levels within NFD. Where responsibilities are shared between the groups, the divisions of responsibility and procedures for information transmittal and approval are formally documented and included in the pertinent operations manuals or in the operational procedures for the groups.

SECTION 3
DESIGN CONTROL

NFD Engineering is responsible for the mechanical, nuclear, and thermal-hydraulic design, development, and prototype testing activities associated with Westinghouse-designed fuel assemblies and core components. The safety and performance requirements to be met by the fuel assemblies are established jointly by NFD and the Nuclear Technology Division. The division of responsibility for design activities and the methods and procedures used to control specification, review, approval, and transmittal of design information are documented in the Engineering Operations Manual. The procedures in the manual are reviewed and approved by the Product Assurance department.

3-1. DESIGN BASES

The design bases and basic configuration for the fuel assemblies and core components are described in applicable Safety Analysis Reports. Contract requirements are formally documented and transmitted to responsible design organizations by the NFD Fuel Projects department.

3-2. DESIGN PROCESS

The following elements are utilized in establishing fuel assembly and core component design:

- Analytical programs and models, pertinent to such disciplines as stress, thermal, hydraulic, and radiation and accident analysis, under design bases conditions
- Selection of materials on the basis of their mechanical and physical properties and mutual compatibility under the environmental conditions of concern
- Analysis of the suitability of parts, equipment, and processes to the design bases functions of components and assemblies
- Analysis and utilization of fuel performance data

3-3. DESIGN VERIFICATION

The adequacy of the design elements to satisfy design bases and regulatory requirements is evaluated through use of one or more of the following verification methods.

Formal design reviews are scheduled and conducted in accordance with documented procedures as part of the design process. These reviews are performed by personnel who are not directly responsible for the design under review, but who are knowledgeable of the design and its applicable requirements. The meetings follow an agenda which is established in advance and designed to identify deficiencies or potential problem areas. The results of the review, including agreed actions to resolve any deficiencies uncovered, are documented and reported to the NFD Engineering manager and the Product Assurance manager. The results of the actions involved in resolution of such deficiencies are reviewed, and if deemed necessary, made the subject of another design review.

Calculations utilized in design work are verified for accuracy by such means as review by personnel other than those involved in the original work, or use of alternate calculational methods of proven validity. Results are reviewed by authorized managers and appropriate corrective actions directed when warranted.

Tests of materials, components, or assemblies are conducted under either simulated or actual environmental conditions consistent with design bases functional requirements. Results are documented in test reports and serve as a basis for review and confirmation of design adequacy.

3-4. CONFIGURATION CONTROL

Design requirements are defined in the engineering drawings and the material and process specifications, and include designation of appropriate regulatory and quality standards. These documents are reviewed and approved by the design group preparing the document, by Manufacturing and Quality Control, and, where necessary, by representatives of other affected design groups.

3-5. CHANGE CONTROL

Changes to approved drawings and specifications are effected through documented Engineering Change Notices (ECNs). The procedure for controlling an ECN requires review and approval of the change by organizational groups whose discipline or responsibilities are pertinent to the change, including provision for control of design adequacy verification consistent with those of the original design. Handling of manufacturing nonconformances is discussed in section 15.

SECTION 4

PROCUREMENT DOCUMENT CONTROL

The procurement of materials, services, or components required in the production of fuel assemblies and core components, and the specification of technical and quality assurance requirements in such procurement are performed in accordance with the formal procedures detailed or referenced in the NFD Manufacturing and Quality Control manuals. Individual manual procedures are reviewed and approved by the NFD Product Assurance department. Compliance with these procedures is audited by NFD Product Assurance. These procedures are designed to ensure that the technical and quality requirements transmitted to the supplier are complete, and that the quality assurance programs utilized by the supplier are adequate to control the quality of the product.

Procurement and Quality Assurance Requirement (PQAR) documents are prepared by Manufacturing and Quality Control for each type of product-related material, part, or service to be purchased, and are furnished to the Purchasing department for incorporation into pertinent procurement documents. Procurement documents include requirements for supplier adherence to the following:

- A quality assurance program in compliance with appropriate sections of Appendix B, 10CFR50
- NFD Product Assurance access to vendor facilities for purposes of audit, surveillance, and source inspection
- Designated drawings and specifications, applicable codes and standards, test and inspection requirements
- Applicable process restrictions or designated use of approved processes only
- Submittal of test reports and certification of material or service conformance with all purchase order requirements
- Submittal, when required, of processing or other pertinent supplier records
- Restriction on subcontractor use, unless specifically permitted by provisions for extending pertinent procurement control requirements to the lower-tier suppliers

1621 115

Prior to issue, Quality Control reviews and approves each purchase order for product-related items, to assure the completeness and accuracy of the order, identification of appropriate quality requirements, and placement of the order with an approved supplier.

Purchase order amendments are made only through formal purchase order changes subject to the same controls and approvals designated above for the original order.

Supplier audit and approval requirements are detailed in section 7, as are the activities of source surveillance and source receiving inspections.

SECTION 5

INSTRUCTIONS, PROCEDURES, AND DRAWINGS

Throughout the design, manufacturing, and inspection phases, the activities and operations affecting the quality of the fuel assemblies and core components are controlled through the use of approved drawings, specifications, instructions, and procedures. These are generated in accordance with policies and procedures contained in the pertinent Division, Product Assurance, Fuel Projects, Engineering, Quality Control, and Manufacturing manuals. Manuals are reviewed and approved by Product Assurance.

Drawings, specifications, instructions, and procedures define appropriate acceptance criteria for materials, parts, and assemblies and applicable parametric limits for processes and test methods, with respect to dimensions, tolerances, operating limits, and quality standards.

5-1. DIVISION

Policies and procedures in the NFD Policy Manual direct NFD departments in their responsibilities pertinent to the Quality Assurance Program, including generation of procedures and documents directing the specific quality activities within each department, and the control of interfaces between departments and with other divisions.

5-2. PRODUCT ASSURANCE

Product Assurance activities are conducted to assure that all planned and systematic actions are taken as necessary to provide adequate assurance that products will perform satisfactorily in service and be in compliance with all requirements. These responsibilities are exercised by setting Quality Assurance policy, and by review, approval, and auditing of the implementation of procedures.

5-3. QUALITY CONTROL

Quality Control Operating Procedures (QCOPs) are approved by the managers of Quality Control and Operations Product Assurance. These procedures specify the administrative and technical policies to be followed for quality control activities.

Inspection operations, including supplier surveillance, receiving, and final inspection of materials, parts, and assemblies are performed in accordance with approved Quality Control Instructions (QCIs). QCIs define, where appropriate, the characteristic or detail to be inspected, inspection method, sampling plan, acceptance limits, and the tools, gages or test equipment necessary to perform the inspection.

5-4. FUEL PROJECTS

Fuel Projects quality-related activities are governed by procedures in that department's manual, including those directing preparation, review, approval, and distribution of documents pertinent to the receipt and dissemination of contractual requirements.

5-5. ENGINEERING

Engineering activities are governed by the documents approved by Engineering management and outlined in section 3 of this program plan. Reviews and approvals of design details and information, design analysis, test reports, drawings and specifications, and changes thereto are utilized as a means of ensuring that all necessary activities have been completed and have been performed in accordance with the proper procedures.

5-6. MANUFACTURING

Manufacturing operations are conducted in accordance with established written procedures which are approved by the responsible process and quality control personnel. Prior to initiation of product manufacture, required process outlines and/or route cards which list the steps in progression of materials, parts, subassemblies, and assemblies through the various manufacturing and inspection points are written. These outlines identify the sequence of operations, including inspection upgrade steps as supplied by Quality Control, and the procedures applicable at each step of the sequence.

SECTION 6

DOCUMENT CONTROL

The generation and distribution of drawings, instructions, and procedures utilized in the design, manufacture, or inspection of NFD products are controlled through formal policies and procedures. The operating manual for each department or functional group within NFD contains procedures for the control of documents applicable to the activities of that department. Those procedures which are pertinent to the Quality Assurance Program are reviewed and approved by the Product Assurance department as outlined in sections 1, 2, and 5 of this plan.

Drawings and specifications are prepared, distributed, and revised in accordance with procedures in the Engineering Operations Manual that have been developed to assure review and approval by responsible technical and management personnel. The generation and revision of manufacturing drawings, process outlines and manufacturing operating procedures, quality control operating procedures, and quality control instructions are controlled through formal administrative procedures in the Quality Control and Manufacturing manuals. The administrative procedures have been developed for the purpose of assuring that Manufacturing and Quality Control personnel have reviewed and approved the documents and that the documents have been transmitted to the proper work stations or personnel. Changes to the documents are formally processed and require approvals by the same functional organizations as the original issue, or by others, as authorized by the originators to act in their behalf.

SECTION 7

CONTROL OF PURCHASED MATERIALS, EQUIPMENT, AND SERVICES

NFD Quality Control and Manufacturing procedures are utilized for the purpose of assuring that purchased materials, parts, or services meet the requirements specified in the procurement documents. These governing procedures are contained or referenced in the Quality Control and Manufacturing manuals approved by Product Assurance. Suppliers with whom orders are placed must be qualified by, and acceptable to, NFD Product Assurance.

Periodic audit of supplier operations, review of records, surveillance inspection, and/or in-plant receiving inspection are performed for the purpose of ensuring that quality requirements are met and maintained. Supplier quality assurance programs must be compliant to the requirements of those sections of Appendix B, 10CFR50, that are applicable to the particular product or service for which the supplier is approved.

As noted in section 4, NFD procurement documents require that NFD Product Assurance has access to the supplier facility for audits, as noted above, and for surveillance and source inspection on specific orders.

Source and receiving inspection requirements, including sampling methods where applicable, are specified in written Quality Control instructions (QCIs). Receiving inspection tasks include verification of receipt and conformance of supplier documentation with purchase order requirements. Material must be clearly identified by lot number or other means permitting recall of raw material and process history documentation.

Procurement, audit, surveillance, source and receiving records, and supplier records submitted are retained according to the systems described in section 17.

No product-related materials are permitted to be placed in Inventory Stores until accepted by Quality Control. All such materials are marked as Quality Control released, and production control procedures include the requirement that the release status be verified at the time of material withdrawal.

Nonconformances, when discovered in source or receiving inspection, are subject to holds, dispositions, and corrective actions in accordance with formal procedures providing the same degree of control as that described in other pertinent sections of this program plan.

1621 120

SECTION 8

IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS

Requirements for identification and control of materials, parts, and assemblies are directed by Engineering drawings and specifications, and implemented through use of procedures in the Manufacturing and Quality Control manuals, subject to approval by department managers and Product Assurance.

Identification systems provide for the marking or tagging of individual items, their containers, or accompanying documents with lot, heat, or other pertinent identity in a manner to permit traceability of each item to its applicable release status, drawings, specifications, and other appropriate technical information. Major subassemblies, when directed by Engineering, are marked with individual serialized identities. Permanent markings directly on parts or assemblies are controlled by Engineering specifications which direct the use of suitable marking materials and methods, and their placement, consistent with quality and service requirements of the item.

Where necessary, route cards, work station batch records, or other suitable records are maintained to continually control and document the work sequence status of all items; they also serve to further identify the items in process. These systems also serve to prevent the unwarranted passage of any item beyond any Quality Control upgrading point.

Supplier identification requirements are specified in purchase orders, and such identification together with the supplier certification and test records is verified at the source or at receiving inspection by Quality Control, for conformance.

Identification of items by lot, heat, or other parent history is maintained through their Quality Control release stages, and evidence of such releases is confirmed at the next use station. When lots are subdivided during processing, each subdivision is identified by its parent lot. At assembly stages, requirements for maintaining specific identity of components beyond their individual release points are applicable to the extent specified by Engineering.

Records of nonconformance disposition are identified on the controlling route cards or batch records, and such items are marked and controlled as described in section 15.

1621 121

SECTION 9

CONTROL OF SPECIAL PROCESSES

Control of special processes, including welding, heat treating, and nondestructive testing, is maintained through the policies and procedures contained or referenced in the Quality Control and Manufacturing manuals approved by Product Assurance. The Process Specifications, Process Outlines, Operating Procedures, and Quality Control Instructions describe the detail necessary for qualification of procedures, equipment, and personnel, in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

9-1. PURCHASED MATERIALS AND PARTS

When special processes are utilized by suppliers, the material specifications and the Procurement and Quality Assurance Requirement (PQAR) used for the procurement require that the processes be qualified by the suppliers. The procurement documents contain the requirements for Quality Control approval of such processes prior to production, as noted in section 4 of this program plan, and for any changes to the processes after initial approval. The requirements for pilot-order or first-piece inspection, surveillance inspections, and Quality Control audits during production are also specified.

9-2. CONTROL OF NFD MANUFACTURING PROCESSES

Prior to initiation of manufacture of core component and fuel assemblies, the drawings, specifications, process outlines, and operating procedures to be used in manufacturing are forwarded to Quality Control for review with regard to the following:

- That required qualifications of personnel, procedures, and equipment for any special processes are adequately identified and specified for completion prior to production
- That special tooling, fixtures, gages, or other equipment needed to assure product quality are adequately identified at the correct steps in the process
- That special testing, instructions, and/or documentation, along with acceptance criteria, are identified. Typical of such requirements would be strength tests, furnace heat records, operator logs, atmosphere control, thermocouple placements, and other details necessary for process control.

1621 122

Quality Control generates the necessary QCIs to specify the inspection methods and procedures, sampling plans, and inspection forms required for the processes. During production, Quality Control periodically reviews manufacturing qualification records for the purpose of assuring continued compliance with process and specification requirements. Quality Control also performs the following functions:

- Maintains qualification records for personnel and process control
- Notifies Manufacturing if requalifications are due

9-3. NONDESTRUCTIVE TESTING

Nondestructive testing on purchased items or during manufacturing processes is conducted in accordance with procedures required by QCOPs or Material Test Specifications. Where specific nondestructive test methods are used, the procedures for qualification of personnel are comparable to the techniques and requirements of ASNT Standards, with the exception as noted in appendix III. Personnel involved in X-ray inspection of welds are periodically monitored by Quality Control.

SECTION 10

INSPECTION

Inspection programs are conducted in accordance with documented procedures and requirements as defined by the Quality Control Manual. This manual is reviewed and approved by Product Assurance. All pertinent engineering drawings and specifications are reviewed by Quality Control for approval of quality requirements, which are then used as a basis for reviewing Manufacturing Process Outlines and establishing the necessary inspection points and requirements for the processes.

Quality Control Instructions (QCIs) are prepared for design-specified material, components, and assemblies, listing appropriate characteristics requiring inspection, the inspection techniques to be used, accept/reject criteria, and recording requirements. Sampling techniques, when employed, are based on statistical standards, and are compliant with design requirements.

Characteristics with design-specified tolerances not amenable to direct verification inspection, such as assembly weldments, may be controlled as special processes, described in section 9.

Material, part, or assembly acceptance inspections are performed by qualified inspectors who function independently of the production personnel. Procedures utilized in manufacturing limit product progress past process upgrading points unless accepted by Quality Control. Acceptance for further processing must be formally certified by approvals on inspection reports, signoffs on route cards, or in the case of deviated parts, documented disposition or acceptance by Engineering as described in section 15. At each inspection stage Quality Control verifies that all prior work steps have been completed and properly signed off.

Inspectors are qualified for specific inspection tasks by work experience and supervisory training. Inspectors performing nondestructive tests are trained and qualified for competency in their specific work efforts. The acceptance bases for qualifications are delineated in the Quality Control training manual.

SECTION 11

TEST CONTROL

Numerous tests are performed during design and fabrication to assure that nuclear fuel assemblies or core components produced by NFD will perform satisfactorily in service. Such tests include the following:

- Tests on materials and components during design
- Prototype design tests under simulated reactor conditions
- In-pile testing of fuel rods and materials
- Material, process qualification, and product tests during manufacture

Detailed material and component tests, prototype tests, and in-pile verification tests on fuel rods and materials are used as part of the design process as necessary for the development of new fuel assembly designs or for qualification of design changes. Responsibility for direction of these design process tests is that of Engineering, and provisions for implementation are directed by procedures in the Engineering Operations Manual approved by Engineering and Product Assurance.

Engineering further directs, in drawings and specifications, the test acceptance criteria for manufacturing materials and products, and applicable process qualification test criteria. Complying procedures are prepared by Quality Control, as governed by directives in the Quality Control Manual approved by Product Assurance.

Procedures for all of the above purposes make provision for control of test accuracy through calibration programs and use of standards, appropriate instrumentation, environmental controls, and qualification of testing personnel.

Test results are documented and checked by designated personnel for acceptance to procedural requirements and specification criteria. Nonconformances are handled as described in sections 3 and 15 of this program plan.

SECTION 12

CONTROL OF MEASURING AND TEST EQUIPMENT

The calibration program as defined by the Quality Control Manual provides for control of gages, tools, balances, and other equipment utilized in the testing and inspection of fuel assemblies and core components. This manual is reviewed and approved by Product Assurance. Testing and inspection equipment, including personal tools and gages, are registered with Quality Control and are subject to documented Quality Control Instructions governing their use, serialization, calibration, qualification, and maintenance. These requirements are not intended to apply, except with respect to purchasing control, to rulers, tape measures, levels, and similar items commercially available with known control of accuracy and stability.

12-1. SERIALIZATION

The QCOP governing control of inspection equipment requires, where physically possible, a tool and gage number which is inscribed on Westinghouse-supplied equipment and attached by means of a tag to personal equipment. Upon acceptance of such equipment by Quality Control, a tool and gage record for each item is prepared and maintained by Quality Control, with entry of initial and subsequent, periodic calibration events.

12-2. CALIBRATION

Instructions for test equipment, tools, and gages define calibration procedures, methods, tolerance limits, and frequency. The standards used for the calibration are traceable to the National Bureau of Standards where such standards exist. In other instances, online control standards or standards of documented accuracy from other sources are utilized and the basis for calibration is documented.

Inspection equipment must be calibrated and certified by Quality Control before it can be used for inspection purposes. Such items must also be recalibrated by Quality Control in accordance with schedules maintained on a computerized report which specifies the tools and gages, balances, and test equipment needing calibration during a specific period of time. The intervals between calibrations are defined by procedure and are based on the type of equipment, its stability characteristics, and the accuracy necessary in drawing or specification verification tasks to which it is applied.

1621 126

Measuring and test (M&T) equipment is calibrated utilizing standards whose accuracies are at least four times that specified for the M&T equipment. Exceptions may be necessary because of limitations in the state of the art.

When gages are found to be incapable of maintaining required accuracy, they are removed from service. Personnel and their supervisors are required to report and request nonscheduled calibration action if any tool or gage is suspected to be out of accuracy tolerance because of damage or other reasons. Quality Control is responsible for dispositioning material initially inspected with a gage discovered, in subsequent calibration, to have been significantly out of accuracy tolerance.

12-3. REVIEW OF TOOL AND GAGE RECORDS

A Quality Control representative periodically verifies, by reference to tool and gage records, that calibrations are current and that quality control tools and gages used in NFD's manufacturing and inspection areas have been accepted and serialized by Quality Control. Quality Control also periodically reviews the primary standards to determine the advisability of their continued use or replacement.

SECTION 13

HANDLING, STORAGE, AND SHIPPING

Beginning with the raw material or component procurement and continuing through to shipment to the reactor site, protective measures are used to assure that all core components and fuel assemblies are handled and stored in a manner to prevent damage or deterioration. Special shipping procedures and containers are utilized for items susceptible to damage. Fuel shipping containers are inspected by Quality Control prior to and after loading of fuel assemblies to assure proper packaging of the assemblies for shipment.

13-1. HANDLING

Components and assemblies are handled in such a manner as to minimize possible damage to the product. Special lifting tools are inspected and functionally tested to drawing requirements by tool and gage personnel. Handling and storage of assemblies during manufacture are conducted in accordance with formal operating instructions. In addition, detailed handling procedures and supporting documents are furnished to each reactor site in an effort to assure proper handling of fuel assemblies and core components.

13-2. PRESERVATION, PACKAGING, AND STORAGE

In-process or completed core components and fuel assemblies are packaged and stored in accordance with engineering and safeguards requirements. The fuel assemblies are thoroughly cleaned in accordance with operating procedures, and after cleaning and visual inspection are packaged to preclude contamination. Where practical, component parts are packaged in sealed boxes, bags, and/or containers until required for assembly. Fuel assemblies and core components awaiting shipment are stored in specially designed racks.

Quality Control Instructions stipulate the use of checkoff sheets to control loading of shipping containers and shipment of nuclear fuel.

13-3. SHIPPING

Special shipping containers are used to ship fuel assemblies, fuel rods, and core components. The containers used for fuel assembly shipment have been designed, fabricated, and licensed in accordance with applicable NRC and DOT regulations.

~~1621 127~~

Containers are marked to comply with written instructions, including identification of contents, special handling precautions, source and destination, and special nuclear material markings in accordance with NRC and DOT regulations.

Quality Control is responsible for inspection of vehicles and loading arrangements at the manufacturing plant. Fuel Site Surveillance is responsible for surveillance at the receiving site, including unloading practices, and confirming that container contents are not damaged.

SECTION 14

INSPECTION, TEST, AND OPERATING STATUS

Operation and inspection procedures, as defined in Quality Control and Manufacturing manuals for the production of fuel assemblies and core components, have been established for and allow ready determination of the operation and inspection status of materials, parts, and assemblies through the production cycle. These manuals are reviewed and approved by Product Assurance.

Purchased parts and materials are subject to surveillance inspection at the supplier's plant and/or NFD receiving inspection. Supplier packing lists, test and inspection certifications, and material and container markings are required, and are verified as present and conforming to order requirements at NFD receiving inspection. Only fully acceptable parts are released to NFD Stores, and are marked directly or by tags with material identity and Quality Control receiving inspection release stamps.

During in-house processing of materials, parts, and assemblies, the operation and inspection items are, in most instances, maintained by route cards that conform to the steps in the process outlines and accompany the items through the processes. Upon completion of each step, the route cards are stamped or initialed to provide a running status of operation and inspection. For continuous processes, alternate operational status schemes may be used, such as entry-exit station logs.

Materials, parts, or assemblies cannot progress past upgrading points unless accepted by Quality Control in accordance with approved procedures. Acceptance is recorded by an inspection report or an inspector's stamp or initialed release notation on the route card. Deviated materials, parts, or assemblies are segregated from acceptable items and placed on hold for disposition as outlined in sections 8 and 15 of this program plan.

Inspector stamps are serialized and are issued and controlled by Quality Control in accordance with approved procedures. The various identification tags, labels, and forms pertinent to material and inspection status identification are described in and controlled by Quality Control procedures.

1621 130

SECTION 15

NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

NFD maintains systematic control of the identification, segregation, documentation, and disposition of nonconforming materials, parts, components, and assemblies. Inspection points are utilized throughout production to provide for detection and segregation of deviated products and for assurance that only acceptable items are released for further processing. Disposition of deviated items is controlled in accordance with procedures contained or referenced in Manufacturing, Engineering, and Quality Control manuals. These manuals are reviewed and approved by Product Assurance.

Deviated items, when encountered, are tagged or marked for hold or, where practical, are segregated with appropriate documents in hold areas under Quality Control supervision until they are dispositioned. Disposition action, whether by scrapping, rework or repair and reinspection, or QC release per Engineering acceptance of deviation, is specified by written instructions, and must be reviewed by Quality Control before release from hold is permitted. Items that are dispositioned to scrap are so tagged or marked, and are transferred to storage areas to await disposal.

Rework or repair of deviated items may be performed only in accordance with approved procedures. The reworked or repaired items are reinspected by Quality Control, to NFD Engineering requirements, to determine acceptance.

A deviated item may be accepted without rework or can be repaired using a nonstandard repair procedure. In such cases, a Deviation Notice Disposition Request (DNDR), identifying the item, defining the deviation and the relevant specification requirements, and specifying the corrective action, is prepared by Manufacturing and submitted to Quality Control and Engineering. The Engineering disciplines responsible for originally designating the pertinent specification limits in question, and those responsible for any interacting design requirements, review and make documented disposition. This disposition includes any required repair procedures, records, and retention of pertinent calculations or other design review items necessary to justify acceptance.

Quality Control is responsible for monitoring and verifying acceptable completion of any followup action or measures required by Engineering. Parts rejected by Engineering are dispositioned in accordance with the scrap procedure noted above.

1621 131

Copies of DNDRs are routinely distributed to cognizant departments. Product Assurance personnel periodically review the Engineering disposition to assure that actions and documentation are in compliance with controlling procedures.

Field Discrepancy Reports (FDRs) are generated for nonconformances when encountered at reactor sites and dispositioned by Engineering in a manner similar to the DNDR system described above. Corrective action followup is the responsibility, in these instances, of the Fuel Site Surveillance personnel.

A periodic report is issued by Quality Control identifying nonconformances by type and product encountered within the report period and cumulative figures on an annual basis. These reports are distributed to cognizant managers for their review.

Quality Control issues a certification on each final assembly and forwards it to the customer. Referenced thereon are any DNDRs pertinent to the final assembly. All DNDRs are retained with Quality Control records.

Throughout the fabrication phase and following shipment of the final assemblies, all DNDRs pertinent to the assemblies are made available to customers for review upon request. Referencing DNDRs on the assembly certification form provides the necessary traceability to documentation justifying acceptance of the nonconforming condition.

SECTION 16
CORRECTIVE ACTION

Procedures in the Product Assurance, Engineering, Manufacturing, and Quality Control manuals direct that material and process nonconformances to product or process specifications be recorded. In addition to the control and disposition of deviant material as described in section 15, provisions are made for identifying, where possible, the probable cause of the nonconformance and the corrective actions necessary to prevent recurrence. The nature and extent of followup activities are defined in appropriate procedure manuals.

Quality Control is responsible for accumulating historical data on nonconformances and trends which could lead to deviant conditions, and for reporting results and corrective action recommendations to Manufacturing and other managerial levels.

Manufacturing management has the primary responsibility for establishing and maintaining process methods and controls to prevent process excursions and resultant material deviations, and for the expedient use of corrective actions where warranted.

Fuel Site Surveillance is responsible for reporting site-observed nonconformances and directing Field Discrepancy Reports to Engineering, Manufacturing, and/or Quality Control, who are then responsible for taking appropriate material and systems corrective actions.

Manufacturing, Quality Control, and Engineering are responsible for directing upgrading of raw material and process specifications, as warranted, to prevent recurrence of those nonconformances whose causative factors may be inadequacies in those control procedures.

SECTION 17

QUALITY ASSURANCE RECORDS

The requirements for preparation and retention of records of design, procurement, manufacturing, and quality control activities and related materials are defined by procedures of, or referenced in, the department manuals approved by Product Assurance. Systems pertinent to the generation of such records, including drawings, specifications, and procedural documents, are described in earlier sections of this program plan. Appendix II presents an overview of the sequence of Division work activities and identifies many of the key documents and records involved.

Record retention responsibilities are described in the following paragraphs, under the headings of cognizant departments. For principal records, retention is required for product service lifetime.

17-1. FUEL PROJECTS

Fuel projects is responsible for project administrative records and documents transmitting project requirements to functional departments.

17-2. DESIGN ENGINEERING

Design Engineering is responsible for the records resulting from the design activities defined in section 3, including those pertinent to design initiation, codes and standards, design change control, design drawings and specifications, design reviews and other verification systems, design tests, and fuel performance.

17-3. PRODUCT ASSURANCE

Product Assurance is responsible for retention of fuel site surveillance and Division audit records. At the manufacturing facility, Quality Control is responsible for retention of inspection records, as well as certain process and procurement records pertinent to the Quality Control upgrading needs.

Figure 17-1 illustrates quality-related activities in the manufacturing process, and some of the primary procedures and records generated. Records are maintained at the manufacturing plant at least until the related fuel assemblies are loaded and the core has reached criticality at the reactor site. Copies of the records are retained at the Westinghouse Records Center for the required storage period. Records are retrievable as needed.

Quality Control is responsible for collection of such documents as the following:

- Current and outdated revisions of Quality Control procedures and instructions
- Inspection reports, including tests and analyses
- Release records, including dispositions of nonconformances
- Supplier certifications, test reports, and audit records
- Manufacturing records to the extent required for certification needs
- Route cards

Quality Control shares with Manufacturing the responsibility for collection and retention of the following:

- Qualification records for equipment, processes, and personnel
- Other documents and records pertinent to codes, standards, and special contractual requirements

17-4. MANUFACTURING

Manufacturing is responsible for collection and retention control of principal processing and procurement records, except in those instances where records are turned over to Quality Control. Typical records collected and retained are the following:

- Current and outdated revisions of process specifications, process outlines, and operating procedures.
- Purchase requisitions, orders, and change orders

17-5. RECORD STORAGE FACILITIES

The existing Westinghouse Records Center is constructed, located, and secured to prevent records loss by fire, flooding, theft, or deterioration. This facility is used for the permanent storage of QA records from NFD and other divisions within NES. In some instances alternate methods of records storage include duplicate sets maintained at separate locations to protect against records loss.

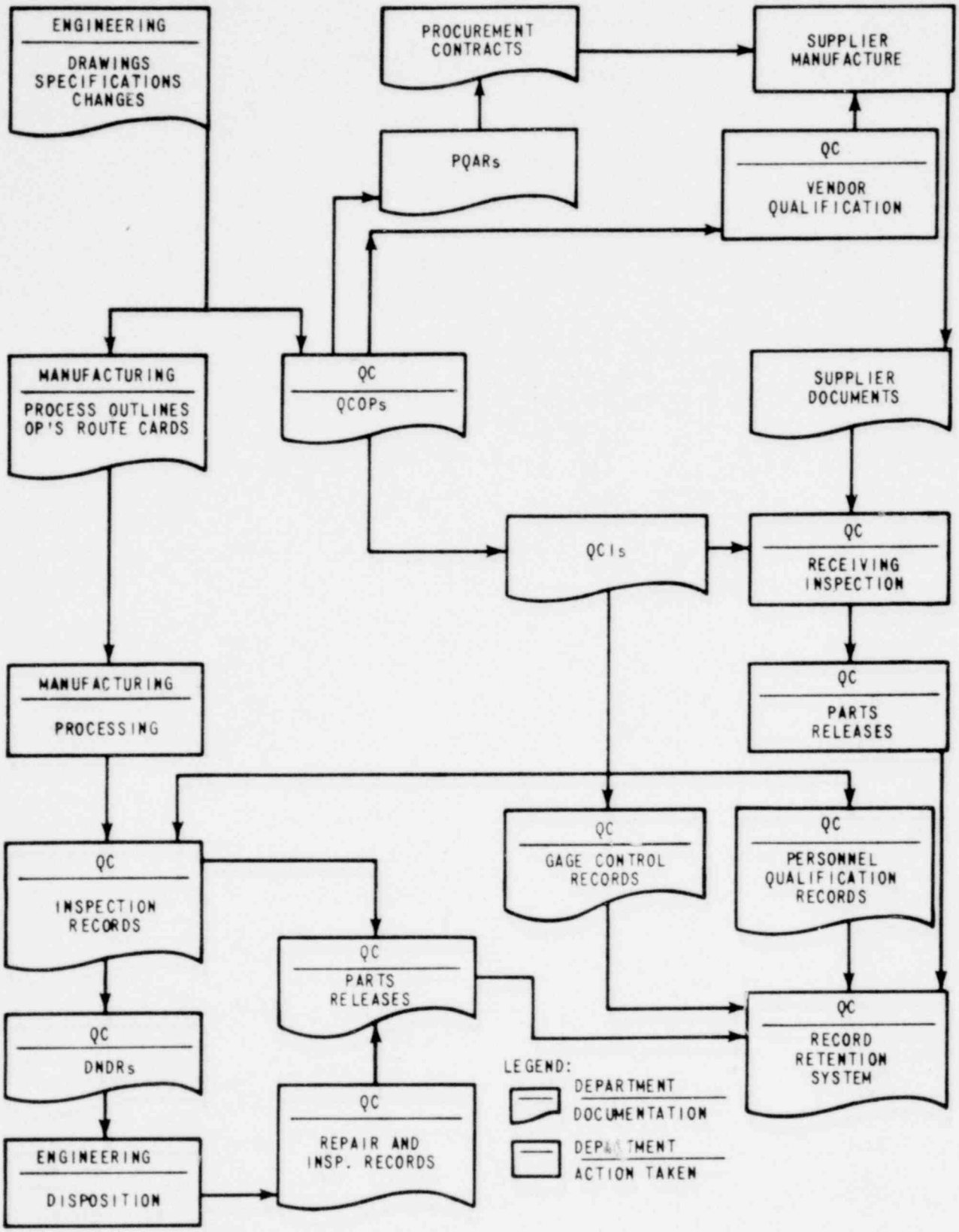


Figure 17-1. Quality-Related Activities and Records

1621 136

SECTION 18

AUDITS

A comprehensive system of planned and documented audits has been developed to assure compliance with the quality assurance program outlined in this document.

Audits of NFD activities are performed by various auditing groups, both internal and external to NFD. The composition of these groups and the specific activities audited vary, depending on audit objectives, as summarized below.

18-1. PRODUCT ASSURANCE DIVISION AUDITS

Audits of NFD quality-assurance-related activities are conducted routinely under an audit program directed by the Product Assurance department. The program is formalized by procedures which prescribe the use of schedules, checklists, and the distribution of audit reports which assure proper management visibility.

The audit program is evaluated on an annual basis and an audit schedule is established to assure coverage of all quality-related departments, areas, and activities together with a followup review by the audit chairman, for status on required corrective actions, within 6 months of each scheduled audit. Appendix II is referenced as an overview of activities and documentation encompassed in audits.

Audits are designed to evaluate the overall effectiveness of, and adherence to, this program plan, as it is supported by clearly defined Division and departmental policies and procedures, and as further implemented in actual work practices, including documentation and records.

At the discretion of Product Assurance, audits of an area or activity may be increased in frequency, on a scheduled or random, unannounced basis, if warranted by such events as the following:

- Audit team need for increased auditing time
- Evidence of questionable control conditions, creating a need for extensive and/or timely corrective actions
- Major changes in personnel or in departmental responsibilities, or significant changes in procedural and work practices

1621 137

Audit teams are chaired by an experienced Product Assurance auditor, with one or more additional auditors from Product Assurance or other departments. Members participate with the chairman in pre-audit indoctrination relative to this program plan, Product Assurance approved audit procedures and checklists, and the procedures and functional roles of the area or activity to be audited.

At the conclusion of each audit, an oral presentation of findings and recommendations is made to the responsible managers of the audited activity. A written report is submitted to these managers, their immediate supervisor, and the Product Assurance manager. The audited activity must respond to the audit report by identifying the corrective actions taken and the schedule for their implementation. Followup reviews are conducted by Product Assurance to assure that corrective actions are adequate and have been implemented.

18-2. PRODUCT ASSURANCE AUDITS OF SUPPLIERS

Product Assurance is responsible for audits of NFD's suppliers. Supplier qualification is based on these audits and on actual performance against purchase order requirements.

Audits are conducted in accordance with procedures contained or referenced in Product Assurance Department manuals and include evaluation of supplier compliance to each of those sections of Appendix B, 10CFR50, pertinent to his activities.

Product Assurance is responsible for reporting the need for supplier corrective actions to Purchasing, who in turn is responsible for directing supplier compliance. Failure to comply is cause for removal or restriction of the supplier's qualification.

18-3. DEPARTMENTAL REVIEWS

Reviews and/or audits of activities by personnel within NFD functional departments are performed to assess the effectiveness and control of operations in their respective departments. The selection of participants and the formal publication of results and corrective actions are at the option of the department.

18-4. NUCLEAR ENERGY SYSTEMS AUDITS

Audits of the various divisions making up Nuclear Energy Systems (NES) are conducted on an annual basis by representatives from the NES Quality Assurance Committee, which comprises Product Assurance, Quality Assurance, and Reliability managers from NES divisions.

These audits are performed by teams drawn from the committee members or their designates on a rotating basis. However, committee members from the division being audited are excluded.

A major objective of these audits is to ensure compliance of each division's quality assurance policies and programs with the intent of 10CFR50, Appendix B. Audit findings are documented and forwarded to the management of the division audited, together with recommendations (where deemed necessary) for improving product quality and/or reliability. Followup reviews are conducted to assess compliance with recommendations.

18-5. WESTINGHOUSE CORPORATE AUDITS

The Westinghouse Corporate Audit Program includes audits of Westinghouse divisions and, when performed, substitutes for the NES Quality Assurance Committee audit. These headquarters-conducted audits provide independent verification that the quality assurance programs of Westinghouse divisions are effective in assuring that product quality complies with customer requirements. In addition, the Corporate group assists divisions in continually improving their quality assurance programs, and provides any required aid in implementing recommended improvements identified in the audits.

Each Corporate audit is documented by a report containing the findings and recommendations. A copy of the report is sent to the Corporate vice president to whom the audited division reports, and to the appropriate headquarters personnel. This assures that the attention of high-level management is directed to actions needed to carry out the recommendations of the audit.

1621 139

APPENDIX I
NFD POLICIES AND PROCEDURES DEMONSTRATING COMPLIANCE TO 10CFR50 APPENDIX B

10CFR50 Appendix B	Quality Assurance Criterion	Typical NFD Policies – Procedures
I	ORGANIZATION – the definition of functional responsibilities, levels of authority, lines of communication, and individuals performing activities affecting quality, safety, and performance.	Quality Assurance Program Plan – Section 2 Product Assurance Manual Quality Control Manual Fuel Projects Manual Engineering Operations Manual Manufacturing Manual
	QUALITY ASSURANCE PROGRAM – all those planned and systematic actions necessary to provide confidence that the structure, system, or component will perform satisfactorily in service and that contain provisions which assure identification and compliance with requirements of pertinent recognized and appropriate codes, standards, requirements, and practices.	Quality Assurance Program Plan – Section 1 Division Policies and Procedures Manual Product Assurance Manual Quality Control Manual Fuel Projects Manual Engineering Operations Manual Manufacturing Manual
III	DESIGN CONTROL – the development, implementation, and documentation of measures which assure that regulatory, SAR, design bases, and related safety code requirements are correctly translated to specifications, designs, procedures, and instructions; and which assure control of deviations from specified quality requirements and standards; and which assure the identification and control of design interfaces and design interface documents; and which assure verification or checking the adequacy of design; and which assure control of design changes including field changes commensurate with control measures applied to the original design.	Quality Assurance Program Plan – Section 3 Fuel Projects Manual Contract and Technical Data Engineering Operations Manual NFD/NTD/NED Engineering Interface NFD Engineering/Manufacturing Interface Safety Analysis Report Formal Design Review Engineering Material Specification Process Specifications Engineering Change Notice Defect Notice Disposition Request

1621 140

APPENDIX I

NFD POLICIES AND PROCEDURES DEMONSTRATING COMPLIANCE TO 10CFR50 APPENDIX B

10CFR50 Appendix B	Quality Assurance Criterion	Typical NFD Policies – Procedures
IV	PROCUREMENT DOCUMENT CONTROL – controls which assure that applicable requirements are included or referenced in procurement documents and provisions made in such documents to reference supplier quality assurance programs, basic technical requirements, source inspections and audits, documentation requirements, and lower-tier procurement control consistent with regulatory requirements.	Quality Assurance Program Plan – Section 4 Quality Control Manual Qualification and Audit of Vendors Surveillance Inspection Procurement QA Requirements Engineering Operations Manual Equipment Specifications Engineering Change Notice Manufacturing Manual Procurement Document Control
V	INSTRUCTIONS, PROCEDURES, AND DRAWINGS – requires that activities affecting quality are to be accomplished in accordance with documented policies, procedures, and drawings that include appropriate acceptance criteria for determining that important activities have been satisfactorily accomplished.	Quality Assurance Program Plan – Section 5 Product Assurance Manual Procedures and Instructions Quality Control Manual Initiation, Revision and Retention of QC Procedures Fuel Projects Manual Contract Quality Assurance Requirements Engineering Operations Manual Design Bill of Material and Key Sheet Product Design Drawings Material Specifications Manufacturing Manual Process Outlines Operating Procedures

1621 141

APPENDIX I

NFD POLICIES AND PROCEDURES DEMONSTRATING COMPLIANCE TO 10CFR50 APPENDIX B

10CFR50 Appendix B	Quality Assurance Criterion	Typical NFD Policies – Procedures
VI	DOCUMENT CONTROL – the development and documentation of measures to assure that the issuance, review, change, release, distribution, and availability of documents is controlled for accuracy and adequacy to regulatory requirements and approved for use by authorized personnel. This includes instructions, procedures, specifications, drawings, or related written or pictorial presentations which represent or support a design or its adequacy.	Quality Assurance Program Plan – Section 6 Product Assurance Manual Document Control Quality Control Manual Initiation, Revision, and Retention of QC Procedures Engineering Operations Manual Equipment Specifications Engineering Drawings Engineering Change Notices Manufacturing Manual Product Drawing Control
VII	CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES – measures that assure and provide documentation that purchased materials, equipment, and services – whether purchased directly or indirectly – conform to requirements in procurement documents. Source evaluation, selection, evidence of quality, inspection and audits, and examination upon delivery are measures to be applied to accomplish this control.	Quality Assurance Program Plan – Section 7 Quality Control Manual Record Retention and Control Receiving Inspection Surveillance Inspection Material Approval and Release Procurement and QA Requirements Manufacturing Manual Procurement Document Control Control and Disposition of Non-Uranium-Bearing Purchased Materials

1621 142

APPENDIX I
NFD POLICIES AND PROCEDURES DEMONSTRATING COMPLIANCE TO 10CFR50 APPENDIX B

10CFR50 Appendix B	Quality Assurance Criterion	Typical NFD Policies – Procedures
VIII	IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS – measures and documentation that provide assurance that physical identification of an item is maintained by heat number, part number, serial number, or other appropriate means either on the item or on records traceable to the item throughout fabrication, erection, installation, and use. These controls are to be designed to prevent the use of incorrect or defective materials, parts, or components.	Quality Assurance Program Plan – Section 8 Quality Control Manual Receiving Inspection Material Approval and Release Parts Identified to Heat Releases Engineering Operations Manual NFD Engineering/Manufacturing Operations Interface Use of Traceability System Material Specifications Material Test Specifications Manufacturing Manual Upgrading Control and Disposition of Non-Uranium-Bearing Purchased Material Route Cards
IX	CONTROL OF SPECIAL PROCESSES – measures and documentation that provide assurance that special processes are accomplished under controlled conditions in accordance with applicable codes, standards, specifications, and the like through use of qualified personnel, procedures, and equipment.	Quality Assurance Program Plan – Section 9 Quality Control Manual Weld Qualification Procedures Radiographic Reading Technique Monitoring Engineering Operations Manual Process Specifications Material Test Specifications Manufacturing Manual Qualification of Manufacturing Processes Process Outlines

APPENDIX I

NFD POLICIES AND PROCEDURES DEMONSTRATING COMPLIANCE TO 10CFR50 APPENDIX B

10CFR50 Appendix B	Quality Assurance Criterion	Typical NFD Policies – Procedures
X	INSPECTION – an inspection program to verify that activities affecting quality, safety, and performance are accomplished in conformance with documented instructions, procedures, drawings, etc., and that design requirements are satisfied.	Quality Assurance Program Plan – Section 10 Quality Control Manual Initiation, Revision, and Retention of QC Procedures Weld Evaluation Procedures Surveillance Inspection Special Inspection Requests Receiving Inspection Qualification and Audit of Vendors Engineering Operations Manual Process Specifications Material Test Specifications
XI	TEST CONTROL – the establishment of a test program to assure that all testing required to demonstrate that the item will perform satisfactorily in service is identified and documented, and that the testing is performed in accordance with written test procedures incorporating the requirements and limits contained in applicable design documents, and that they are appropriately applied and documented.	Quality Assurance Program Plan – Section 11 Quality Control Manual Initiation, Revision, and Retention of QC Procedures Tool and Gage Control Engineering Operations Manual Material Specifications Material Test Specifications Verification Test Procedures

APPENDIX I

NFD POLICIES AND PROCEDURES DEMONSTRATING COMPLIANCE TO 10CFR50 APPENDIX B

10CFR50 Appendix B	Quality Assurance Criterion	Typical NFD Policies -- Procedures
XII	CONTROL OF MEASURING AND TEST EQUIPMENT – the establishment of measures and documentation that provide assurance that tools, gages, instruments, and other measuring and testing devices used to control activities affecting quality, safety, and performance are identified, controlled, calibrated, and adjusted at specified intervals to maintain the accuracy necessary for their application.	Quality Assurance Program Plan – Section 12 Quality Control Manual Tool and Gage Control
XIII	HANDLING, STORAGE AND SHIPPING – documented measures to control all elements of handling, storage, shipping, and preservation of materials and equipment necessary to prevent damage, malfunction, and deterioration of safety-related materials and equipment.	Quality Assurance Program Plan – Sections 7, 13, 15 Product Assurance Manual Field Discrepancy Reporting Quality Control Instructions Engineering Operations Manual Field Discrepancy Reporting Manufacturing Operating Procedures
XIV	INSPECTION, TEST, AND OPERATING STATUS – control measures, marking and documentation that provide assurance that required inspections and tests are performed and that the acceptability of each item to required inspection and tests is known, documented and traceable throughout the manufacturing, installation, and operating cycle.	Quality Assurance Program Plan – Section 14 Quality Control Manual Process Hold by Quality Control Receiving Inspection Quality Control Stamps Material Approval and Release Manufacturing Manual Process Outlines Route Cards

APPENDIX I

NFD POLICIES AND PROCEDURES DEMONSTRATING COMPLIANCE TO 10CFR50 APPENDIX B

10CFR50 Appendix B	Quality Assurance Criterion	Typical NFD Policies – Procedures
XV	NONCONFORMING MATERIAL, PARTS, OR COMPONENTS measures and documentation that identify and control materials, parts, and components which do not conform to requirements to prevent inadvertent installation or use.	Quality Assurance Program Plan – Section 15 Product Assurance Manual Field Discrepancy Reporting Quality Control Manual Removal of Scrapped Material from Production Quality Control Deviation Notice Material Approval and Release Engineering Operations Manual Defect Notice Disposition Request Field Discrepancy Reporting Manufacturing Manual Defect Notice Disposition Request
XVI	CORRECTIVE ACTION – measures and documentation that provide assurance that conditions adverse to quality are promptly identified and corrected. Included are measures to assure that significant conditions adverse to quality, safety, and performance are determined, actions taken to preclude repetition, and documented by appropriate management levels.	Quality Assurance Program Plan – Section 16 Quality Control Manual Receiving Inspection Quality Control Deviation Notice Qualification and Audit of Vendors Engineering Operations Manual Defect Notice Disposition Request Field Discrepancy Reporting Reporting Design and Construction Deficiencies Manufacturing Manual Defect Notice Disposition Request

APPENDIX I

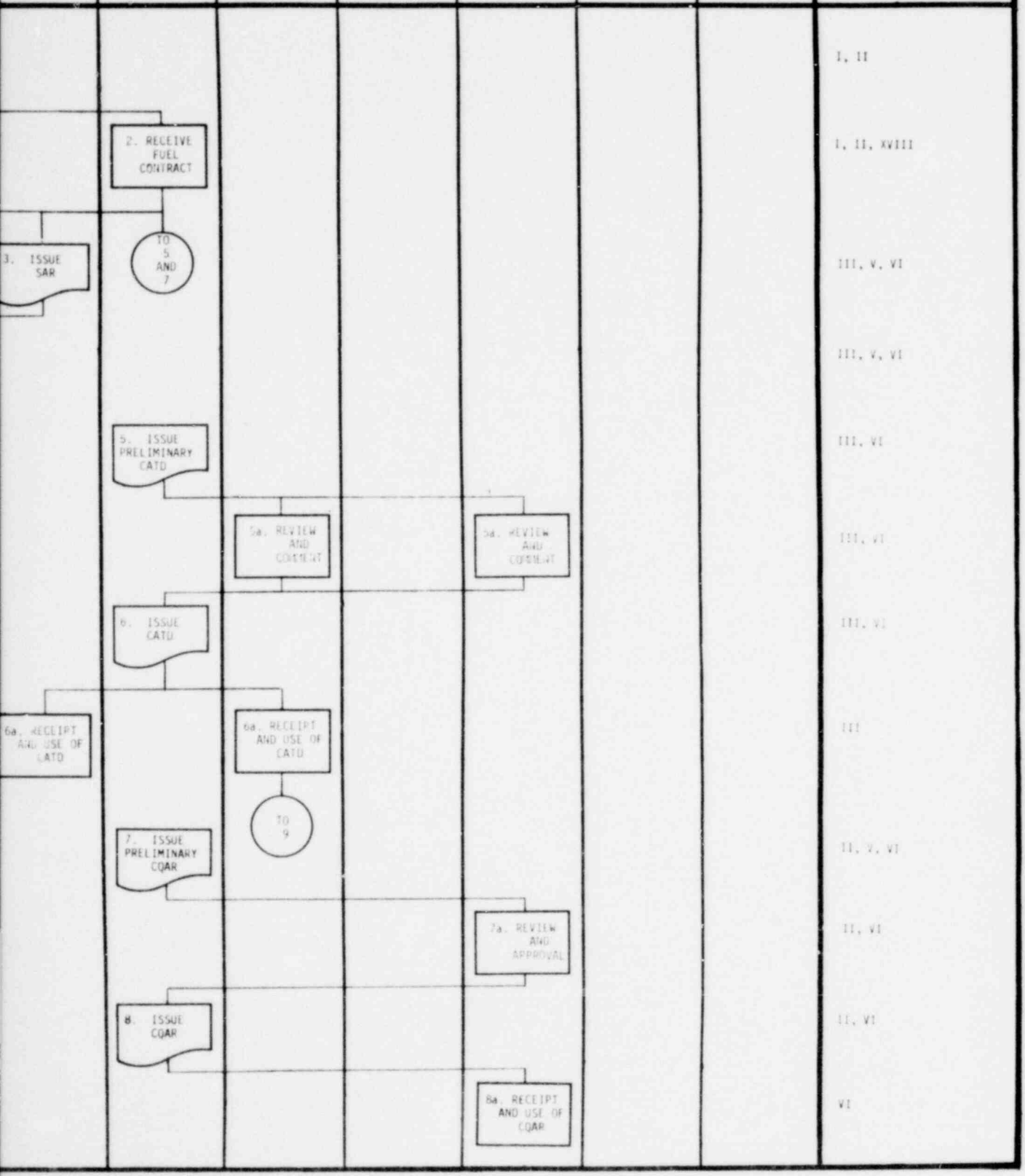
NFD POLICIES AND PROCEDURES DEMONSTRATING COMPLIANCE TO 10CFR50 APPENDIX B

10CFR50 Appendix B	Quality Assurance Criterion	Typical NFD Policies – Procedures
XVII	QUALITY ASSURANCE RECORDS – a records management system that provides assurance that documentary evidence (records) of the quality, safety, and performance of safety related structures, systems, and components and of activities affecting their quality are prepared and maintained as work is performed. These records are to be identifiable and retrievable in accordance with records retention guidelines defining duration of retention, responsibility, and location.	Quality Assurance Program Plan – Section 17 Fuel Projects Manual Project Files Quality Control Manual Record Retention and Control Qualification and Audit of Vendors Material Approval and Release Engineering Operations Manual Production Fuel Archive Program Use of Traceability System Project Summary Files Procedure for Documenting Calculations Preparation and use of the Design Manual Manufacturing Manual Route Cards Bill of Materials
XVIII	AUDITS – a comprehensive, planned, and documented system for assuring verification of compliance with all aspects of the quality assurance program and to establish the effectiveness of that program. Such audits are to be conducted in accordance with procedures and check lists by trained personnel not having direct responsibility for the area indicated, documented and reviewed by responsible management, and followed to assure necessary action.	Quality Assurance Program Plan – Section 18 Product Assurance Manual Internal QA Audits of NFD External QA Audits of NFD Quality Control Manual Qualification and Audit of Vendors

ACTIVITY DESCRIPTION	CUSTOMER	NCOD
1. CUSTOMER: ISSUE CONTRACTS	1. ISSUE CONTRACTS	
2. NCOD, NFD PROJECTS: RECEIVE PLANT AND FUEL CONTRACTS		2. RECEIVE PLANT CONTRACT
3. NTD: ISSUE SAFETY ANALYSIS REPORT WITH INPUT FROM NFD		
4. CUSTOMER: RECEIVE SAR	4. RECEIVE SAR	
5. FUEL PROJECTS: ISSUE PRELIMINARY CONTRACT AND TECHNICAL DATA (CATD)		
5a. ENGINEERING/PRODUCT ASSURANCE: REVIEW AND COMMENT		
6. FUEL PROJECTS: ISSUE CATD		
6a. RECEIPT AND USE OF CATD FOR DESIGN AT PLANT-FUEL INTERFACE		
7. FUEL PROJECTS: ISSUE PRELIMINARY CONTRACT QUALITY ASSURANCE REQUIREMENTS (CQAR)		
7a. PRODUCT ASSURANCE: REVIEW AND APPROVAL		
8. FUEL PROJECTS: ISSUE CQAR		
8a. PRODUCT ASSURANCE: RECEIPT AND USE OF CQAR		

APPENDIX II

TYPICAL INFORMATION FLOW CHART — PAGE 1 OF 4



ACTIVITY DESCRIPTION	CUSTOMER	
9. ENGINEERING: INITIATE FUEL ASSEMBLY DESIGN WITH REVIEW OF CATD, SAR, FUEL PERFORMANCE DATA, ETC.		
10. ENGINEERING: ANALYSIS AND/OR CALCULATIONS FOR NEW DESIGNS		
11. ENGINEERING: PRELIMINARY DESIGN VERIFICATION BY TESTS, DESIGN REVIEW, AND/OR INDEPENDENT REVIEW OF REQUIREMENTS		
12. ENGINEERING: TRANSLATES REQUIREMENTS INTO PRELIMINARY DRAWINGS AND SPECIFICATIONS		
12a. ENGINEERING/MANUFACTURING/PRODUCT ASSURANCE: REVIEW AND COMMENT		
13. ENGINEERING: RESOLVE COMMENTS, PREPARE FINAL DRAWINGS AND SPECIFICATIONS		
13a. ENGINEERING/MANUFACTURING/PRODUCT ASSURANCE: REVIEW AND APPROVE		
14. ENGINEERING: RELEASE DRAWINGS AND SPECIFICATIONS		
14a. MANUFACTURING/PRODUCT ASSURANCE: RECEIVE DRAWINGS AND SPECIFICATIONS FOR MANUFACTURING AND INSPECTION USE		
15. ENGINEERING: ISSUE DESIGN BILL OF MATERIALS/KEY SHEET (DBOM/KS)		
15a. MANUFACTURING/PRODUCT ASSURANCE: RECEIVE AND USE OF DBOM/KS TO IDENTIFY KEY PARAMETERS AND DESIGN DRAWINGS		

APPENDIX II (Cont)

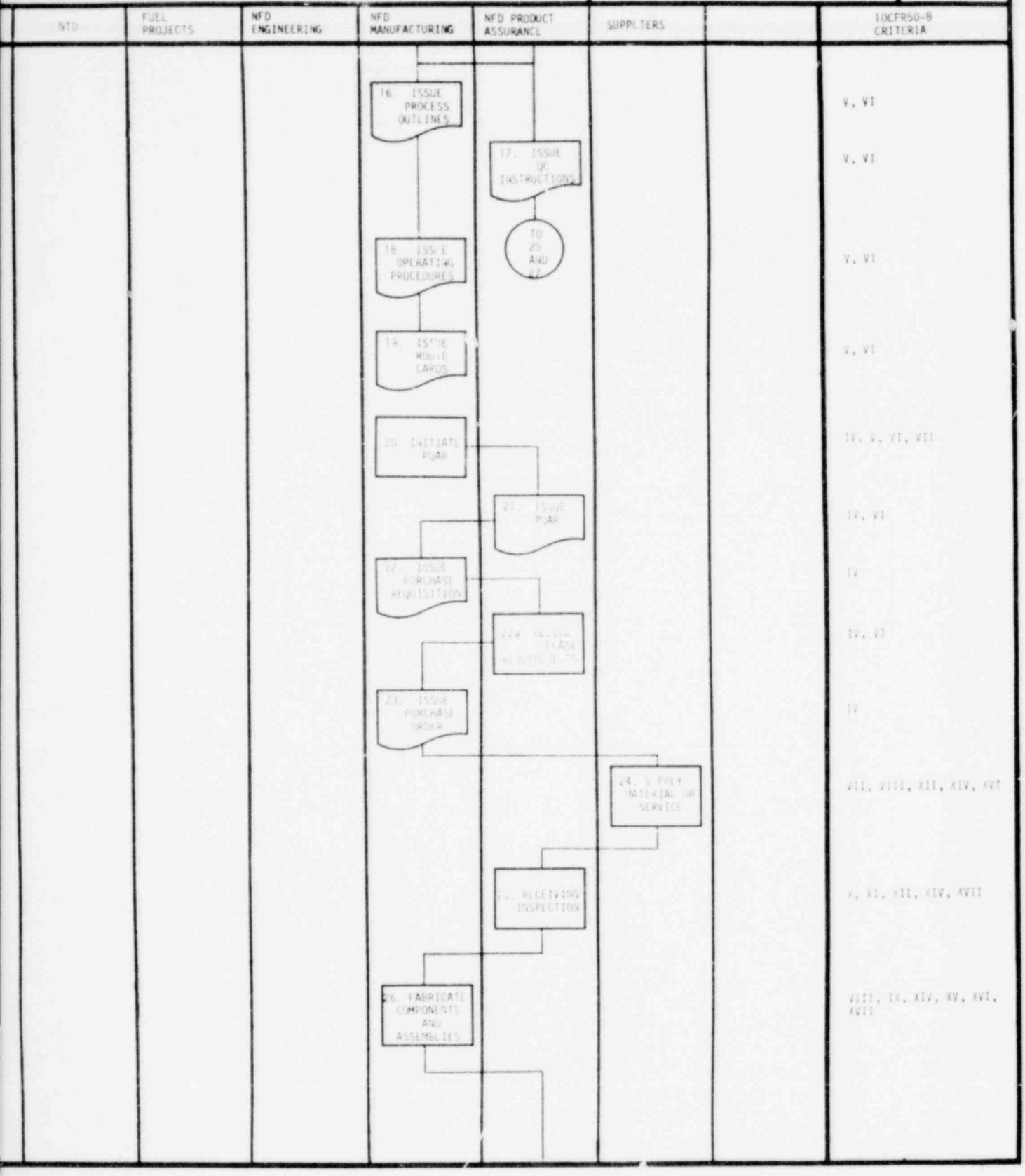
TYPICAL INFORMATION FLOW CHART — PAGE 2 OF 4

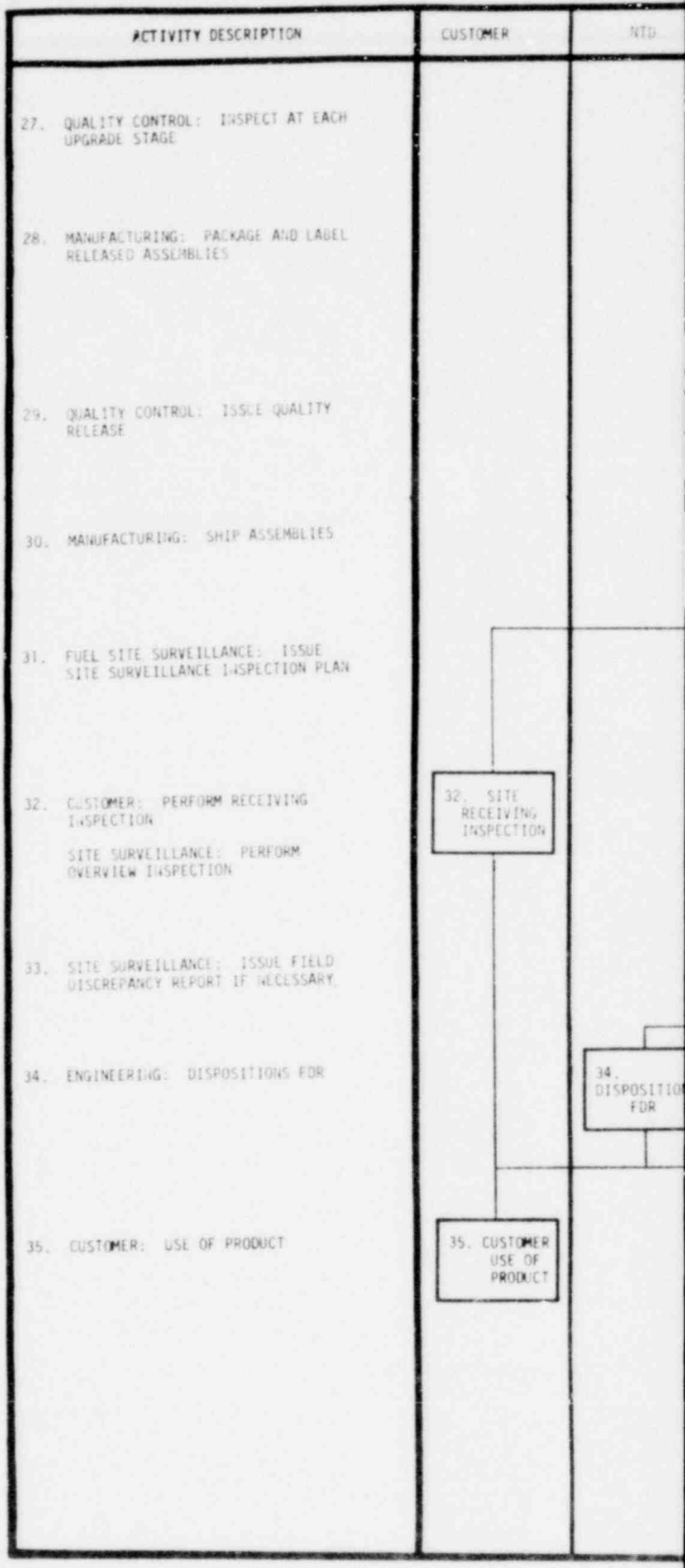
NTD	FUEL PROJECTS	NFD ENGINEERING	NFD MANUFACTURING	NFD PRODUCT ASSURANCE	SUPPLIERS		10CFR50-B CRITERIA
		9. DESIGN INITIALIZATION					III
		10. PRELIMINARY ANALYSIS AND CALCULATIONS					III
		11. VERIFY OR REVIEW DESIGN REQUIREMENTS					III, XI
		12. ISSUE PRELIMINARY DWGS AND SPECS					III
		12a. REVIEW AND COMMENT	12a. REVIEW AND COMMENT	12a. REVIEW AND COMMENT			III, VI
		13. PREPARE FINAL DRAWINGS AND SPECS					III, V, VI
		13a. REVIEW AND APPROVAL	13a. REVIEW AND APPROVAL	13a. REVIEW AND APPROVAL			III, VI
		14. RELEASE DRAWINGS AND SPECIFICATIONS					III, V, VI
			14a. RECEIPT OF DRAWINGS AND SPECIFICATIONS	14a. RECEIPT OF DRAWINGS AND SPECIFICATIONS			III, V, VI
			TO 16	TO 17			
		15. ISSUE DBOM/KS					III, V, VI
			15a. RECEIPT AND USE OF DBOM/KS	15a. RECEIPT AND USE OF DBOM/KS			V, VI

ACTIVITY DESCRIPTION	CUSTOMER
16. MANUFACTURING: WITH INPUT FROM QC ISSUES PROCESS OUTLINES (SEQUENCE OF WORK/INSPECTION STEPS)	
17. QUALITY CONTROL: ISSUES QUALITY CONTROL INSTRUCTIONS (QCI's)	
18. MANUFACTURING: ISSUES OPERATING PROCEDURES	
19. MANUFACTURING: ISSUES ROUTE CARDS	
20. MANUFACTURING: INITIATE PROCUREMENT QUALITY ASSURANCE REQUIREMENTS (PQAR) FOR PURCHASED ITEMS	
21. QUALITY CONTROL: ADDS TECHNICAL REQUIREMENTS AND ISSUES PQAR	
22. MANUFACTURING: ISSUES PURCHASE REQUISITION	
22a. QUALITY CONTROL: REVIEW PURCHASE REQUISITION FOR TECHNICAL CONTENT	
23. MANUFACTURING: ISSUES PURCHASE ORDER TO SUPPLIER	
24. SUPPLIER: FABRICATES OR SUPPLIES MATERIALS OR SERVICES	
25. QUALITY CONTROL: RECEIVING INSPECTION OF MATERIAL DOCUMENTATION	
26. MANUFACTURING: FABRICATE COMPONENTS AND ASSEMBLIES	

APPENDIX II (Cont)

TYPICAL INFORMATION FLOW CHART — PAGE 3 OF 4





APPENDIX II (Cont)

TYPICAL INFORMATION FLOW CHART — PAGE 4 OF 4

FUEL PROJECTS	NFD ENGINEERING	NFD MANUFACTURING	NFD PRODUCT ASSURANCE	SUPPLIERS		10CFR50-B CRITERIA
			27. INSPECT AT EACH UPGRADE STAGE			VII, X, XIV, XV, XVII
		28. PACKAGE AND LABEL				XIII
			29. ISSUE QUALITY RELEASE			XVII
		30. SHIP				XIII
			31. ISSUE SITE PLAN			V, XIII
			32. SITE INSPECTION OVERVIEW			X, XIII
			33. ISSUE FDR			XV, XVI
	34. DISPOSITION FDR					XV, XVI

APPENDIX III

NFD POSITION ON QUALITY-RELATED REGULATORY GUIDES AND ANSI STANDARDS WHICH AFFECT NFD PRODUCTS

Designation

Regulatory Guide	ANSI Standard
1.28 Rev. No. 0	N45.2 – 1971
1.38 Rev. No. 2	N45.2.2 – 1972
1.58 Rev. No. 0	N45.2.6 – 1973
1.74 Rev. No. 0	N45.2.10 – 1973
1.64 Rev. No. 2	N45.2.11 – 1974
	N45.2.12 – 1974 (Draft 3, Rev. No. 4)
1.123 Rev. No. 1	N45.2.13 – 1976
1.88 Rev. No. 2	N45.2.9 – 1974

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.28 REVISION 0 AND ANSI N45.2 QA PROGRAM REQUIREMENTS

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.28 Revision 0 with the following clarifications, alternatives and exceptions:

REG.GUIDE/ANSI STD.PARAGRAPH	REQUIREMENT	NFD POSITION
1. Cleaning (Section 1.2)	"The requirements apply to activities... cleaning...and modifying."	Exception - Cleaning is not considered a special process in our application because the effect can be adequately evaluated without destructive testing or without taking such action as could be detrimental to the product's ability to perform its intended function.

NFD POSITION ON REGULATORY GUIDE 1.38 REVISION 2 AND ANSI N45.2.2 - 1972

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.38 Revision 2 with the following clarifications, alternatives, and exceptions:

REG.GUIDE/ANSI STD.PARAGRAPH	REQUIREMENT	NFD POSITION
1. Color of tapes and vapor barriers (Regulatory Position C2.d and C2.e)	d. Subdivision A.3.5.2(3) - This guideline states that tapes should be brightly colored to preclude their loss into a system. In lieu of this guideline, tapes should be colored to contrast with the materials on which they are used. e. Section A.3.6.2 - This guideline states that the vapor barrier material should be brightly colored to preclude loss within a system. In lieu of this guidline, vapor barrier material should be colored to contrast with the materials on which they are used.	Alternative NFD utilizes tapes, and vapor barriers in packaging processes that contrast with the material being packaged when such packaging materials are commercially available. A variety of colors for these packaging materials is not readily available because of the limited supply of materials which meet other physical and chemical requirements.
2. Qualification of Personnel (Section 2.4)	"Those personnel who perform inspection, examination or testing activities at the job site shall be qualified in accordance with N45.2.6."	Exception The requirements of Section 2.4 are not applicable to NFD.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.38 REVISION 2 AND ANSI N45.2.2 - 1972

(Continued)

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.38 Revision 2 with the following clarifications, alternatives, and exceptions:

REG.GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
3. Housekeeping (Section 2.6)	"In job-site areas, facilities, and environments where packaging, shipping, receiving, storage and handling of items is performed in accordance with the requirements of this standard, the housekeeping requirements shall be in accordance with N45.2.3".	Exception The requirements and recommendations in N45.2.3-1973 apply to the construction site and, therefore, are not applicable to NFD.
4. Sections 2.7 through 4.5	All	Exception Fuel assemblies are shipped as specified in the NRC fuel license and other governing regulations and therefore the sections are not applicable.
5. Receiving (Section 5)	Requirements for receiving contained in Section 5.	Clarification The requirements for receiving at the plant site are outside the scope of NFD activities.
6. Storage (Section 6)	Requirements for storage contained in Section 6.	Clarification The requirements for storage at the plant site as contained in Section 6 are outside of the scope of NFD responsibility.
7. Handling (Section 7)	Requirements for handling contained in Section 7.3, Section 7.4, Section 7.5	Clarification Even though requirements for handling contained in Sections 7.3, 7.4 and 7.5 are outside of NFD scope of responsibility, NFD does provide specifications to the owner at the plant site for handling and storage of fuel assemblies.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.58 REVISION 0 AND ANSI N45.2.6 - 1973

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.58 Revision 0 with the following clarifications, alternatives:

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
1. Applicability of Standard (Section 1.2)	"The requirements apply to the personnel of any organization that participate in the construction phase activities of a nuclear power plant including personnel of the owner, architect-engineers, nuclear power plant system designers and suppliers, plant designers and constructors, equipment suppliers, outside testing agencies, and consultants."	Clarification At NFD, the requirements of this standard apply only to inspection, examination, and testing personnel, and to quality engineers involved in supplier surveillance activities.
2. General Requirements (Section 2.0)	Certificate of Qualification (Section 2.2.4) Item 4, Level of capability.	
Levels of Capability (Section 3.1)	Level I - Section 3.1.1, Level II - Section 3.1.2, and Level III Section 3.1.3.	Alternative Within NFD, the specific level designations for personnel involved in inspection, examination, and testing activities are not used. A combination of position descriptions and pre-determined qualification requirements for a position define the level of capability required to perform the function. These methods are used to identify levels of capability that include the comparable requirements of the levels identified in this standard.

NFD POSITION ON REGULATORY GUIDE 1.74 REVISION 0 AND ANSI N45.2.10 - 1973

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.74 Revision 0.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.64 REVISION 2 AND ANSI N45.2.11 - 1974

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.64 Revision 2 with the following clarifications, alternatives, and exceptions:

REG.GUIDE/ANSI STD.PARAGRAPH	REQUIREMENT	NFD POSITION
1. Supervisory Design Verification (Regulatory Position C2)	"Regardless of their title, individuals performing design verification should not (1) have immediate supervisory responsibility for the individual performing the design..."	Clarification Within NFD, the designer's immediate supervisor may perform design verification in exceptional cases when the supervisor is the only qualified engineer available. When the designer's immediate supervisor performs the design verification, justification is individually documented and approved in advance by the supervisor's management. Additionally, the other provisions of this regulatory guide are satisfied, and during quality assurance audits, the frequency and effectiveness of use of supervisors as design verifiers is reviewed to guard against abuse.
2. Design Input Requirements (Section 3.0)	Requirements, Section 3.2, Item 13 - Electrical Requirements; 17 - Access and Administrative Controls for Plant Security; 20 - Inplant Test Requirements; 21 - Maintenance and Repair Requirements; 22 - Number of personnel Qualifications for Plant Operation; 26 - Other Requirements to Prevent Undue Risk to Health and Safety of the Public; and 28 - Requirements for Preventing Personnel Injury, Radiation Hazards, Escape Procedures, etc.	Exception The requirements of Items 13, 17, 20, 21, 22, 26 and 28 are not applicable to NFD scope of supply.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.64 REVISION 2 AND ANSI N45.2.11 - 1974

(Continued)

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
3. Transmittal of Information Among External Design Interfaces (Section 5.1.3)	"Documents shall identify the positions and titles of key personnel in the communication channels and their responsibilities for decision-making, for resolution of problems, and for taking other action within the scope of this standard."	Clarification The titles, responsibilities and authority of persons involved in the design process are defined in NFD by organization charts, management appointment letters and internal procedures. These documents are available for audit but are not transmitted to external organizations. Various interface agreements are established among the design departments, suppliers, and customers to ensure the proper flow and control of design information among the participants, and are documented by correspondence procedures, memorandums of understanding or contract documents.
4. Documentation of Design Verification (Section 6.1, Paragraph 3)	"Documentation of results shall be auditable against the verification methods identified by the responsible design organization."	Clarification Design verification requirements and methods within NFD are identified in internal procedures. The design verification process is audited against internal procedures and regulatory requirements to assure that appropriate design verification methods are used. These methods of verification, however, are not necessarily specified in advance, since different methods can be used for individual applications.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.64 REVISION 2 AND ANSI N45.2.11 - 1974

(Continued)

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.64 Revision 2 with the following clarifications, alternatives, and exceptions:

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
5. Editorial Changes to Design Documents (Section 7.2)	"However, minor changes to design documents such as inconsequential editorial corrections or changes to commercial terms and conditions, may not require that the revised document receive the same review and approval as the original documents. To avoid a possible omission of a required review, the type of minor changes which do not require such a review and approval and the persons who can authorize such a decision shall be clearly delineated in the document control procedures."	Exception When an editorial or commercial change is made in a design document, the change is approved by responsible personnel. These types of changes do not require any additional review, and since they are not considered part of the design change control process, they are not specifically addressed in design control procedures.

ANSI STANDARD N45.2.12 - 1974 (DRAFT 3, REVISION 4)

NFD POSITION - NFD follows the guidance of ANSI N45.2.12 - 1974 (Draft 3, Revision 4) with the following clarifications, alternatives, and exceptions:

ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
1. Annual Audits (Section 3.4.2)	"Applicable elements of the quality assurance program shall be audited at least annually or once within the life of the activity, whichever is shorter."	Alternative In lieu of conducting annual audits of suppliers, NFD has implemented an alternative audit program which assures that suppliers have established and are maintaining an acceptable quality assurance program.

APPENDIX III

ANSI STANDARD N45.2.12 - 1974 (DRAFT 3, REVISION 4)

(Continued)

NFD POSITION - NFD follows the guidance of ANSI N45.2.12 - 1974 (Draft 3, Revision 4) with the following clarifications, alternatives, and exceptions:

ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
1. Annual Audits (Section 3.4.2.) (Cont)		Each supplier is audited initially to determine the acceptability of their quality assurance program. If acceptable, the supplier is placed on the approved supplier list. In lieu of routinely conducting an annual reaudit, a formal evaluation of the supplier is performed each year to determine if a reaudit is required during the upcoming year. This evaluation includes a review of some or all of the following: prior quality program audits, supplier surveillance activities, nature and frequency of hardware discrepancies, results of audits from other sources (customers, or NRC audits, etc.) when available, significant changes in the supplier's QA program, and the supplier's responsiveness and cooperation in resolving quality questions or problems. As a result of this evaluation, suppliers requiring a complete quality program reaudit are identified. The results of this evaluation are documented and approved by responsible management. Regardless of the results of the evaluation, suppliers will be reaudited every three years.

APPENDIX III

ANSI STANDARD N45.2.12 - 1974 (DRAFT 3, REVISION 4)

(Continued)

NFD POSITION - NFD follows the guidance of ANSI N45.2.12 - 1974 (Draft 3, Revision 4) with the following clarifications, alternatives, and exceptions:

ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
2. Performance of Audit Follow-up (Section 4.5.2)	"Follow-up action shall be performed by the audit team leader of management of the auditing organization..."	Alternative Within NFD, audit follow-up actions may be delegated to an auditor other than the lead auditor. For example, audit follow-up for a supplier audit may be routinely performed by a quality engineer (other than the audit team leader) during product surveillance activities. It should also be recognized that an audit team leader may not be available (e.g. change in assignments, reloaction, etc.) to perform the audit follow-up. In such cases, the manager responsible for the auditing function assigns a qualified auditor to perform the follow-up actions.

NFD POSITION ON REGULATORY GUIDE 1.123, REVISION 1 AND ANSI N45.2.13 - 1976

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.123, Revision 1 with the following clarifications, alternatives:

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
1. Purchaser/Notification Points (Regulatory Position C.6.b)	"Section 6.2 - The guideline concerning purchaser notification points as part of pre- and post-award activities."	Alternative NFD routinely identifies notification points in procurement documents when applicable. Such points are not always identified in pre- and post-award meetings. However, the required notification/hold points are specified

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1. 123, REVISION 1 AND ANSI N45.2.13 - 1976

(Continued)

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.123, Revision 1 with the following clarifications, alternatives:

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
		by changes to the procurement documents in a reasonable time prior to their being accomplished to allow the Purchaser the opportunity to witness the event.
2. Technical Requirements in Procurement Documents (Section 3.2.2)	"Technical requirements shall be specified in the procurement documents by reference to the specific drawings, specifications, codes, regulations, procedures or instructions including revisions thereto that describe the items or services to be furnished."	Alternative Technical requirements may be clarified or amended in a purchase order or change notice and are not always specified "by reference" to other documents. This practice is used to specify unique or changing requirements which have not been routinely incorporated in the documents referenced in the purchase order.
3. Vendor Quality Assurance Program Requirements (Section 3.2.3)	"Procurement documents shall require that the supplier have a documented quality assurance program that implements portions or all of ANSI N45.2 as well as applicable quality assurance program requirements of other nationally recognized codes and standards."	Clarification Suppliers of parts or services that become a part of the fuel assemblies and core components have the required quality assurance programs. Other parts and services are controlled by one or more of the following: receiving inspection, surveillance inspection, or material overcheck to predetermined frequencies.
4. QA Review of Procurement Documents (Section 3.3)	Bid Solicitation "A review of the procurement documents shall be made to assure that documents transmitted to the prospective suppliers for bid... purposes include appropriate provisions to assure items or services meet the specified requirement."	Alternative The bid solicitation process is primarily considered a commercial function and, as such, is not subject to regulatory requirements in the same manner as a contract award. The NFD alternative for implementing the requirements of this section of ANSI N45.2.13 is described below for bid (request for quotation) and contract award activities.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.123, REVISION 1 AND ANSI N 45.2.13 - 1976

(Continued)

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.123, Revision 1 with the following clarifications, alternatives:

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
5. QA Review of Procurement Documents (Section 3.3) (Continued)		a. Bid Solicitation - A request for quotation is prepared by cognizant purchasing personnel to solicit quotations. This request for quotation contains sufficient technical and quality assurance information to allow the supplier to bid.
	Contract Award a. "Such reviews shall be performed prior to release for...contract award and shall assure that the documents are complete and contain the applicable requirements specified in Section 3.2".	Clarification Within NFD a contract award is initiated by the preparation of a purchase requisition and subsequent issue of a purchase order. At NFD manufacturing facilities quality engineers review and approve the purchase order. The purchase order is then issued to the supplier.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.88 REVISION 2 AND ANSI N45.2.9 - 1974

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.88 Revision 2 with the following clarifications, and alternatives:

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
1. Definition of a Quality Assurance Record (Section 1.4)	"Quality Assurance Records - Those records which furnish documentary evidence of the quality of items and of activities affecting quality. For the purposes of this standard, a document is considered a quality assurance record when the document has been completed."	Alternative At the NFD manufacturing facility, a document is considered a quality assurance record and thus requires protection at the time of product shipment. At NFD, the various engineering design and analysis records and related inputs and output documents are provided long-term protection of duplicate copies which are stored at two geographically separate locations. During the period from receipt or generation of the record until it is incorporated in the long-term protection system, these documents are afforded protection by normal office procedures, and duplicate copies of completed records (signed and issued for use) are maintained in different locations in the same building. Records lost during this period will be reconstructed.
2. Completion of Quality Assurance Records (Section 3.2.1)	"All such quality records shall be legible completely filled out and adequately identified to the item involved. "	Alternative NFD procedures identify requirements and provide guidance for completing quality assurance records. These procedures require that applicable portions of these records be completed. It should be recognized that in all cases it is not appropriate to "completely fill out" all records, particularly for those records completed on pre-printed forms.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.88 REVISION 2 AND ANSI N45.2.9 - 1974
(Continued)

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.88 Revision 2 with the following clarifications, alternatives, and exceptions:

REG.GUIDE/ANSI STD.PARAGRAPH	REQUIREMENT	NFD POSITION
3. Indexing of Quality Assurance Records (Section 3.2.2)	"The quality assurance records shall be listed in an index."	Clarification NFD maintains more than one index for quality assurance records to provide necessary access and retrievability. This practice is utilized as an alternative to a single index for all quality assurance records.
4. Receipt Control (Section 4.3)	"As a minimum, a receipt control system shall include: 2. A record of quality assurance records received."	Alternative NFD maintains receipt control systems to fit local needs and requirements. Systems are defined in procedures which identify the types of records to be processed. Files are established in accordance with these procedures establishing a separate file location for each category of record. When a record is received or generated, it is then filed in its pre-assigned location. The large volume of records and the diverse nature of the activities being performed practically preclude keeping a running inventory of each record received into in-process/working files. The presence of the document itself serves as the record of what has been received. When action is completed for a particular activity or component, the in-process information is checked to assure that all appropriate records are available.
Storage (Section 5.3)	6. A method of verifying that the records agree with the pre-established records check list.	

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.88 REVISION 2 AND ANSI N45.2.9 - 1974

(Continued)

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.88 Revision 2 with the following clarifications, alternatives, and exceptions:

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
5. Permanent Storage Facility (Section 5.6)	"Where a single records storage facility is maintained, at least the following features should be contained in its construction:	Alternative NFD utilizes the Westinghouse Records Center in Boyers, Pa, as a permanent records storage facility for inactive records which are not stored in duplicate. This facility is located in an underground limestone mine that is no longer being worked and is approximately 200 feet beneath the surface. Entry is made down a gradual graded hard surface roadway to a 24-hour guarded steel gate. This records storage facility provides an alternative to the construction criteria for a permanent records storage facility (as described below) which adequately protects records from possible destruction.
	1) Reinforced concrete, concrete block, masonry, or equal construction.	Clarification The walls which constitute the perimeter of this storage facility are limestone ribs, 15-20 feet thick with eight inch heavy duty concrete blocks constructed between the ribs from floor to ceiling. There are no doors or other openings in this perimeter to permit access to non-Westinghouse sections of the storage facility.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.88 REVISION 2 AND ANSI N45.2.9 - 1974

(Continued)

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.88 Revision 2 with the following clarifications, alternatives, and exceptions:

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
	2) Concrete floor and roof with sufficient slope for drainage; if a floor drain is provided, a check valve (or equal) shall be provided.	Alternative The limestone mine approximately 200 feet below ground level is impervious to water and is 38 feet above the water table. Additionally, the entrance to the Records Center is located approximately 5 miles away and 100 feet above the nearest stream. Floor and roof drains are not necessary
	3) Structures, doors, frames, and hardware should be Class A fire-rated with a recommended four-hour minimum rating.	Clarification All doors, frames, and hardware are constructed of non-flammable materials such as steel or brass.
	4) Sealant applied over walls as a moisture or condensation barrier.	Clarification Aluminum enamel paint is applied to the walls and ceiling as a sealant.
	5) Surface sealant on floor providing a hardwear surface to minimize concrete dusting.	Clarification Floors in the storage area are constructed of either asphalt or concrete over four feet of limestone. The asphalt floors are coated with a sealant. Concrete floors are coated with a hard-wearing deck enamel.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.88 REVISION 2 AND ANSI N45.2.9 - 1974

(Continued)

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.88 Revision 2 with the following clarifications, alternatives, and exceptions:

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
	6) Foundation sealant and provisions for drainage.	Clarification The foundation consists of a four-foot thick limestone base covered with concrete or asphalt acting as the foundation sealant. Because of the underground location and the fact that limestone is impervious to water, no foundation draining is necessary.
	7) Forced-air circulation with filter system.	Clarification A natural draft of air flows through the mine and passes through forced-air circulation fans when entering and exiting the storage areas. This air is also filtered as it enters the storage facility. This system assures adequate air circulation through the storage areas.
	8) Adequate fire protection system.	Clarification A series of smoke detectors are located at strategic locations throughout the storage facility which would alert the fire crew at the first sign of a fire. A volunteer fire crew with equipment is located at the storage facility. Additionally, fire extinguishers are located throughout the storage areas. A guard makes a tour inside the area every four hours during non-working hours. A volunteer fire department, in a neighboring town, is located within 1-1/2 miles of the mine entrance.

APPENDIX III

NFD POSITION ON REGULATORY GUIDE 1.88 REVISION 2 AND ANSI N45.2.9 - 1974

(Continued)

NFD POSITION - NFD follows the Regulatory Position provided by the NRC in Regulatory Guide 1.88 Revision 2 with the following clarifications, alternatives, and exceptions:

REG. GUIDE/ANSI STD. PARAGRAPH	REQUIREMENT	NFD POSITION
	9) No pipes other than those providing fire protection to the storage facility are to be located within the facility."	Alternative A single water line is located within the storage facility to provide service water for sanitation and kitchen facilities. This line is equipped with shut-off valves both inside and outside the storage area. A drainage line is also located in the storage area to remove the discharge.
7. Accumulating and Transfer of Records (Section 7.2)	"Quality Assurance records accumulated at various locations prior to final transfer to Owner..."	Alternative NFD stores and maintains quality assurance records related to Owners fuel and core components.
8. Appendix A.3 Manufacturing Records	Radiographic review forms and Radiographs.	Exception Within NFD Radiographs of fuel rod welds are not retained as quality records. Results are recorded on radiographic review forms which are retained.

ADDENDUM I
10CFR50 APPENDIX B

10CFR50 "Licensing of Production and Utilization Facilities"

Appendix B – Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants

[Appendix B as added June 17, 1970, effective July 27, 1970 (35FR10498) and amended September 11, 1971, effective October 11, 1971 (36FR18301), and amended January 20, 1975, effective February 19, 1975 (40FR3210D)]

INTRODUCTION

Every applicant for a construction permit is required by the provisions of Section 50.34 to include in its preliminary safety analysis report a description of the quality assurance program to be applied to the design, fabrication, construction, and testing of the structures, systems, and components of the facility. Every applicant for an operating license is required to include, in its final safety analysis report, information pertaining to the managerial and administrative controls to be used to assure safe operation. Nuclear power plants and fuel reprocessing plants include structures, systems, and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. This appendix establishes quality assurance requirements for the design, construction, and operation of those structures, systems, and components. The pertinent requirements of this appendix apply to all activities affecting the safety-related functions of those structures, systems, and components; these activities include designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, and modifying.

As used in this appendix, "quality assurance" comprises all those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service. Quality assurance includes quality control, which comprises those quality assurance actions related to the physical characteristics of a material, structure, component, or system which provide a means to control the quality of the material, structure, component, or system to predetermined requirements.

I. ORGANIZATION

The applicant[1] shall be responsible for the establishment and execution of the quality assurance program. The applicant may delegate to others, such as contractors, agents,

1 While the term "applicant" is used in these criteria, the requirements are, of course, applicable after such a person has received a license to construct and operate a nuclear power plant or a fuel reprocessing plant. These criteria will also be used for guidance in evaluating the adequacy of quality assurance programs in use by holders of construction permits and operating licenses.

or consultants, the work of establishing and executing the quality assurance program, or any part thereof, but shall retain responsibility therefor. The authority and duties of persons and organizations performing activities affecting the safety-related functions of structures, systems, and components shall be clearly established and delineated in writing. These activities include both the performing functions of attaining quality objectives and the quality assurance functions. The quality assurance functions are those of (a) assuring that an appropriate quality assurance program is established and effectively executed and (b) verifying, such as by checking, auditing, and inspection, that activities affecting the safety-related functions have been correctly performed. The persons and organizations performing quality assurance functions shall have sufficient authority and organizational freedom to identify quality problems; to initiate, recommend, or provide solutions; and to verify implementation of solutions. Such persons and organizations performing quality assurance functions shall report to a management level such that this required authority and organizational freedom, including sufficient independence from cost and schedule when opposed to safety considerations, are provided. Because of the many variables involved, such as the number of personnel, the type of activity being performed, and the location or locations where activities are performed, the organizational structure for executing the quality assurance program may take various forms provided that the persons and organizations assigned the quality assurance functions have this required authority and organizational freedom. Irrespective of the organizational structure, the individual(s) assigned the responsibility for assuring effective execution of any portion of the quality assurance program at any location where activities subject to this Appendix are being performed shall have direct access to such levels of management as may be necessary to perform this function.

II. QUALITY ASSURANCE PROGRAM

The applicant shall establish at the earliest practicable time, consistent with the schedule for accomplishing the activities, a quality assurance program which complies with the requirements of this appendix. This program shall be documented by written policies, procedures, or instructions and shall be carried out throughout plant life in accordance with those policies, procedures, or instructions. The applicant shall identify the structures, systems, and components to be covered by the quality assurance program and the major organizations participating in the program, together with the designated functions of these organizations. The quality assurance program shall provide control over activities affecting the quality of the identified structures, systems, and components, to an extent consistent with their importance to safety. Activities affecting quality shall be accomplished under suitably controlled conditions. Controlled conditions include the use of appropriate equipment; suitable environmental conditions for accomplishing the activity, such as adequate cleanness; and assurance that all prerequisites for the given activity have been satisfied. The program shall take into

account the need for special controls, processes, test equipment, tools, and skills to attain the required quality, and the need for verification of quality by inspection and test. The program shall provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained. The applicant shall regularly review the status and adequacy of the quality assurance program. Management of other organizations participating in the quality assurance program shall regularly review the status and adequacy of that part of the quality assurance program which they are executing.

III. DESIGN CONTROL

Measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in Section 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. Measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety related functions of the structures, systems, and components.

Measures shall be established for the identification and control of design interfaces and for coordination among participating design organizations. These measures shall include the establishment of procedures among participating design organizations for the review, approval, release, distribution, and revision of documents involving design interfaces.

The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. The verifying or checking process shall be performed by individuals or groups other than those who performed the original design, but who may be from the same organization. Where a test program is used to verify the adequacy of a specific design feature in lieu of other verifying or checking processes, it shall include suitable qualification testing of a prototype unit under the most adverse design conditions. Design control measures shall be applied to items such as the following: reactor physics, stress, thermal, hydraulic, and accident analyses; compatibility of materials; accessibility for inservice inspection, maintenance, and repair; and delineation of acceptance criteria for inspections and tests.

Design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design and be approved by the organization that performed the original design unless the applicant designates another responsible organization.

IV. PROCUREMENT DOCUMENT CONTROL

Measures shall be established to assure that applicable regulatory requirements, design bases, and other requirements which are necessary to assure adequate quality are suitably included or referenced in the documents for procurement of material, equipment, and services, whether purchased by the applicant or by its contractors or subcontractors. To the extent necessary, procurement documents shall require contractors or subcontractors to provide a quality assurance program consistent with the pertinent provisions of this appendix.

V. INSTRUCTIONS, PROCEDURES, AND DRAWINGS

Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

VI. DOCUMENT CONTROL

Measures shall be established to control the issuance of documents, such as instructions, procedures, and drawings, including changes thereto, which prescribe all activities affecting quality. These measures shall assure that documents, including changes, are reviewed for adequacy and approved for release by authorized personnel and are distributed to and used at the location where the prescribed activity is performed. Changes to documents shall be reviewed and approved by the same organizations that performed the original review and approval unless the applicant designates another responsible organization.

VII. CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

Measures shall be established to assure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures shall include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, and examination of products upon delivery. Documentary evidence that material and equipment conform to the procurement requirements shall be available at the nuclear power plant or fuel reprocessing plant site prior to installation or use of such material and equipment. This documentary evidence shall be retained at the nuclear power plant or fuel reprocessing plant site and shall be sufficient to identify

the specific requirements, such as codes, standards, or specifications, met by the purchased material and equipment. The effectiveness of the control of quality by contractors and subcontractors shall be assessed by the applicant or designee at intervals consistent with the importance, complexity, and quantity of the product or services.

VIII. IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS

Measures shall be established for the identification and control of materials, parts, and components, including partially fabricated assemblies. These measures shall assure that identification of the item is maintained by heat number, part number, serial number, or other appropriate means, either on the item or on records traceable to the item, as required throughout fabrication, erection, installation, and use of the item. These identification and control measures shall be designed to prevent the use of incorrect or defective material, parts, and components.

IX. CONTROL OF SPECIAL PROCESSES

Measures shall be established to assure that special processes, including welding, heat treating, and nondestructive testing, are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

X. INSPECTION

A program for inspection of activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity. Such inspection shall be performed by individuals other than those who performed the activity being inspected. Examinations, measurements, or tests of material or products processed shall be performed for each work operation where necessary to assure quality. If inspection of processed material or products is impossible or disadvantageous, indirect control by monitoring processing methods, equipment, and personnel shall be provided. Both inspection and process monitoring shall be provided when control is inadequate without both. If mandatory inspection hold points, which require witnessing or inspecting by the applicant's designated representative and beyond which work shall not proceed without the consent of its designated representative are required, the specific hold points shall be indicated in appropriate documents.

XI. TEST CONTROL

A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. The test program shall include, as appropriate, proof tests prior to installation, preoperational tests, and operational tests during nuclear power plant or fuel reprocessing plant operation, of structures, systems, and components. Test procedures shall include provisions for assuring that all prerequisites for the given test have been met, that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions. Test results shall be documented and evaluated to assure that test requirements have been satisfied.

XII. CONTROL OF MEASURING AND TEST EQUIPMENT

Measures shall be established to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits.

XIII. HANDLING, STORAGE AND SHIPPING

Measures shall be established to control the handling, storage, shipping, cleaning, and preservation of material and equipment in accordance with work and inspection instructions to prevent damage or deterioration. When necessary for particular products, special protective environments, such as inert gas atmosphere, specific moisture content levels, and temperature levels, shall be specified and provided.

XIV. INSPECTION, TEST, AND OPERATING STATUS

Measures shall be established to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspections and tests performed upon individual items of the nuclear power plant or fuel reprocessing plant. These measures shall provide for the identification of items which have satisfactorily passed required inspections and tests, where necessary to preclude inadvertent bypassing of such inspections and tests. Measures shall also be established for indicating the operating status of structures, systems, and components of the nuclear power plant or fuel reprocessing plant such as by tagging valves and switches, to prevent inadvertent operation.

XV. NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

Measures shall be established to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation. These measures shall include, as appropriate, procedures for identification, documentation, segregation, disposition, and notification to affected organizations. Nonconforming items shall be reviewed and accepted, rejected, repaired, or reworked in accordance with documented procedures.

XVI. CORRECTIVE ACTION

Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

XVII. QUALITY ASSURANCE RECORDS

Sufficient records shall be maintained to furnish evidence of activities affecting quality. The records shall include at least the following: Operating logs and the results of reviews, inspections, tests, audits, monitoring of work performance, and materials analyses. The records shall also include closely related data such as qualifications of personnel, procedures, and equipment. Inspection and test records shall, as a minimum, identify the inspector or data recorder, the type of observation, the results, the acceptability, and the action taken in connection with any deficiencies noted. Records shall be identifiable and retrievable. Consistent with applicable regulatory requirements, the applicant shall establish requirements concerning record retention, such as duration, location, and assigned responsibility.

XVIII. AUDITS

A comprehensive system of planned and periodic audits shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program. The audits shall be performed in accordance with the written procedures or check lists by appropriately trained personnel not having direct responsibilities in the areas being audited. Audit results shall be documented and reviewed by management having responsibility in the area audited. Followup action, including reaudit of deficient areas, shall be taken where indicated.