STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Rhode Island Atomic Energy Commission
NUCLEAR SCIENCE CENTER
South Ferry Road
Narragansett, R. I. 02882

# QUALITY ASSURANCE MANUAL

## I. Organization

The RINSC Quality Assurance Program shall be carried out under the direction of the Director, Assistant Director, Radiological Protection Officer and Reactor Facility Engineer. These supervisors shall provide for control of all activities under their jurisdiction affecting the safety-related functions of structures, systems and components of the reactor and also of irradiation and experiments which utilize the reactor. Table A presents the distribution of responsibilities.

Activities under the jurisdiction of each supervisor shall be as specified in the job descriptions of each individual and as directed by the RIAEC. The qualifications of each supervisor are as stated in the section of the job description entitled "Qualifications and Experience." (See enclosed "Organizational Chart" and "Job Descriptions").

The overall authority and responsibility for the Q.A. Program shall be the Director. The Director is responsible for establishing the policies, goals, and objectives of the Q.A. Program.

All differences of opinion between the Q.A./Q.C. Personnel and other personnel shall be resolved by the Assistant Director, or Director who have the ultimate decision making powers. In order to assure a high degree of confidence that a structure, system, component or service is satisfactory, the RINSC supervisors will provide for inspections and/or tests by themselves or others. The RINSC supervisors have the responsibility and authority to stop any unsatisfactory work, installation of non-conforming materials or processes, and other quality control activities. Individuals who disagree with the resolution of differences may present their disagreement to the RIAEC or Reactor Utilization Committee for action.

By-passing of inspections, tests, and other critical operations required by the Q.A. Program is permitted provided that no license, federal or state rule, or formal agreement is violated. However, such by-passing must have the approval of the supervisor under whose jurisdiction the feature falls and the approval of the Director or Assistant Director.

## II. Quality Assurance Program

The Quality Assurance Program includes those design, construction, maintenance, and operational activities which affect the structures, systems and components for which specifications are established in the technical specifications, operating procedures, emergency procedures, and licenses of the RINSC and shall include those activities which affect the ability of such a structure or component to perform its function safely.

These activities include, but are not limited to, designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling and modifying. Where appropriate, these activities are carried out according to written procedures, instructions and drawings.

Where existing operating procedures and emergency procedures are followed, they shall continue to be carried out under the license.

The Q.A. Program shall be operated in the following fashion:

(1) The appropriate supervisor initiating a Q.A. activity shall obtain a "package" of Q.A. Form QA/QC-1 thru 11 and shall determine what the necessary steps to follow shall be and what forms apply to the activity or activities. QA/QC-1 and 2 shall be completed in all reports as a minimum requirement.

(2) Prior to issuing the work to the subordinates, a "work permit" (Form QA/QC-6) shall be prepared. The "work permit" acts as a review of the work to be carried out. Enclosed with the work permit shall be all necessary "training," instructions, specifications, drawings, etc. and the signature of another supervisor familiar with the work. Work permits shall be issued to those personnel who are trained and qualified in the techniques of the activity being performed, before the work is performed.

(3) The supervisors monitoring the activities (at least 2) shall be responsible for completing the Q.A. forms in accordance with the other sections of this program. Upon satisfactory completion of the activity or job, the entire Q.A. package is returned to the Reactor Facility Engineer who is in charge of the program files.

## III. Q. A. Activity Training

Personnel responsible for performing quality-affecting activities are instructed as to the purpose, scope, and implementation of the quality-related manual, instructions, and procedures. Personnel performing quality-affecting activities are trained and qualified in the principles and techniques of the activity being performed.

The supervisor shall "test" the trainee in a suitable fashion, document the results and attach to the work permit the "Q.A. Activity Training Sheet," (Form QA/QC-8). Proficiency of personnel performing quality-affecting activities is maintained by retraining, reexamining, and/or recertifying.

IV. Program Scope

The structures, systems, and components within the scope of the program include, but are not limited to, the following:

(1) Reactor core, bridge, pool, dry gamma room, thermal shield and thermal column.

(2) Shim blades, regulating rod, and their drive and indicator mechanism and detector systems.

(3) The reactor building and its penetrations.

(4) Control system and its components.

(5) Ventilation systems and components.

39 (6) Effluent and area monitoring systems and components.

(7) Emergency generator, evacuation system, burglar systems, fire control systems and their components.

(8) Reactor fuel, reflectors, baskets, storage racks and fuel safe.

(9) Reactor handling tools, experimental tubes and devices and gas storage.

(10) Irradiational facilities, start-up experiments, calibration of control blades, critical experiments.

(11) Sources, monitoring instruments and dosimetry devices.

(12) Primary and Secondary cooling systems and components.

(13) Water treatment systems and components.

(14) Effluent storage tanks, pumps and piping systems.

(15) Overhead crane system.

(16) Refueling and power distribution factors.

(17) Approvals of irradiations and experiments which utilize the reactor.

(18) All records pertaining to operating procedures and technical specifications.

(19) Reactor spare parts and components.

(20) Quality Assurance Program.

(21) Shipment of spent fuel to reprocessing.

18 V. Design Control and Reveiw

The Director shall provide for a design review by the appropriate supervisors of the staff, RUC or RIAEC for any modifications of or additions to those structures, systems, components or documents within the scope of the Q.A. Program as necessary. The reviews are perfomed by individuals or groups other than those who perfomed
19 the original design. In all instances, the review assures that the design is correctly described in the approval or license application and that the contents of safety analyses are correct. Design reviews cover such items as reactor physics, thermal and hydraulic stress, accident analyses, compatibility of materials, and design interfaces and delineation of acceptance criteria for inspection and tests. The review assures that the design is adequate and complies with all applicable regulatory requirements as specified in the license or other approved application and that the design is translated correctly
20 into specifications, drawings, procedures and instructions. Changes to documents are reviewed like original documents.

Documentation for the design verification reviews is provided in the form of approval applications containing the signature of at least two individuals who are familiar with the safety-related functions of the affected structures, systems, components, etc. The approval application may be made in the form of an internal document (memo), a request to the RUC or an application to the NRC for an amendment to the Technical Specifications.

A Q.A. review shall assess the scope, status, implemtation and effectiveness of the Q.A. Program to assure that it is adequate and complies with 10CFR Part 71 and other applicable codes and regulations.

Assurance that an approved design is correctly translated into specifications, installation procedures, testing and operating instructions is to be accomplished by requiring that all such documents which fall within the Q.A. Program be checked by a knowledgeable individual other than the one who prepared the document and that they shall be signed or initialed by both. The use of the Q.A. design form, QA/QC-3, and/or review form, QA/QC-7, shall be used as Q.A. documents and shall be maintained on file with the Q.A. documents.

## VI. Procurement Document Control

15 In documents for procurement of materials, equipment and services, assurance that applicable regulatory requirements, design bases and other requirements such as material and component identification requirements, codes and industrial standards which are necessary to assure adequate quality are suitably included in such documents shall
11,13 be accomplished by requiring that the appropriate supervisor and either the Assistant Director or Director both review and approve the specifications, drawings, processes, instructions or other documents which
12 form part of the purchase order or contracts subject to the Q.A. Program.

The Director or Assistant Director shall specify which quality requirements are necessary, which are inspectable and controllable and what the acceptance and rejection criteria shall be and that the document has been prepared, reviewed and approved in accordance with the Q.A. Program.

A list of qualified vendors for materials supplied in the past shall be a part of the procurement process. An original vendor who has provided satisfactory equipment, components or services are qualified to provide direct replacements without providing extensive Q.A. documentation. That is, direct orders may be placed directly to them for replacement parts with only a supervisors review and a purchase requisition signed by the Assistant Director or Director.

Other purchases under the Q.A. Program must comply with the requirements of a properly completed "Procurement" sheet (QA/QC-S) being reviewed prior to placing the purchase order. A copy of the procurement sheet shall be attached to the purchase requisition.

Non qualified vendors must submit Q.A. documents as cited in the purchase specifications prior to actual award of the order or contract.

A copy of the purchase order, procurement sheet and attached specifications, drawings, procedures, etc. shall be maintained in the secretary files and also the Q.A. files. The original procurement shall become part of the original Q.A. report package.

## VII. Instructions, Procedures and Drawings

Activities affecting Quality Assurance shall be prescribed where appropriate, by documented instructions, procedures or drawings..

For modifications or additions to structures, systems or components within the scope of the program, such documents shall be prepared, approved as per Section V (Design Control and Review) and retained on file.

All copies of standards, tests, inspection requirements, regulatory requirements and special processes and instructions shall be also maintained on file.

## VIII. Document Control

Documents relating to a particular type of activity are, in general, prepared under the direction of the supervisor having responsibility for that activity. That supervisor is delegated the responsibility for maintaining a file on such documents, revising them to reflect approved changes and as built conditions, and clearly identifying all drafts, the document as originally approved and all revisions. Approved
22 changes in Q.A. documents shall be included in all instructions, procedures, drawings, etc. before the Q.A. activity is carried out. Distribution of documents is subject to the approval of each supervisor. The proper Q.A. report or document(s) shall be made available at the location of the Q.A. activity prior to its commencement.

Changes to documents shall be reviewed and approved by the group that performed the original review and approval, if possible, unless the Director or Assistant Director specifically designates another responsible group or organization.

The Reactor Facility Engineer shall maintain a master list with the
21,23 current revision numbers of all instructions, procedures, drawings, etc. and all Q.A. forms and reports. He will assure that approved changes are included before allowing the implementation of the change. Refer to Tables A and B for the description, location and responsibility
8 of RINSC files and records. It shall be his responsibility to maintain a current copy of the Q.A. manual which includes all revisions. He shall be responsible for updating all existing copies of the manual.

## IX. Material Control

Identification and control of safety related parts, components or assemblies shall be used where it is necessary to identify items, through handling, storage, shipping, cleaning, installation, repair and modification. Identification shall be controlled by the RINSC "Material Tagging Program."

Material tagging shall be accomplished by completing a "Material Identification Sheet" and tagging the item with the RINSC "accepted material" tag for acceptable items or affixing a "Do Not Use - Defective" tag for unacceptable items. Tag numbers are kept on the material identification sheet and also on each tag. When a tagged item is to be used, repaired, etc., the tag is returned to the Reactor Facility Engineer. He administers the Tagging Program. All records are kept
35 under his control. (See Table A). The application and removal of all tags, labels and markings are procedurally controlled by the Reactor Facility Engineer.

## X. Control of Special Processes

The supervisors or such other individuals or organizations as the Director, Assistant Director, as appropriate, may designate, are assigned the responsibility for incorporating into instructions, procedures and drawings, used either for procurement or for control of internal activities within the scope of the Quality Assurance
24 Program, the applicable portions of codes and standards in order to assure that Special Processes are accomplished by qualified personnel using qualified procedures. Such processes include, but are not limited to: welding, heat treating, non-destructive testing, cleaning and preparation and shipment of spent reactor fuel elements.

Vendors will be required to guarantee compliance before a contract or purchase order is issued. Vendors will be required to furnish documented
14 evidence of qualification when applicable, including company licenses or other proff of competence.

The appropriate supervisor is responsible for surveillance of both vendor and in-house Special Processes and for certifying to the Director or Assistant Director in written form that the work has been accomplished as specified. The Director or Assistant Director, as appropriate, may at times involve expert council in special problems. The written recommendation of the consultant shall be obtained and shall be part of the Quality Assurance file, but responsibility for acceptance shall be with the former individuals.

For the preparation and shipment of spent fuel elements:

(1) Special handling, preservation, storage, cleaning, packaging, and shipping requirements are established and accomplished by qualified individuals in accordance with predetermined work and inspection instructions.

(2) The departure, arrival time, and destination of a package will be established and maintained to a degree consistent with the safe transportation of the package.

(3) All necessary shipping papers will be prepared, as required.

(4) All conditions of the NRC package approval and the U.S. Department of Transportation shipping requirements are satisfied prior to shipment.

## XI. Inspection and Testing

The RINSC inspection and testing program includes examinations,
25 measurements and tests to assure that purchased material, equipment, services and work conform to the requirements of applicable instructions, procedures, drawings and specifications.

Acceptance criteria and any necessary test procedures are in written form and approved prior to its procurement or installation.

Where necessary, the RINSC supervisors may witness special inspections or tests and shall be provided with current drawing, specifications, procedures and instructions and shall document the results of their inspections on the "Receiving, Inspection and Test" form, QA/QC-4, which is part of the Q.A. Report to be retained on file. Inspection
26 personnel will be independent from individuals performing the activity being inspected.

Inspections or tests that fail shall be reported on a "Discrepancy and Nonconformance" sheet. The activity shall be stopped and the supervisor involved shall be notified. When the proper corrections have been made and, if retesting is necessary, then the results shall be noted. Any "Discrepancy and Nonconformance" sheet used shall be attached as part of the Q.A. Report, and retained. The Engineer shall also maintain a log of such discrepancies or nonconformances, duly noted on a log sheet. He shall retain these on file as part of the Q.A. Program.

Some activities cannot be proven acceptable by inspection by one person and must be subject to inspection by a second individual to assure satisfactory completion of the Q.A. activity. All inspectors shall sign the proper Q.A. forms used in inspections.

Written inspection procedures, including any instrument calibrations shall be attached to the inspection and testing forms prior to actual inspections and tests. They shall be retained as part of the Q.A. report.
27 All test instrument calibrations shall be in accordance with manufacture instructions or with nationally known standards or procedures, including
29 the interval between calibrations. All results shall be recorded in the "Q.A. Instrument Calibration Sheet", QA/QC-9. When an instrument is out of calibration it shall not be used for Q.A. inspection and must be repaired and/or removed from use. If it is defective, it should be tagged
28 as such (See Section IX). When measuring and test equipment is found to be out of calibration, a review will be made and documented to determine the validity of previous inspections using the equipment.

Directly upon the completion of each inspection or test, the inspector must sign the form to prevent inadvertent by-passing.

Recommendations may be made for Q.A. corrective procedures, specifications, drawings, etc. to help minimize the recurrence of deficiencies. Such recommendations shall be made thru the use of the "review sheet" or in the form of a "memo" attached to a review sheet. They shall be part of the Q.A. Program and be retained on file.

## XII. Non-conforming Materials, Parts, Structures and Systems

37 All non-conforming safety-related material, parts, structures and systems shall be identified as described in Section IX. These items shall be segregated and shall either be repaired or disposed of. Disposition of these non-conforming items shall be accomplished after a review by the supervisor. Any items "repaired" shall go thru
38 the Q.A. Program the same as new purchased items. Notification to affected organizations will be made. Form QA/QC-10 should be completed.

## QUALITY ASSURANCE RECORDS

XIII. The Quality Assurance Program is based upon documentary evidence of all activities affecting quality of safety-related items.

Records maintained shall include as a minimum: Q.A. reports, logs, inspection and test results, results of Quality Assurance reviews, monitoring actions, audits, materials analyses, procedures used in Quality Assurance Program Records, modification records, and records of personnel involved in the quality related activities.

All records shall be identifiable and retrievable. Retention requirements will be established for these records. (See the attached Table A).

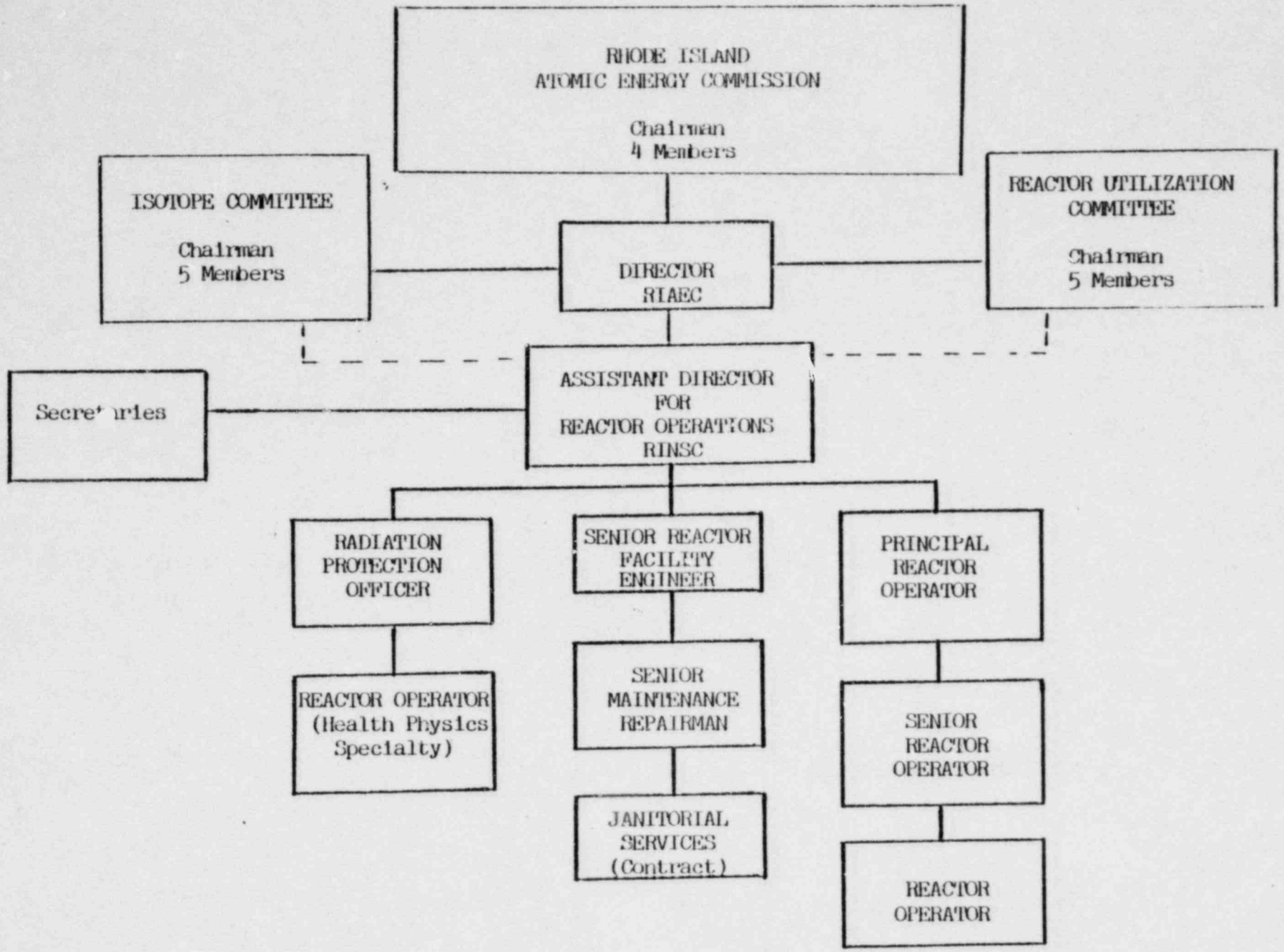
In the case of those records which define the "as built" condition of the system, the retention period shall be for the life of the system.

Quality Control Reports shall be composed of the Quality Control Report sheets and the necessary enclosed forms and retained on file.

## AUDITS

7 XIV. Audits shall be performed at least annually. The audit shall be conducted in accordance with the provisions of the Audit report
40 sheet, QA/QC-11, and the results shall be documented and reported to the management. The Audits may be scheduled or unscheduled. The Audit shall be conducted for the Rhode Island Atomic Energy Commission by the Director and shall include the scope, status and effectiveness of the program.

Deficient areas will be noted and corrective actions taken. Deficient
41 areas will be reaudited on a timely basis to verify implementation or corrective actions taken to minimize reoccurrence of deficiencies.


RHODE ISLAND
ATOMIC ENERGY COMMISSION
Chairman
4 Members
ISOTOPE COMMITTEE
Chairman
5 Members
DIRECTOR
RIAEC
REACTOR UTILIZATION
COMMITTEE
Chairman
5 Members
Secre' ries
ASSISTANT DIRECTOR
FOR
REACTOR OPERATIONS
RINSC
RADIATION
PROTECTION
OFFICER
SENIOR REACTOR
FACILITY
ENGINEER
PRINCIPAL
REACTOR
OPERATOR
REACTOR OPERATOR
(Health Physics
Specialty)
SENIOR
MAINTENANCE
REPAIRMAN
SENIOR
REACTOR
OPERATOR
JANITORIAL
SERVICES
(Contract)
REACTOR
OPERATOR

CLASS TITLE: DIRECTOR, RHODE ISLAND ATOMIC ENERGY COMMISSION

CLASS DEFINITION:

GENERAL STATEMENT OF DUTIES: To be responsible for directing the administrative and technical programs of the RIAEC on a day to day basis; and to do related work as required.

SUPERVISION RECEIVED: Works under the administrative direction of the Rhode Island Atomic Energy Commission with wide latitude for the exercise of independent judgment and initiative; work is reviewed for conformance to directions, policies, procedures, rules and guidelines of the RIAEC.

SUPERVISION EXERCISED: Plans, organizes, coordinates and reviews the work of professional, scientific, technical and other employees.

ILLUSTRATIVE EXAMPLES OF WORK PERFORMED:

To be responsible for directing the administrative and technical programs of the RIAEC on a day to day basis.

To audit the functioning of the Rhode Island Nuclear Science Center in order to insure compliance to federal and state rules and guidelines.

To conduct studies of nuclear energy proposals in order to assess such factors as safety, environmental impact and possible benefits.

To be responsible for representing the Rhode Island Atomic Energy Commission in discussions relating to scientific, technical and licensing matters with respresentatives of public agencies, private industrial establishments and Department of Defense contractors.

To review the planning, installing and maintaining of methods, procedures and techniques approved by the federal government to assure the safe and efficient operating and functioning of the Reactor at the Nuclear Science Center at proper power levels and to assure the safe manipulation of the Reactor's control systems.

To serve as an expert on various committees concerned with utilization of nuclear energy and reactors within the State.

To do related work as required.

REQUIRED QUALIFICATIONS FOR APPOINTMENT:

KNOWLEDGES, SKILLS AND CAPACITIES: A thorough knowledge of the principles, practices and techniques of reactor physics and nuclear engineering as they relate to various uses of nuclear power including energy and research reactors; the ability to audit the operations of a reactor for conformance to federal and state laws and regulations; the ability to conduct studies of nuclear energy proposals in order to assess such factors as safety, environmental impact and possible benefits; the ability to provide expert advice on all matters concerning the operation and safety of nuclear reactors; the ability to prepare and submit scientific, technical and other reports containing findings, conclusions and recommendations; the ability to maintain effective working relationships with public and private officials; and related capacities and abilities.

EDUCATION AND EXPERIENCE:

Education: Such as may have been gained through: graduation from a college of recognized standing with a Bachelor's degree in engineering or one of the physical sciences, preferably in physics, and supplemented by graduate study in reactor physics and nuclear engineering; and

Experience: Such as may have been gained through: employment in a highly responsible capacity in the field of nuclear reactors.

Or, any combination of education and experience that shall be substantially equivalent to the above education and experience.

CLASS TITLE: ASSISTANT DIRECTOR FOR OPERATIONS, NUCLEAR SCIENCE CENTER

CLASS DEFINITION:

GENERAL STATEMENT OF DUTIES: To assist by directing and managing the operations and functions of the R.I. Nuclear Science Center's Reactor Facilities established for the purpose of research and experimentation in the physical and biological sciences, for training personnel, for testing materials and techniques, and for such other purposes which the R.I. Atomic Energy Commission shall deem necessary for the health, welfare and economy of the people of Rhode Island; and to do related work as required.

SUPERVISION RECEIVED: Works under the administrative direction of the Director with wide latitude for the exercise of independent judgment; work is reviewed for conformance to state and federal laws, regulations and guidelines.

SUPERVISION EXERCISED: Plans, organizes, coordinates and reviews the work of professional scientific, technical and other employees.

ILLUSTRATIVE EXAMPLES OF WORK PERFORMED:

To assist by directing and managing the operations and functions of the R.I. Nuclear Science Center's Reactor Facilities established for the purpose of research and experimentation in the physical and biological sciences, for training personnel, for testing materials and techniques, and for such other purposes which the R.I. Atomic Energy Commission shall deem necessary for the health, welfare and economy of the people of Rhode Island.

To supervise the operation of the reactor and to insure that its operation is in accordance with the conditions of the facility license granted by the Nuclear Regulatory Commission.

To supervise the work of a staff of licensed reactor operators and trainees in the performance of their duties which include: operation of the reactor, handling of reactor fuel, movement of the reactor bridge, removal and insertion of reactor core components, and maintenance of the reactor system.

To be responsible for the organization and maintenance of an effective radiation protection program.

To serve as a member of the Reactor Utilization Committee for the technical review of all proposed programs or experiments for its scientific and technical value.

To develop and maintain a schedule for the use of the reactor.

To be responsible for the development and operation of a training program for reactor personnel.

To do related work as required.

REQUIRED QUALIFICATIONS FOR APPOINTMENT:

KNOWLEDGES, SKILLS AND CAPACITIES: A thorough knowledge of the principles, practices and techniques of reactor physics and nuclear engineering as they relate to the management and operation of a research reactor; a thorough knowledge of the principles, practices, methods and techniques required for the operation of the Rhode Island Nuclear Science Center Reactor and the ability to apply such knowledge and techniques; the ability to plan, organize and supervise the work of a staff of professional, scientific, technical and other personnel engaged in the operation of the facility; the ability to serve as a technical and scientific expert on matters of

nuclear research reactors and to provide advice and instructions to persons availing themselves of the reactor facilities; the ability to plan, develop and maintain an in-service training program for reactor personnel; and related capacities and abilities.

EDUCATION AND EXPERIENCE:

Education: Such as may have been gained through: graduation from a college of recognized standing with a Bachelor's degree in one of the physical sciences, preferably in physics, and supplemented by graduate study in one of the reactor oriented physical sciences or nuclear engineering; and

Experience: Such as may have been gained through: employment in a supervisory capacity in one of the reactor oriented physical sciences or nuclear engineering.

Or, any combination of education and experience that shall be substantially equivalent to the above education and experience.

SPECIAL REQUIREMENT: Within six months from the date of appointment, must possess a senior reactor operator's license issued by the U.S. Nuclear Regulatory Commission for operation of the R.I. Reactor.

CLASS TITLE: SENIOR REACTOR FACILITY ENGINEER

CLASS DEFINITION:

GENERAL STATEMENT OF DUTIES: To be responsible for the engineering phases of all physical improvements, construction, modifications, and repairs at the Rhode Island Nuclear Science Center; to provide professional engineering assistance and advice to the Director of Operations and experimenters at the Rhode Island Nuclear Science Center; and to do related work as required.

SUPERVISION RECEIVED: Works under the general direction of the Director of Operations with wide latitude for the exercise of independent judgment; work is subject to review for conformance to Rhode Island Atomic Energy Commission and United States Atomic Energy Commission policies and state and federal rules and regulations.

SUPERVISION EXERCISED: Plans, organizes, supervises and reviews the work of staff members engaged in performing engineering work at the Nuclear Science Center; supervises and inspects the work of consultant engineers and contractors engaged in performing work at the Center.

ILLUSTRATIVE EXAMPLES OF WORK PERFORMED:

To be responsible for the engineering phases of all physical improvements, construction, modifications, and repairs of the reactor site, buildings, reactor, equipment and experiments installed at the reactor .

To make studies and establish minimum design requirements for proposed experiments and new facilities.

To design and plan additions to the reactor building, the reactor and machinery.

To supervise the preparation of architectural and engineering drawings of structures and machinery.

To assist in the preparation of requests for federal grants under programs of the U.S. Atomic Energy Commission, National Science Foundation and the United States Office of Education and to prepare requests for partial and final payments.

To supervise and inspect the work performed at the Nuclear Science Center by private contractors; to interpret plans and specifications; to furnish lines, grades and elevations, to enforce compliance with plans and specifications of engineering projects; to make weekly estimates of payments and check contractors' payrolles; to review and make recommendations relating to requests for changes to plans and recommendations.

To review and analyze all work done by consultant engineers for conformance to rules, regulations and policies of federal and state laws, U.S. Atomic Energy Commission, and the R.I. Atomic Energy Commission.

To prepare reports and submit recommendations to the Director relating to the planning, expansion and improvement of the Nuclear Science Center.

To supervise facility operations, reactor operations and routine health physics.

To do related work as required.

REQUIRED QUALIFICAITONS FOR APPOINTMENT:

KNOWLEDGES, SKILLS AND CAPACITIES: A thorough knowledge of the principles, practices and techniques of mechanical and nuclear engineering and

heat transfer; a thorough knowledge of the principles, practices, methods and materials relating to the construction of nuclear facilities; the ability to design and plan construction of new buildings and addition, modifications and repairs to existing buildings and facilities at the Center; the ability to prepare complex engineering reports, plans and specifications; the ability to interpret plans and specifications; the ability to inspect complex engineering work for compliance with plans and specifications; the ability to provide engineering advice concerning experiments at the Center; the ability to plan, direct, coordinate and supervise the work of reactor operations engaged in mechanical operations; the ability to acquire and apply the principles, practices, methods and techniques of operations at the Nuclear Science Center; and related capacities and abilities.

EDUCATION AND EXPERIENCE:

Education: Such as may have been gained through: graduation from a college of recognized standing with specialization in mechanical, chemical, nuclear engineering, or engineering physics; and

Experience: Such as may have been gained through: employment involving the application of principles, practices, methods and techniques in the field of mechanical, chemical, nuclear engineering or engineering physics.

Or, any combination of education and experience that shall be substantially equivalent to the above education and experience.

SPECIAL REQUIREMENT: At the time of appointment, must possess a certificate of a Registered Professional Engineer issued by the Rhode Island State Board of Registration for Professional Engineers and Land Surveyors; and within six months from the date of appointment, must possess a Senior Reactor Operator's license issued by the U.S, Atomic Energy Commission for operation of the R.I. Reactor.

May 28, 1972

CLASS TITLE: RADIATION PROTECTION OFFICER

CLASS DEFINITION:

GENERAL STATEMENT OF DUTIES: To be responsible for radiation protection at the Rhode Island Nuclear Science Center (RINSC) and the University of Rhode Island with responsibility for planning, organizing, and maintaining an effective radiation protection program; and to do related work as required.

SUPERVISION RECEIVED: Works under the technical and administrative supervision of the Assistant Director of Operations - RINSC and/or the RINSC Radiation Safety Committee with considerable latitude for the exercise of independent judgment in the application of accepted methods, procedures, and techniques of health physics; work is reviewed by the Assistant Director of Operations and/or the RINSC Radiation Safety Committee, usually upon completion, for evaluation of such methods, procedures and techniques.

SUPERVISION EXERCISED: Plans, supervises and reviews the work of professional, technical and clerical personnel assigned to assist in the performance of assignments.

ILLUSTRATIVE EXAMPLES OF WORK PERFORMED:

To serve as the professional health physicist for the R.I. Nuclear Science Center and U.R.I. with responsibility for planning, organizing, and maintaining an effective radiation protection program, including the development of methods and procedures for the handling, storage, disposal and decontamination of radioactive materials.

To plan, organize, and maintain a program of:

facility monitoring using: air monitors to detect airborne radiation; monitors to determine general background in the facility; a fission product monitor to insure against an undetected rupture of the uranium fuel plates; and such other related or needed monitoring as may be required;

environmental monitoring and recordkeeping, on and off the reactor site, to determine and evaluate radiation released from the reactor building and waste disposal system;

personnel exposure monitoring and recordkeeping to insure the safety of individuals in the facility including periodic physical examinations.

To develop and conduct a radiological health safety program for the radiation workers and other personnel in the facility.

To maintain accurate records and reports to comply with Federal and State licensing conditions.

To conduct research and development on all methods, techniques, and instrumentation of health physics.

To exercise authority to halt radiological operations when necessary for health and safety.

To serve as a member of the RINSC and the URI Radiation Safety Committee for the review and acceptance of all experiment proposals.

To do related work as required.

REQUIRED QUALIFICATIONS FOR APPOINTMENT:

KNOWLEDGES, SKILLS AND CAPACITIES: A thorough knowledge of the principles, practices and techniques of the field of health physics especially as it relates to the program of the RINSC and the URI; a thorough knowledge of Federal and State regulations and licensing procedures; the ability to plan, organize and maintain a radiation protection program; to conduct a training program concerning health physics matters for the facility personnel; the ability to plan, supervise and review the work of technical assistants and others engaged in health physics activities; the ability to prepare scientific, technical, and other reports containing findings, conclusions, and recommendations relating to health physics problems and techniques; the ability to develop health physics techniques and instruments useful for specific nuclear research programs with little technical supervision; and related capacities and abilities.

EDUCATION AND EXPERIENCE:

Education: Such as may have been gained through: graduation from a college of recognized standing with a Bachelor's Degree in one of the physical sciences, preferably physics, and supplemented by completion of graduate study in the field of health physics; and

Experience: Such as may have been gained through: employment in a responsible technical position in the field of health physics preferably at a nuclear reactor facility.

Or, any combination of education and experience that shall be substantially equivalent to the above education and experience.

Revised
July 2, 1978

TABLE A

QUALITY ASSURANCE RECORDS

| RECORDS | LOCATION | RESPONSIBILITY | RETENTION CODE * |
|---|---|---|---|
| Reactor Operations Log Books | Safe/or Control Room | Asst. Director | A |
| Reactor Maintenance Log (see Table B) | Control Room File | See Enclosed List | A |
| Purchase Orders | Secretary Files | Asst. Director | C |
| Visitor's Log | Secretary Files | Asst. Director | A |
| Recorder Charts (11) | Storage File | Asst. Director | A |
| Pre-Start Up Check Sheets | Control Room File | Asst. Director | A |
| Shift Record Data Sheets | Control Room File | Asst. Director | A |
| Engineering Drawings | Engineering Office or Control Room | Engineer | A |
| Instrument Calibration Log | Radiation Protection Officer's Office | Radiation Protection Officer | A |
| Personnel Monitoring Records | Radiation Protection Officer's Office | Radiation Protection Officer | A |
| Irradiation Requests, App. etc. | Assistant Director's Office File | Asst. Director | A |
| Experiments Files | Rad. Protection Office Asst. Dir. Office File | Asst. Director Rad. Prot. Officer | A |
| Inventory of Radioactive Material | Rad. Protection Office | Rad. Prot. Officer | A |
| Source Leak Test Records | Rad. Protection Office | Rad. Prot. Officer | A |
| Survey Records & Bioassay | Rad. Protection Office | Rad. Prot. Officer | A |
| Reactor Security Checklist | Control Room File | Asst. Director | A |
| Work Permits - QA/QC Log | Engineer's Office | Engineer | A |
| Air Flow Systems Log | Engineer's Office | Engineer | A |
| QA/QC Reports - QA/QC Log & Tags | Engineer's Office | Engineer | A |
| Campus Guard Reports | Engineer's Office | Engineer | C |
| Reactor Operator Requalifications | Director's Office | Director | A |
| QA Procedures | Engineer's Office | Engineer | A |
| R. I. RUC Reports | Director's Files | Director | A |
| Isotope Radiation Safety Commission | Rad. Prot. Office | Rad. Prot. Officer | A |
| BMI-1 Cask Q.A. Forms QA/QC Log | Engineer's Office | Engineer | A |
| Fuel Element History Records | Director's Files | Director | A |

*A-Duration of Operation + 2 Yrs. *B-Till Item Disposed of + 2 *C-2Yrs.

TABLE B

REACTOR MAINTENANCE LOG BOOK

| | RECORD | SUPERVISOR RESPONSIBILITY |
|---|---|---|
| 1. | Secondary & Primary Water Samples | Radiation Protection Officer |
| 2. | Water Disposal Records | Radiation Protection Officer |
| 3. | Emergency Charcoal Filter Efficiency Test | Assistant Director |
| 4. | Stack Gas Release Records | Radiation Protection Officer |
| 5. | Standby Power Supply - Checklist | Assistant Director |
| 6. | Rod Drop (Magnet release time, control & reg. rod speed) | Assistant Director |
| 7. | Shutdown & Scram Records | Assistant Director |
| 8. | Reactor Maintenance History | Assistant Director |
| 9. | Operational Hours | Assistant Director |
| 10. | Rabbit System Irradiation History | Assistant Director |
| 11. | Dem. Resin Changes | Assistant Director |
| 12. | Seismic Detector Calibration | Assistant Director |
| 13. | Evacuation Drills | Assistant Director |
| 14. | Emergency Generator Maintenance Checklist | Assistant Director |
| 15. | Crane Load Test Results and Inspection Records | Engineer |

Form# NSC-QA/QC-1

Rev.#_____

QUALITY CONTROL REPORT

QA/QC REPORT# ISSUED TO DATE

(Check the Applicable Enclosed Forms)

| | | |
|---|---|---|
| 1. | QA Activity Check List | |
| 2. | QA Design Sheet | |
| 3. | QA Procurement Sheet | |
| 4. | QA Receiving Inspection & Test Sheet | |
| 5. | QA Work Permit | |
| 6. | QA Review Sheet | |
| 7. | QA Activity Training Sheet | |
| 8. | QA Instrument Calibration Sheet | |
| 9. | QA Discrepancy or Nonconformance Sheet | |
| 10. | QA Audit Sheet | |
| 11. | *Discrepancy or Nonconformance Log | |
| 12. | *Material Identification Sheet | |

*NOTE: Filled out only-retained in QA files

QA/QC REPORT APPROVALS DATE COMPLETED

1. Director
2. Assistant Director
3. Radiological Protection Officer
4. Reactor Facility Engineer
5. RI AEC
6. Reactor Utilization Committee

Form# QA/QC-2

Rev#_____

# QUALITY CONTROL ACTIVITY CHECK LIST

Check the Applicable Items Below and Attach to the QA/QC Report

| | | | |
|---|---|---|---|
| PROCUREMENT | | DESIGN | |
| MODIFICATION | | REPAIR | |
| REFUELING | | ERECTING | |
| SHIPPING | | RECEIVING | |
| HANDLING | | CLEANING | |
| STORING | | IDENTIFICATION | |
| TAGGING | | REVIEW | |
| PREOPERATIONAL TEST | | OPERATIONAL TEST | |
| INSPECTION | | SPECIFICATION WRITING | |
| PROCEDURE WRITING | | DRAWING (S) | |
| DOCUMENT CONTROL | | CALIBRATION | |
| PERSONNEL QUALIFICATIONS | | AUDIT | |
| MAINTENANCE | | OTHER: | |

DATE:

INITIATED BY:

RESPONSIBILITY DELEGATED: FROM:

TO:

DATE:

Form Completed By:

Form# NSC-QA/QC-3

Rev#_____

# DESIGN SHEET

Initiator: Designer(s):

Quality Control Activity: Date:

Project Description:

Activity Acceptance Criteria: (Specifications, Calculations, Drawings, Procedure, etc.)

QA/QC References, Documents, etc.:

QA/QC Approvals: (Two (2)) required

1. Name: Title:

2. Name: Title:

Form# NSC-QA/QC-4

Rev.#_____

# RECEIVING, INSPECTION AND TESTING FORM

Item: New___ or Repaired___ Surplus___

Date Received: By:

P.O. #:

Reference Criteria: (Drawing #, Parts List, Model # etc.)

Packing Slip Enclosed_____ Returned to Secretary_____

## INSPECTION AND TESTING

1. Visual Inspection Results: By_____
   A.
   B.

2. Special Procedures, Codes or Instructions Applicable: (Attach) By_____

3. Vendor Documents (Guarantee, Test Results, etc.): By_____

4. Calibration Procedures and Results:
   Instruction Cal. Sheet Required _____yes _____no

5. Test Results:
   Conformance:_____
   Non Conformance:_____ Retest Required_____
   Discrepancy Noted on QA/QC-9
   Tested by: Date:

6. Recommendations:
   Accept_____
   Return_____ Repair By Vendor_____

Required Approvals: (At least 2 required)

1. Director:
2. Assistant Director:
3. Health Physicist:
4. Engineer:

Form# NSC-QA/QC-5

Rev.#_____

# RINSC QA/QC PROCUREMENT SHEET

QA Initiator_____ Date_____

Purchase Order or Requisition # _____

QA/QC Report # _____

Item Description ( Include specifications, drawings etc.)_____

_____

_____

_____

Acceptance or rejection criteria _____

_____

_____

Applicable codes and standards_____

_____

Test and inspection requirements _____

_____

_____

Special process instructions _____

_____

_____

Vendor documents and QA/QC requirements_____

_____

_____

RINSC APPROVALS

TITLE

(1) _____ _____

(2) _____ _____

NOTE:

Attach copy to: Purchase Requisition
Retain Original in QA Report

Form# NSC-QA/QC-6

Rev.#_____

QA WORK PERMIT

DATE:_____

Prior Approvals Required Before Any Work Is Done:

(1) QA Activity Training Sheet Completed and Enclosed: _____

(2) Job Description: _____

_____

(3) Attached Procedures, Drawings, etc., (copies at site): _____

(4) Protective Measurements To Be Used: _____

_____

(5) Name and Title of Personnel Required:

(a) _____

(b) _____

(c) _____

(d) _____

(6) Copies of Necessary Licenses and Permits: _____

(7) If Radiological Surveys are Necessary, Contact the RPO and Attach Results: _____

(8) QA Testing Equipment Calibrated (if applicable): _____

QA SIGNATURES (2 Required)

(1) Director

(2) Assistant Director

(3) Radiological Protection Officer

(4) Reactor Facility Engineer

Form# NSC-QA/QC-7

Rev.#_____

# REVIEW SHEET

DATE: REVIEWED BY:

DESCRIPTION OF AREA (S) OF REVIEW:

OFFICIAL RECOMMENDATIONS:

REQUIRED APPROVALS: (At Least Two (2)) Individuals'

1. DIRECTOR:
2. ASSISTANT DIRECTOR:
3. RADIATION PROTECTION OFFICER
4. ENGINEER:
5. RIAEC:
6. RUC:

Form# NSC-QA/QC-8

Rev.#_____

# QA ACTIVITY TRAINING SHEET

Instructor: _____ Date:_____

Trainee: _____

Scope and Objective: _____

Test Method and Results: _____

_____

_____

Instructor Approval:_____ Date: _____

Trainee Signature: _____ Date: _____

Retraining Necessary: _____yes _____no

Retraining Schedule: _____

_____

_____

Retraining Test Method and Results: _____

_____

_____

_____

Instructor Signature: _____ Date: _____

Trainee Signature: _____ Date: _____

Form# NSC-QA/QC-9

Rev.#_____

# QA INSTRUMENTATION CALIBRATION SHEET

Instrument Type: _____ Date: _____

Model #: _____ Serial #: _____ Mfg.: _____

Calibration Procedures: (attach if necessary)_____

_____

_____

_____

Reference Codes and Standards or Precedures: _____

_____

_____

_____

Calibration Frequency: _____

Results (attach if necessary): _____

_____

_____

_____

% Accuracy: _____

_____

Recalibration Necessary: _____yes _____no

Person Calibrating Instrument: _____ Supervisor: _____

Title: _____ Title: _____

Form# NSC-QA/QC-10

Rev.# _____

# DISCREPANCY OR NONCONFORMANCE SHEET

QA Report #

| DWG/Spec. No. | Rev. No. | Item/System Identification | Date |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

Vendor/Contractor: _____

Discrepancy or Nonconformance: _____

Discrepancy Noted

Receiving ____

Inspection ____

Test ____

Other _____

Signature: _____ Signature: _____

Title: _____ Title: _____

## DISPOSITION/ACTION TAKEN

| | | |
|---|---|---|
| Director Notification: | ____yes | ____no |
| Assistant Director Notification: | ____yes | ____no |
| Radiation Protection Officer: | ____yes | ____no |
| Reactor Facility Engineer: | ____yes | ____no |

ACTION TAKEN

Corrective Action Required ____yes ____no

Reinspection Required ____yes ____no

_____ _____ _____

Inspector Signature Supervisor Signature

Distribution:

1. QA Report 2. QA Files 3. P.O.

Form# NSC-QA/QC-11

Rev.#_____

# QA AUDIT SHEET

QA/QC Report # _____ Date _____

Criteria Being Audited: _____

_____

_____

_____

Audit Plan: _____

_____

Personnel Contacted: _____

_____

Audit Team Members: _____

_____

Corrective Actions or Nonconformance Issued Against Audit: _____

_____

_____

Follow-up Activities: _____

_____

Audit Team Leader: _____ Approved: _____

Title: _____ Date: _____

Distribution:

16715