



**B&W Nuclear Environmental Services, Inc.**

a McDermott company

70-824  
P.O. Box 11165  
Lynchburg, VA 24506-1165  
(804) 522-5414  
FAX (804) 522-6860

March 23, 1994

U.S. Nuclear Regulatory Commission  
Attn: Robert C. Pierson, Chief  
Licensing Branch  
Division of Fuel Cycle Safety  
And Safeguards  
Washington D.C. 20555

Gentlemen:

The B&W Nuclear Environmental Services, Inc., Lynchburg Technology Center is requesting an amendment to our license, SNM-778, to incorporate organizational changes and to increase one of our possession limits which will allow us to save considerable money on transportation costs.

A description of the changes is provided in Attachment 1. The actual proposed page changes to the specification and demonstration sections of our license are also provided. Changes are marked on the text pages by a vertical line in the right hand margin. A list of the revised pages is included as Attachment 2. B&W NESI believes that these changes have no negative impact on our current operations and are administrative in nature.

This request does not significantly affect nor modify any operations which are currently approved and in progress. We believe that this request should not require an environmental review since it meets the categorical exclusion criterion outlined in 10 CFR 51.22 (c) (11).

If you should have any further questions, please contact me at (804) 522-5753.

Sincerely,

Charlie C. Boyd, Jr.  
Licensing & Compliance Officer

Attachments

cc: U.S. Nuclear Regulatory Commission  
Attn: Stewart Ebnetter, Regional  
Administrator  
101 Marietta ST., N.W.  
Atlanta GA 30323

T. D. Lee  
D. W. Zeff

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### REVISIONS BY PAGE AND PARAGRAPH

The following is a list of the major changes which are occurring in this submittal followed by a description of the changes by page and paragraph number.

1. The safety functions for the site will be carried out by the Babcock & Wilcox Naval Nuclear Fuel Division's Safety and Safeguards Department. This move is a part of the transition process leading to the combination of our license and NNFD's. The NNFD safety organization has provided this function in the recent past when the site was formally called the NNFD Research Laboratory. This changeover should present no problems or degradation to the site's safety program. In fact, this should allow the Lynchburg Technology Center to access the greater resources of the NNFD organization. Throughout the license, references to various positions have been changed to fit into the NNFD organization without any major changes to the actual license required functions or tasks.

2. An increase to the possession limit for Am-241 sources on the site is being requested to allow us to receive a shipment of sources which we are planning to perform work on. The planned work is to modify the outermost container (the third barrier) and would not involve any work on the doubly encapsulated source itself - therefore the sources would remain encapsulated throughout the process.

There is a tremendous cost savings to ship the sources in one or two major shipments instead of in several small shipments, which would be the case under our current possession limit. The sources would remain in storage at our site until the work is ready to be performed.

In light of the fact that the sources will remain encapsulated and our current broad scope ability and authorization to work with large amounts of radioactive materials, we do not believe that this increase represents any addition danger to the workers, the environment, or the public.

3. In Sections 2 and 11 the changes mentioned in paragraph no. 1 above have caused the repagination of the entire sections.

Page i

"NES" Division changed to "NNFD".

Page 1-1

Paragraph 1.1 - "Nuclear Environmental Services Division" changed to "Naval Nuclear Fuel Division".

Page 1-3

Item # 16 - The limit for Am-241 changed from 30 Ci to 300 Ci.

Page 1-4

Paragraph 1.6.7 - "Manager, Environment Safety & Health (ES&H)" changed to "Manager, Safety & Safeguards (SS)".

Page 2-1

Paragraph 2.2.2 - "Manager, ES&H" changed to "SS".

Paragraphs 2.2.3 to 2.2.6 were added to reference the additional positions within NNFD's safety organization. The remaining paragraphs were renumbered accordingly.

Page 2-2

Paragraph 2.2.7 - "Manager, ES&H" changed to "SS".

Paragraph 2.2.7 - "Manager, ES&H" changed to "Manager, Radiation and Criticality Safety".

Page 2-3

Paragraph 2.2.9 - "Manager, ES&H" changed to "Manager, Radiation Protection".

Paragraph 2.2.11 - "Manager, ES&H" changed to "Manager, Environmental & Industrial Safety".

Paragraph 2.2.12 - The first sentence was deleted and the reporting arrangements for this position added.

Page 2-4

Paragraph 2.3.1.3 - "NES" Division changed to "NNFD".

Paragraph 2.3.1.3 - "Manager, ES&H" changed to "SS".

Paragraph 2.3.3.4 - "Manager, ES&H" changed to "SS".

Page 2-5

Paragraphs 2.3.4.1, 2.3.5.2, 2.3.5.6, 2.4.1, and 2.5.2 - "Manager, ES&H" changed to "SS".

Paragraphs 2.3.5.2, 2.3.5.6, 2.4.1, and 2.5.1 - "NES" Division changed to "NNFD".

Page 2-6

Paragraphs 2.5.3 to 2.5.6 were added to reference the additional positions within NNFD's safety organization. The remaining paragraphs were renumbered accordingly.

Page 2-10

Paragraph 2.8.1.1 - "Manager, ES&H" changed to "Manager, Radiation and Criticality Safety".

Paragraph 2.8.1.1 - Manager, Nuclear Criticality Safety was added to the reporting requirement.

Page 2-11

Paragraph 2.8.2.1 - "Manager, ES&H" changed to "Manager, Radiation Protection".

Paragraph 2.8.2.1 - "Manager, ES&H" changed to "Manager, Radiation and Criticality Safety".

Paragraph 2.8.3.1 - "Manager, ES&H" changed to "SS".

Page 2-15

A new organization chart has been provided.

Page 3-1

Paragraph 3.1.1.3 - "Manager, ES&H" changed to "Manager, Radiation Protection".

Page 4-2

Paragraph 4.1.6 - "Manager, ES&H" changed to "Manager, Radiation and Criticality Safety".

Paragraph 4.1.6 - Manager, Nuclear Criticality Safety was added to the reporting requirement.

Page 9-1

Paragraphs 9.1.1 and 9.1.2 - "NES" Division changed to "NNFD".

Page 11-i

The Table Of Contents was condensed to show the major topics only.

Page 11-1

Paragraphs 11.1.1 and 11.1.2 - "NES" Division changed to "NNFD".

Paragraph 11.1.2 - "NES" changed to "NNFD" and the last sentence was deleted.

Paragraphs 11.1.2 and 11.1.7 - "Manager, ES&H" changed to "SS".

Page 11-2

Paragraph 11.1.7, 2nd Paragraph - "Manager, ES&H" changed to "Manager, Radiation and Criticality Safety".

Page 11-3

Paragraph 11.1.9 - "Manager, ES&H" changed to "Manager, Radiation Protection".

Page 11-4

Paragraph 11.1.11 - "Manager, ES&H" changed to "Manager, Environmental & Industrial Safety".

Page 11-5

Paragraph 11.1.1.3 - Manager, Nuclear Criticality Safety was added to the reporting requirement.

Page 11-5 (cont'd)

Paragraph 11.1.9 - "Manager, ES&H" changed to "Manager, Nuclear Criticality Safety".

Paragraph 11.1.13 - "Manager, ES&H" changed to "Manager, Radiation and Criticality Safety".

Page 11-6

First, Third and Fourth Paragraph - "Manager, ES&H" changed to "SS".

Third Paragraph - "NES" Division changed to "NNFD".

Page 11-26

A new organization chart has been provided.

Page 12-3

Paragraph 12.3.1 - "Manager, ES&H" changed to "Manager, Radiation Protection".

Page 12-5

Paragraph 12.6.1 - "Manager, ES&H" changed to "Manager, Radiation Protection".

Page 12-13

Paragraph 12.8.2 - "Manager, ES&H" changed to "Manager, Radiation Protection".

Page 14-1

Paragraph 14.1 - "Manager, ES&H" changed to "Manager, Radiation and Criticality Safety".

Paragraph 14.1 - The first sentence was deleted in the second paragraph.

Paragraph 14.1 - Manager, Nuclear Criticality Safety was added to the reporting requirement in the last paragraph.

LIST OF REVISED PAGE

REMOVE		ADD	
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1-4	5/92	1-4	3/94
2-i	5/92	2-i	3/94
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11-i	5/92	11-i	3/94
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11-22	5/92	11-22	3/94
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11-24	5/92	11-24	3/94
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11-26	5/92	11-26	3/94
None		11-27	3/94
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12-13	2/93	12-13	3/94
14-1	5/92	14-1	3/94



BAW-381  
March, 1994

DEMONSTRATION AND CONDITIONS  
FOR LICENSE SNM-778

Babcock & Wilcox Naval Nuclear Fuel Division  
Lynchburg Technology Center  
P. O. Box 11165  
Lynchburg, VA 24506-1165

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Page i

PART I

LICENSE CONDITIONS

1.0 STANDARD CONDITIONS AND SPECIAL AUTHORIZATIONS

1.1 NAME

Name - Babcock & Wilcox Investment Company  
Babcock & Wilcox Naval Nuclear Fuel Division  
Lynchburg Technology Center

Babcock & Wilcox Investment Company is incorporated under the laws of the State of Delaware.

Principal Office - 1010 Common Street, New Orleans, Louisiana.

1.2 LOCATION

Address - Babcock & Wilcox  
Lynchburg Technology Center  
P. O. Box 11165  
Lynchburg, Virginia 24506-1165

The Lynchburg Technology Center (site) is located in Campbell County, Virginia, near the James River, approximately four miles East of the city of Lynchburg. Figure 1-1 shows the location of the site with respect to the Commonwealth of Virginia. Figure 1-2 shows the location of the site with respect to a five mile radius. Figure 1-3 shows the location of buildings and facility locations where licensed materials are handled and stored.

1.3 LICENSE NUMBER AND PERIOD

License Number - SNM-778

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<u>Material</u>	<u>Physical Form</u>	<u>Enrichme...</u>	<u>Amou...</u>
11. Fission Products & Transuranium Elements	Irradiated fuel		5,000,000 Ci.
12. Any byproduct material	Irradiated structural materials & components		50,000 Ci.
13. Byproduct material with At. Nos. 3 thru 83	Any		3000 Curies each, total not to exceed 1,000,000 Curies
14. Transuranium elements	Any		20 milliCuries each, total not to exceed 100 milliCuries
15. Cf-252	Sealed Sources		4 milligrams
16. Am-241	Sealed Sources		300 Ci
17. H-3	Sealed Sources		100 Ci
18. H-3	Oxide		3 Ci
19. H-3	Ni plated Sc tritide foil		3 Ci

1.5 LOCATION OF POSSESSION AND USE

- 1.5.1 Licensed material shall be possessed and used at the Lynchburg Technology Center (site).
- 1.5.2 Byproduct material in the form of sealed sources with activities of up to 500 milliCuries may be possessed and used in locations other than the site for performing instrument calibration, electronic noise analysis, shielding studies, or similar operations.

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1.5.3 A restricted zone shall be established on the area north of the Chessie System main line right-of-way with a fence line based on radiation levels not exceeding an exposure dose rate of 500 millirems/year.

1.6 DEFINITIONS

1.6.1 Site means the Lynchburg Technology Center.

1.6.2 SRC means Safety Review Committee.

1.6.3 SNM means Special Nuclear Material.

1.6.4 Licensed Material means source, byproduct, or SNM received, possessed, used or transferred under a general or specific license issued by the Nuclear Regulatory Commission.

1.6.5 Research and Development (R&D) means (1) theoretical analysis, exploration, or experimentation; or (2) the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials and processes. The administration of licensed material, internally or externally, to human beings is not included in this definition.

1.6.6 Safety Audit Subcommittee (SAS) means the subcommittee established under the SRC to perform audit functions.

1.6.7 Manager, Safety & Safeguards means the position with primary responsibility for the safety of operations at the site.

1.6.8 Authorized User means a person who may work with licensed material unsupervised and may supervise others, not so designated, in the handling of licensed material.

1.6.9 Calibration means a comparison of a measurement standard of known accuracy that is traceable to the NIST with another standard or instrument to detect, correlate or adjust any variation in the accuracy of the item being compared, within the specified range and accuracy of the item. Calibration also includes standardization.

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2.0 GENERAL ORGANIZATIONAL AND ADMINISTRATIVE REQUIREMENTS

2.1 POLICY

It shall be the policy of the site to maintain radiation exposures to employees and the general public as low as is reasonably achievable. The facility procedures to ensure the safe handling of licensed material are the Area Operating Procedures.

2.2 ORGANIZATION RESPONSIBILITIES AND AUTHORITIES

- 2.2.1 Vice President and/or General Manager, Nuclear Environmental Services (NES), is ultimately responsible for ensuring that all operations at the site are conducted safely and in full compliance with NRC requirements.
- 2.2.2 Manager, Safety & Safeguards (SS) - The Manager, SS is responsible for safety of operations at the site. He directs technical and administrative activities and establishes policies related to facility decommissioning, accountability and safeguards of special nuclear material, radiation protection, nuclear criticality safety, and licensing. He coordinates resources to perform operations in compliance with Federal and State regulations.
- 2.2.3 Manager, Radiation and Criticality Safety - The Manager, Radiation and Criticality Safety reports to the Manager, Safety & Safeguards and is responsible for the radiation protection, licensing, and criticality safety programs.
- 2.2.4 Manager, Environmental and Industrial Safety - The Manager, Environmental and Industrial Safety reports to the Manager, Safety & Safeguards and is responsible for the environmental protection and industrial safety and hygiene programs.
- 2.2.5 Manager, Nuclear Criticality Safety - The Manager, Nuclear Criticality Safety reports to the Manager, Radiation and Criticality Safety and is responsible for the administration of the nuclear criticality safety program.

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2.2.6 Manager, Radiation Protection - The Manager, Radiation Protection reports to the Manager, Radiation and Criticality Safety and is responsible for the protection of personnel, property, and the environment from contamination with radioactive materials; the protection of personnel from external radiation exposure, and the administration of an effective ALARA program.

2.2.7 Licensing & Compliance Officer - The Licensing & Compliance Officer is responsible to the Manager, Radiation and Criticality Safety for the safe conduct of operations at the site, and for ensuring that applicable operations are conducted in compliance with the license and applicable regulations. To fulfill these responsibilities the Licensing & Compliance Officer shall have the authority to stop any operation that he feels is unsafe or in violation of license. The Licensing & Compliance Officer shall review new Area Operating Procedures and RWP's, and changes thereto, for license and regulatory compliance and for facility safety; and he shall have approval authority for them. He shall submit items for review to the SRC. He shall have approval authority for Area Supervisors.

The Licensing & Compliance Officer shall also be responsible for administering the license. He is the primary liaison with the NRC and other federal, state, and local agencies in matters that pertain to nuclear activities. He shall be the coordinator of the SRC and the Chairman of the Safety Audit Subcommittee and shall represent management on both. He shall maintain the permanent records of the SRC and shall be responsible for assuring that appropriate action is taken to correct SAS audit findings that are approved by the Manager, SS.

2.2.8 Area Supervisors - Area Supervisors are recommended by their management and their appointment shall be jointly approved by the Supervisor, Health Physics, and the Licensing & Compliance Officer. They shall functionally report to the Licensing & Compliance Officer. They shall be responsible for the safety and compliance of operations in their assigned areas. They shall be responsible for maintaining the exposures of personnel assigned to their area below 300 millirem/week; 1250 millirems/quarter. They shall have approval authority for Radiation Work Permits that apply to their assigned areas. They shall keep the Licensing & Compliance Officer advised of plans for projects and work to be carried out in their areas.

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- 2.2.9 Supervisor, Health Physics - The Supervisor, Health Physics is responsible for providing adequate facilities, procedures, and properly trained personnel to implement the Health Physics Program. He is responsible for health physics activities. The Supervisor, Health Physics reports to the Manager, Radiation Protection. The Supervisor, Health Physics has the authority to stop any operation that he believes is contrary to accepted safety practices or license requirements. He shall review new Area Operating Procedures, Radiation Work Permits and changes thereto, for the radiation safety aspects of the procedure, RWP, or change, and he shall have approval authority for them. He shall be responsible for training programs for new employees and Authorized Users of Radioactive Material. He shall be responsible for the shipment of licensed material and SNM Accountability. The Supervisor, Health Physics shall be a member of the Safety Review Committee but shall not be a member of the Safety Audit Subcommittee. He shall have approval authority for Area Supervisors.
- 2.2.10 Health Physicists - The Health Physicists shall administer activities of the Health Physics Group. They shall report to the Supervisor, Health Physics.
- 2.2.11 Industrial Safety Officer - The Industrial Safety Officer shall administer the industrial safety program. He shall report to the Manager, Environmental and Industrial Safety.
- 2.2.12 Nuclear Criticality Safety Specialist - The Nuclear Criticality Safety Specialist reports to the Manager, Nuclear Criticality Safety and is responsible for establishing the nuclear criticality safety limits for the site, assessing potential changes to these limits, ensuring the validity of assumptions, and the accuracy of results. The Nuclear Criticality Safety Specialist or his designated alternate is responsible for the development and implementation of training programs as deemed necessary. The actual presentation may be given by other site trainers if approved by the Nuclear Criticality Safety Specialist.
- 2.2.13 Accountability Specialist - The Accountability Specialist shall be responsible for the maintenance and retention of SNM accountability records. The Accountability Specialist shall report to the Supervisor, Health Physics.

2.3 SAFETY REVIEW COMMITTEE

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2.3.1 Function

- 2.3.1.1 The SRC shall review and approve new Area Operating Procedures, and shall concur with changes made to them in the time interval since their last regular meeting.
- 2.3.1.2 The SRC shall review and approve new projects and major changes to existing projects that utilize licensed materials.
- 2.3.1.3 The SRC shall review the annual report prepared by the Supervisor, Health Physics. The report of the SRC's review shall be sent to the Manager, SS, with a copy to the Vice President, and/or General Manager, NNFD.
- 2.3.1.4 The SRC shall provide general consulting services in the field of radiation protection and the safe handling of licensed material.
- 2.3.1.5 The SRC shall review SAS audit findings, overexposures and unusual occurrences which must be reported to the NRC. These reviews shall be conducted during the next regularly scheduled meeting following the event and the results of the review shall be documented in the minutes.
- 2.3.1.6 The Licensing & Compliance Officer shall be responsible for resolving comments and recommendations made by the SRC.

2.3.2 Frequency of Meetings

- 2.3.2.1 The SRC shall meet at least four times annually for the purposes of conducting its business as specified in Section 2.3.1.

2.3.3 Safety Audit Subcommittee

- 2.3.3.1 The SAS shall perform audits for the Safety Review Committee.
- 2.3.3.2 The SAS shall audit facilities, procedures, records, and operations for compliance with written requirements and the exercise of acceptable safety practices.
- 2.3.3.3 The SAS shall perform at least three audits annually, distributed over a 12-month period. Audits shall be made in accordance with written guidance to assure all aspects of 2.3.3.2 are audited.

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2.3.3.4 SAS membership shall be appointed by the Manager, SS.

2.3.4 Reporting

2.3.4.1 The SRC shall report to the Manager, SS.

2.3.4.2 The SAS shall report to the Chairman, SRC.

2.3.5 Recordkeeping

2.3.5.1 Minutes of the SRC proceedings shall be prepared by the Chairman, SRC.

2.3.5.2 SRC Minutes shall be forwarded to the Manager, SS, with a copy to the Vice President, and/or General Manager, NNFD by the Chairman, SRC.

2.3.5.3 The permanent records of the SRC shall be kept by the Licensing & Compliance Officer.

2.3.5.4 SAS audit reports shall be prepared by the Chairman, SAS.

2.3.5.5 SAS audit reports shall be forwarded to the Chairman, SRC by the Chairman, SAS.

2.3.5.6 SAS audit reports shall be forwarded to the Manager, SS with a copy to the Vice President, and/or General Manager, NNFD by the Chairman, SRC with comments, as he deems appropriate.

2.4 APPROVAL AUTHORITY FOR PERSONNEL SELECTION

2.4.1 The Manager, SS shall approve the personnel selected for safety-related positions specified in Section 2.2 of this Part and shall appoint the members of the Safety Review Committee in writing. The NNFD Vice President and/or General Manager shall appoint the Manager, SS.

2.5 PERSONNEL EDUCATION AND EXPERIENCE REQUIREMENTS

2.5.1 Vice President and/or General Manager, NNFD - The Vice President, and/or General Manager NNFD shall be appointed in accordance with Company policy.

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- 2.5.2 Manager, SS - The Manager, SS shall, as a minimum have a Bachelor's degree or equivalent and three years experience in the nuclear field. He shall have demonstrated sufficient judgment and experience to manage the functions under his direction.
- 2.5.3 Manager, Radiation and Criticality Safety - The Manager, Radiation and Criticality Safety shall have a bachelor's degree in a physical science or engineering and at least five years' experience in nuclear regulatory or safety related responsibilities.
- 2.5.4 Manager, Environmental and Industrial Safety - The Manager, Environmental and Industrial Safety shall have a bachelor's degree and at least six years in nuclear regulatory or safety related responsibilities.
- 2.5.5 Manager, Nuclear Criticality Safety - The Manager, Nuclear Criticality Safety shall have a bachelor's degree in a physical science or engineering. He must have at least two years' experience as a nuclear criticality safety engineer at NNFD or at least three years' experience as a nuclear criticality safety engineer at another nuclear facility.
- 2.5.6 Manager, Radiation Protection - The Manager, Radiation Protection shall have a bachelor's degree in a physical science or engineering and at least five years' experience as a Health Physicist which shall include at least two years' experience as a Health Physicist at a fuel fabrication facility.
- 2.5.7 Licensing & Compliance Officer - The Licensing & Compliance Officer shall have a BS degree in science or engineering and three years experience in the use and handling of licensed material, or an AS degree in science or nuclear technology with five years experience in the use and handling of licensed material.
- 2.5.8 Area Supervisors - Area Supervisors shall have at least a high school education and two years of experience in the handling and use of licensed material. They shall have demonstrated sufficient knowledge and experience in the equipment and techniques employed in projects performed in their assigned areas to ensure that all operations are conducted safely and in full compliance with applicable license conditions and area operating procedures.
- 2.5.9 Supervisor, Health Physics - The Supervisor, Health Physics shall have a BS degree in a technical field and professional experience in

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assignments involving radiation protection at the supervisory level. He must have four years experience and demonstrate proficiency in the application of radiation safety principles and be knowledgeable in fields related to radiation protection.

- 2.5.10 Health Physicists - The Health Physicists shall have a BS degree which shall include at least 20 quarter hours health physics related course work, and two years of radiation control related experience or an MS degree and one year of radiation protection experience.
- 2.5.11 Industrial Safety Officer - The Industrial Safety Officer shall have a BS or advanced degree with course work in industrial safety or at least one year's experience in industrial safety. He shall be familiar with the codes and requirements of the Occupational Health and Safety Act of 1970 and the National Fire Protection Association.
- 2.5.12 Nuclear Criticality Safety Specialist - The Nuclear Criticality Safety Specialist shall have a BS degree in science or engineering. He must have either two years experience with nuclear criticality safety calculations similar to those associated with site activities or he must have one year's experience with nuclear criticality safety calculations similar to those associated with site activities if he has at least an additional two years' experience in nuclear reactor physics calculations.
- 2.5.13 Accountability Specialist - The Accountability Specialist shall have at least a high school education and three years' experience in the use of licensed material. He must demonstrate to Company management his knowledge of the principles necessary for the accountability and safeguarding of special nuclear materials.
- 2.5.14 Safety Review Committee - The SRC membership, as a body, shall have expertise in chemistry, nuclear physics, health physics, and the safe handling of radioactive material. The SRC membership shall have a general understanding of nuclear criticality safety as it pertains to site operation.

## 2.6 TRAINING

- 2.6.1 Program 1 - This course is presented to site workers and non-site workers who will be granted access to the restricted area but who will

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not be granted unescorted access to the controlled areas. The course provides an introduction to radiation and radioactivity (understandable to a non-technical person) and a thorough coverage of safety rules and procedures, including the site emergency procedures. The Supervisor, Health Physics may modify the course content for those individuals knowledgeable in the basics of radiation and radioactivity. However, safety rules, procedures, and emergency procedures that apply at the site shall be covered.

- 2.6.2 Program 2 - This course is presented to site workers and non-site workers who will be granted unescorted access to the restricted area and controlled areas but who will not be permitted to work with radioactive materials without supervision. The Supervisor, Health Physics may modify the course content for those individuals knowledgeable in the basics of radiation and radioactivity. However, safety rules, procedures, and emergency procedures that apply at the site shall be covered. The effectiveness of the training shall be determined by a written examination.
- 2.6.3 Program 3 - This course shall be presented to site workers and non-site workers who will be granted unescorted access to the restricted area and controlled areas and will be permitted to work with radioactive materials and supervise such work. This course shall meet the requirements for designating a worker as an Authorized User. The Supervisor, Health Physics may modify the course content for those individuals knowledgeable in the basics of radiation and radioactivity. However, safety rules, procedures and emergency procedures that apply at the site shall be covered. The effectiveness of the training shall be determined by a written examination.
- 2.6.4 Retraining - Persons who are designated as Authorized Users shall be retrained annually. Satisfactory completion of the retraining shall be determined by passing a written examination.
- 2.6.5 Respiratory Protection Training - Training in respiratory protection techniques and equipment shall be required of all workers before the use of such equipment will be permitted. Satisfactory completion of this training shall be determined by passing a written examination.
- 2.6.6 Respiratory Protection Retraining - Retraining in respiratory protection shall be performed at two year intervals. Satisfactory

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completion of this retraining shall be determined by passing a written examination.

- 2.6.7 The training specified in Section 2.6 shall be administered by the Supervisor, Health Physics, or his designated and qualified alternate.
- 2.6.8 Nuclear Criticality Safety Training - Nuclear Criticality Safety training provided as a part of the programs specified in Sections 2.6.2, 2.6.3 and 2.6.4, shall be performed by the Nuclear Criticality Safety Specialist or his designated alternate. The designated alternate must meet the same minimum qualifications as those specified for the Nuclear Criticality Safety Specialist (2.5.8).

## 2.7 OPERATING PROCEDURES

### 2.7.1 Area Operating Procedures

- 2.7.1.1 All operations with licensed material shall be conducted in accordance with Area Operating Procedures or Radiation Work Permits (see 3.1.1).
- 2.7.1.2 Area Operating Procedures (AOP) - Area Operating Procedures shall be established for all routine operations in which SNM, source and byproduct materials are stored or handled. AOP's shall include those nuclear criticality and radiation safety controls and limits that apply to the operation. Each AOP shall be approved by the Nuclear Criticality Safety Specialist or his designated alternate, the Supervisor, Health Physics or his designated alternate, the Licensing & Compliance Officer or his designated alternate, the Industrial Safety Officer or his designated alternate and the Safety Review Committee.
- 2.7.1.3 AOP's may be revised with the approval of the Supervisor, Health Physics or his designated alternate, the Industrial Safety Officer or his designated alternate, the Nuclear Criticality Safety Specialist or his designated alternate, and the Licensing & Compliance Officer or his designated alternate. The revised procedure may be used with these approvals until the next scheduled regular meeting of the Safety Review Committee when the revision must be approved by the SRC.
- 2.7.1.4 AOP's shall be available in each operations area where they apply and shall be followed by site personnel.

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2.7.1.5 Distribution of new and revised procedures shall be made in accordance with a document control system which assures that the procedure manuals contain only the most current revision of the procedures.

2.7.1.6 AOP manuals shall be reviewed annually by the Licensing & Compliance Officer to assure that the manuals contain the most current revision of the procedures.

## 2.7.2 Technical Procedures

2.7.2.1 Technical procedures shall be established, reviewed, approved, and followed for Health Physics or Nuclear Criticality Safety. They shall be reviewed and approved by a Health Physicist or the Nuclear Criticality Safety Specialist, respectively, or their designated alternates. The designated alternate for a Health Physicist must meet the minimum qualifications specified in Sections 2.5.7. The designated alternate for the Nuclear Criticality Safety Specialist must meet the same minimum qualifications specified in Section 2.5.8. Approval signatures shall appear on the procedure.

## 2.8 INTERNAL AUDITS AND INSPECTIONS

### 2.8.1 Nuclear Criticality Safety

2.8.1.1 The Nuclear Criticality Safety Specialist or his designated alternate shall conduct internal audits for the purpose of evaluating the nuclear criticality safety aspects of operations. This audit shall be conducted in accordance with written audit guidance. This audit shall be conducted once each calendar quarter. A report of his findings shall be made to the Manager, Radiation and Criticality Safety within two weeks of completing the audit. The audit reports shall be forwarded to the Licensing & Compliance Officer and the Manager, Nuclear Criticality Safety. The Licensing & Compliance Officer shall be responsible for assuring that the appropriate corrective actions are taken to address the audit findings.

2.8.1.2 The Licensing & Compliance Officer shall perform an inspection weekly for compliance with the nuclear criticality safety aspects of the operations. Findings resulting from these inspections shall be reported to the Nuclear Criticality Safety Specialist.

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2.8.2 Health Physics

2.8.2.1 The Supervisor, Health Physics or his designated alternate shall conduct internal audits for the purpose of evaluating the health physics aspects of operations. This audit shall be conducted in accordance with written audit guidance. This audit shall be conducted once each month. A report of his findings shall be made to the Manager, Radiation Protection within two weeks of completing the audit. The audit reports shall be forwarded to the Manager, Radiation and Criticality Safety and the Licensing & Compliance Officer. The Licensing & Compliance Officer shall be responsible for assuring the appropriate corrective actions are taken to address the audit findings.

2.8.3 General Safety and Compliance

2.8.3.1 The SAS performs audits of general safety and compliance. These audits shall be conducted three times annually. The audits shall be distributed over a 12-month period. The SAS shall include an audit of the Health Physics and Industrial Safety functions at least once annually. This annual audit shall be performed by a qualified individual who is independent of the Health Physics Group. Other areas shall be audited for compliance with written requirements and the exercise of acceptable safety practices. Audits shall be made in accordance with written guidance to assure all aspects of Section 2.3.3.2 are audited. The Chairman, SAS shall file a report of the audit findings with the Chairman, SRC, with a copy to the Licensing & Compliance Officer and members of the SRC. The Chairman, SRC shall forward the report to the Manager, SS with comments, as he deems appropriate. The Licensing & Compliance Officer shall be responsible for assuring that the appropriate corrective actions are taken to address the audit findings.

2.9 INVESTIGATIONS AND REPORTING OF OFF-NORMAL OCCURRENCES

2.9.1 Licensing & Compliance Officer

The Licensing & Compliance Officer shall investigate and report, when required, the following types of off-normal occurrences:

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- 2.9.1.1 Excessive levels of radiation from or contamination on packages upon receipt.
- 2.9.1.2 Thefts, attempted thefts, or losses of licensed material, other than normal operating losses.
- 2.9.1.3 Incidents as specified in 10 CFR 20.403.
- 2.9.1.4 Overexposure of individuals and excessive levels and concentrations of radioactivity.
- 2.9.1.5 Failures to comply and defects pursuant to 10 CFR 21.
- 2.9.1.6 Changes to security, safeguards, or emergency plans made without prior NRC approval, when prior approval is required.
- 2.9.1.7 Failures to comply with license requirements.
- 2.9.1.8 Unapproved storage or use of licensed material.
- 2.9.1.9 Any violation of nuclear criticality safety criteria.
- 2.9.1.10 Any violation of Area Operating Procedures or RWP's.

2.9.2 Supervisor, Health Physics

The Supervisor, Health Physics shall perform investigations and issue reports of the following:

- 2.9.2.1 Higher than expected personnel exposures.
- 2.9.2.2 Higher than expected concentration of airborne activity in the facility.
- 2.9.2.3 Unauthorized entry into a High Radiation or Airborne Radioactive Material area.
- 2.9.2.4 Failure of equipment or instrumentation to meet Health Physics requirements.

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## 2.10 RECORDS

The following positions or organizations shall be responsible for maintaining the indicated records, for the period specified. Records may be kept in original form, microfilm or in computer storage. The symbol (\*) indicates that the record will be retained until the NRC authorizes its disposition.

### 2.10.1 Health Physics Group

Health Physics Supervisor audits	2 years
Shipping and receiving RM forms	5 years
Waste disposal records	(*)
Personnel dosimetry records	(*)
Results of Bioassays and Whole Body Counting	(*)
Releases to the environment	(*)
Radiation survey data	2 years
Contamination survey data	2 years
Radiation Work Permits (completed)	5 years
Radiation detection instrument calibration	2 years
Leak tests of sealed sources	2 years
Personnel training	(*)
Personnel retraining	(*)
Airborne radioactivity sampling data	(*)
NRC-4 forms	(*)
NRC-5 forms	(*)

### 2.10.2 Nuclear Criticality Safety Specialist

Nuclear criticality safety evaluations and calculations	6 months after termination of the approved process.
Nuclear Criticality Safety Specialist Audit Reports.	2 years

### 2.10.3 Licensing & Compliance Officer

Safety Review Committee Minutes	(*)
Safety Audit Subcommittee Audit Reports	2 years
Investigation reports of off-normal occurrences	2 years

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2.10.4 Emergency Records

Records pertaining to emergency response and preparedness shall be retained in accordance with Radiological Contingency Plan, Section 8.0.

2.10.5 Industrial Safety Officer

Training Records	(*)
Industrial Safety Audits	2 years
Industrial Safety Inspections	2 years

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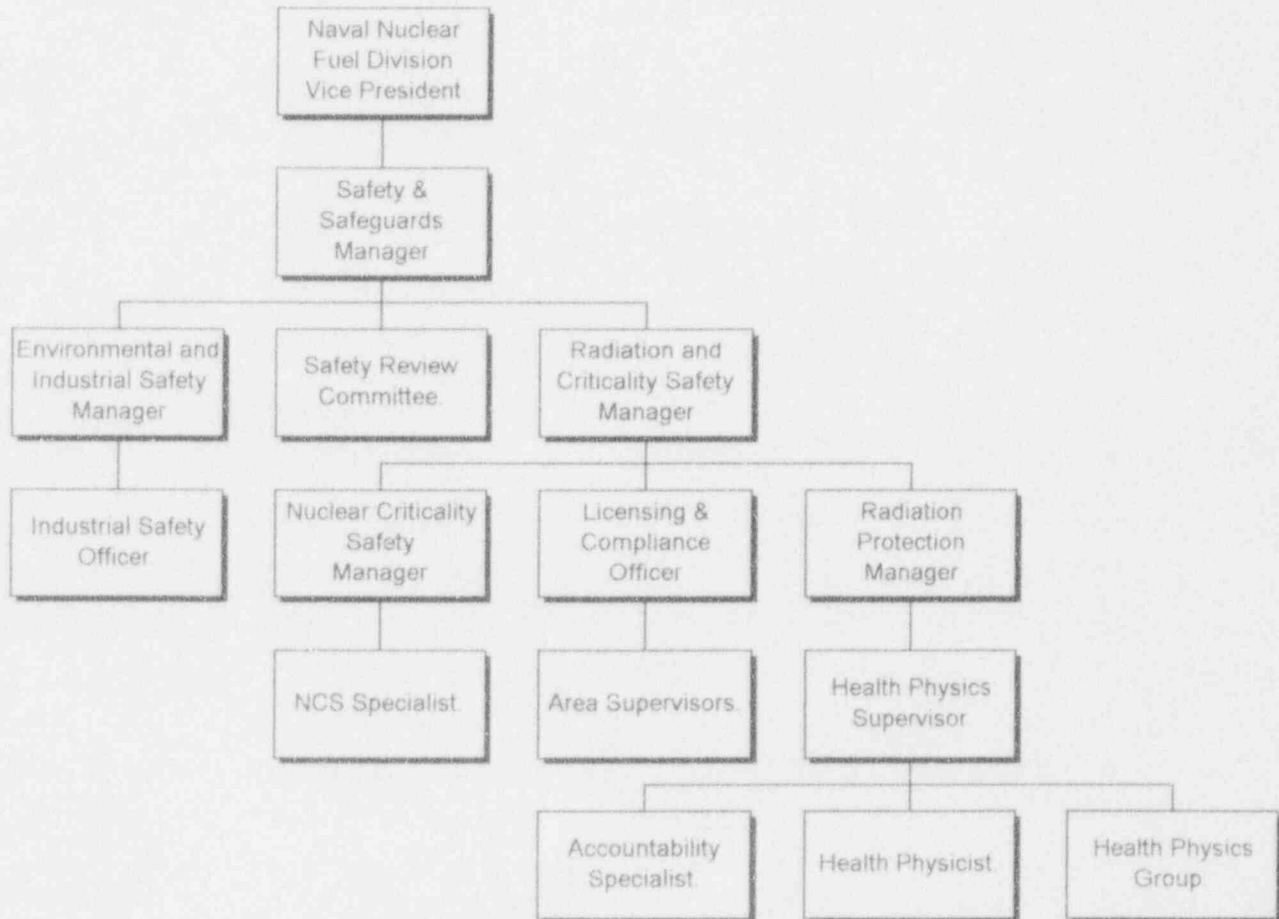
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FIGURE 2-1  
SITE ORGANIZATION



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3.0 RADIATION PROTECTION

3.1 SPECIAL ADMINISTRATIVE REQUIREMENTS

3.1.1 Radiation Work Permits (RWP)

- 3.1.1.1 RWP's shall be issued whenever the activity is not covered by an Area Operating Procedure and workers are likely to be exposed to levels of radiation or concentrations of radioactive material in excess of those specified in 10 CFR 20.101 & 20.103.
- 3.1.1.2 RWP's shall be approved by the Area Supervisor, Supervisor, Health Physics, Industrial Safety Officer, and the Licensing & Compliance Officer. In the absence of any of the above persons, a designated and qualified alternate may approve RWP's.
- 3.1.1.3 The RWP shall specify the radiological protection requirements for the operation and specify levels of worker exposure above which a documented ALARA evaluation shall be performed. RWP's that require a documented ALARA evaluation must, in addition to 3.1.1.2, be approved by the Manager, Radiation Protection.
- 3.1.1.4 RWP's shall be approved at a meeting of all the signators of the form.
- 3.1.1.5 The RWP form shall provide space for entering the estimated exposures to the whole body, extremities, and for the job. These are used to identify the areas of exposure concern and do not constitute an exposure goal or limit.
- 3.1.1.6 The RWP form shall provide space for the employee's supervisor to sign or initial, attesting that the workers have been instructed in the requirements of the RWP.
- 3.1.1.7 The term of a RWP shall not exceed 30-days, except that Standing RWP's shall have a term not to exceed 6-months.

3.1.2 ALARA Policy

The management of the site is committed to a policy of maintaining exposures as low as is reasonably achievable.

- 3.1.2.1 Site workers shall be introduced to this policy during their initial training and shall be reinforced during the annual retraining of Authorized Users.

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shall include all the controls and limits significant to the nuclear criticality safety of the operation. In addition, the Nuclear Criticality Safety Specialist shall perform a quarterly audit for compliance with nuclear criticality safety requirements and verify that process conditions have not been altered that may affect nuclear criticality safety. The results of the audit shall be documented and submitted to the Manager, Radiation and Criticality Safety and the Manager, Nuclear Criticality Safety.

#### 4.2 TECHNICAL REQUIREMENTS

4.2.1 Nuclear Isolation - When nuclear isolation is required (the potential neutronic interaction between units is negligible) the unit or units isolated shall be separated from all other SNM by one of the following or equivalent conditions:

1. Twelve inches of water.
2. Twelve inches of concrete with density of at least 140 lb/ft<sup>3</sup> when the unit(s) being nuclearly isolated are one of the units permitted by this license, (i.e., a mass limit specified in Section 4.2.2.2 or an authorized PWR or BWR fuel assembly or portion thereof, pursuant to Section 4.2.2.7.1) provided that the unit or units cannot be representable as a slab which interacts with other SNM primarily through its major face.
3. The edge-to-edge separation of 12-feet, or the greatest distance across an orthographic projection of either accumulation on a plane perpendicular to a line joining their centers, whichever is larger.

#### 4.2.2 Building B

4.2.2.1 General - Building B shall be limited to 40 units, excluding the hot cells, underwater storage, and the examination of power reactor fuel assemblies. Each unit shall be separated from adjacent units by at least 8-inches edge-to-edge and 24-inches center-to-center.

4.2.2.2 Unit Limits - Each unit shall be limited to one of the following:

4.2.2.2.1 Mass limits for mixtures of plutonium and U-235:

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PART II

SAFETY DEMONSTRATION

9.0 OVERVIEW OF OPERATION

9.1 CORPORATE INFORMATION

9.1.1 LICENSEE:

BABCOCK & WILCOX INVESTMENT CO.  
BABCOCK & WILCOX NAVAL NUCLEAR FUEL DIVISION  
LYNCHBURG TECHNOLOGY CENTER

9.1.2 Address:

Babcock & Wilcox Naval Nuclear Fuel Division  
Lynchburg Technology Center  
P. O. Box 11165  
Lynchburg, Virginia 24506-1165

9.1.3 Principal Offices:

Babcock & Wilcox Investment Co.  
Babcock & Wilcox  
1010 Common Street  
P. O. Box 60035  
New Orleans, Louisiana 70160

9.1.4 Principal Officers:

Robert E. Howson  
Chairman of the Board &  
Chief Executive Officer  
1010 Common Street  
P. O. Box 60035  
New Orleans, Louisiana 70160  
U. S. Citizen

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11.0 ORGANIZATION AND PERSONNEL

11.1 SITE ORGANIZATION

- 11.1.1 Vice President and/or General Manager, NNFD - The Vice President, and/or General Manager, NNFD is responsible for ensuring that all operations on site are conducted safely and in full compliance with NRC requirements.
- 11.1.2 The Manager, Safety & Safeguards (SS) - The Manager, SS is responsible for the safety of site operations and is appointed by and reports to the Vice President and/or General Manager, NNFD. He is responsible for the proper management of the materials accounting function, licensing function, nuclear criticality safety function, and the radiation protection function. He manages the allotment of funds and other resources and assures the proper assignment of personnel priorities.
- 11.1.3 Manager, Radiation and Criticality Safety - The Manager, Radiation and Criticality Safety reports to the Manager, Safety & Safeguards and is responsible for the radiation protection, licensing, and criticality safety programs.
- 11.1.4 Manager, Environmental and Industrial Safety - The Manager, Environmental and Industrial Safety reports to the Manager, Safety & Safeguards and is responsible for the environmental protection and industrial safety and hygiene programs.
- 11.1.5 Manager, Nuclear Criticality Safety - The Manager, Nuclear Criticality Safety reports to the Manager, Radiation and Criticality Safety and is responsible for the administration of the nuclear criticality safety program.
- 11.1.6 Manager, Radiation Protection - The Manager, Radiation Protection reports to the Manager, Radiation and Criticality Safety and is responsible for the protection of personnel, property, and the environment from contamination with radioactive materials; the protection of personnel from external radiation exposure, and the administration of an effective ALARA program.
- 11.1.7 Licensing & Compliance Officer - Research and development work at the site will be performed by personnel who do not report to the Manager,

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SS. Therefore, the positions of Licensing & Compliance Officer and Area Supervisor have been established to control the workers and their activities.

The Licensing & Compliance Officer shall report to the Manager, Radiation and Criticality Safety. He shall be responsible for the safety of all operations performed pursuant to License SNM-778. He shall utilize the expertise of the Supervisor, Health Physics, the Accountability Specialist, Nuclear Criticality Safety Specialist, and the Industrial Safety Officer to ensure the safety of operations.

The Licensing & Compliance Officer is also responsible for administering the license. He is the primary liaison between the site and the NRC and other federal, state, and local agencies regarding nuclear matters. He is the coordinator of the Safety Review Committee and Chairman of the Safety Audit Subcommittee and represents site management on both. The Licensing & Compliance Officer is responsible for ensuring that corrective action is taken in response to audit findings as they pertain to licensed activities.

The Licensing & Compliance Officer shall review and have approval authority for Area Operating Procedures. He shall have authority to terminate any operation that he deems contrary to license conditions, Area Operating Procedures, or general safety conditions. The Licensing & Compliance Officer shall become familiar with all license conditions and procedures concerned with radiation safety, nuclear safety, industrial safety, and nuclear materials safeguards. He may consult with the following personnel to ensure compliance with all safety regulations and principles:

Supervisor, Health Physics

Nuclear Criticality Safety Specialist

Industrial Safety Officer

Accountability Specialist

- 11.1.8 Area Supervisors - Area Supervisors are selected by their Division Management and shall be jointly approved by the Licensing & Compliance Officer and the Supervisor, Health Physics. Area Supervisors

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functionally report to the Licensing & Compliance Officer and are responsible for the safe performance of all activities in their assigned area and that all activities within their assigned areas are performed in full compliance with the license.

11.1.9 Supervisor, Health Physics - The Supervisor of Health Physics is appointed by the Manager, Radiation Protection and reports to the Manager, Radiation Protection. The Supervisor directs the overall operation of the Health Physics Group. He also serves on the Safety Review Committee. He has the authority to stop any operation that he believes is contrary to accepted safety practices, or license requirements. The Supervisor has overall responsibility for the shipment and receipt of licensed material, SNM accountability and exercises signature authority on all Area Operating Procedures. He performs audits of the site for compliance with Health Physics rules. The Health Physicists report to him.

11.1.10 Health Physicists - The Health Physicists report to the Supervisor, Health Physics. They administer the activities of the Health Physics Group, which include:

1. Performing area surveys
2. Administering the air sampling program
3. Administering the respiratory protection program
4. Administering the bioassay program
5. Leak testing radioactive sources
6. Supervising shipping and receiving of licensed material
7. Supervising and coordinating the waste disposal program
8. Assisting in personnel, equipment, and facility decontamination
9. Conducting radiation safety training
10. Providing expertise in all aspects of radiation protection

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11. Generating, maintaining and distributing records and reports that are required by NRC regulations or Health Physics procedures
  12. Providing expertise in health physics to the Licensing & Compliance Officer.
- 11.1.11 Industrial Safety Officer - The Industrial Safety Officer reports to the Manager, Environmental and Industrial Safety. His responsibilities include the following:
1. Administering the industrial safety program
  2. Reviewing proposed facility changes to ensure fire safety
  3. Providing expertise in fire prevention to the Licensing & Compliance Officer and the Safety Review Committee
  4. Performing tests, maintenance, and inspection of fire protection, control, and extinguishing equipment
  5. Providing training for the site Emergency Response Team and off site support agencies
  6. Inspecting all areas of the site periodically to ensure:
    - a. Proper storage and use of flammable solvents
    - b. Proper placement of fire extinguishing equipment
    - c. Elimination of fire hazards
    - d. Reduction, to the extent practicable, of the accumulation of flammable materials
    - e. Proper use and maintenance of electrical equipment.
  7. Working with Area Supervisors to formulate safety rules and elimination of hazards
  8. Investigation of all personnel injuries

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9. Keeping management informed concerning industrial safety activities
  10. Conducting industrial safety training.
  11. Signature authority on all new or revised Area Operating Procedures and Radiation Work Permits (RWP's).
- 11.1.12 Accountability Specialist - The Accountability Specialist reports to the Supervisor, Health Physics. He is responsible for the maintenance and retention of SNM accountability records. He prepares and transmits the reports required by regulation to inform regulatory agencies of SNM transactions.
- 11.1.13 Nuclear Criticality Safety Specialist - The Nuclear Criticality Safety Specialist is appointed by the Manager, Nuclear Criticality Safety. The Nuclear Criticality Safety Specialist is responsible for ensuring that no operation at the site can lead to the inadvertent assembly of a critical mass. To help assure this, he observes operations, develops and implements educational programs if and when he deems them necessary, and carries out confirming nuclear criticality safety calculations.

The Nuclear Criticality Safety Specialist will inspect all site operations where special nuclear material is being processed, quarterly. Other areas may be inspected less frequently, but all licensed facilities will be inspected at least twice a year. He will consider area operations when scheduling these inspections and will, if necessary, schedule his inspection at more frequent intervals. His consideration should include inspection of new operations, an audit of nuclear safety records, a check for area posting, a review of current practices and a review of corrective actions recommended during previous audits and the status of the recommended actions. He shall submit a report of his finding to the Manager, Radiation and Criticality Safety with a copy to the Licensing & Compliance Officer and the Manager, Nuclear Criticality Safety. The following information is to be included:

1. Areas visited
2. Operations observed
3. Unsafe practices and situations noted

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4. Nuclear safety activity of the quarter
5. Recommendations.

11.1.14 Safety Review Committee - The Safety Review Committee (SRC) shall be comprised of at least five technically trained and experienced members appointed by the Manager, SS. One member shall be selected by the Manager, SS to be the SRC Chairman. The Chairman shall preside at the meetings and keep the minutes. The Manager, SS shall appoint an Alternate Chairman who shall act for the Chairman during absences. One member shall be appointed by the Manager, SS to be the SRC Coordinator. The Coordinator shall represent site management on the SRC, set the meeting agenda, and maintains the permanent files of the Committee.

The SRC membership shall have expertise in chemistry, nuclear physics, health physics, and the safe handling of radioactive material. The SRC membership shall have a general understanding of nuclear criticality safety as it pertains to site operations. Consultants with special expertise are available to the Committee when needed.

The SRC shall meet at least four times a year. A quorum shall consist of a simple majority of the membership including the Chairman. The SRC shall review and approve all Area Operating Procedures. It shall review and approve new projects that utilize licensed material that are significantly different from previously reviewed and approved projects. The SRC shall review the annual report issued by the Supervisor, Health Physics which summarizes site workers' exposures, environmental releases, and a summary of the ALARA program accomplishments. The SRC Chairman shall forward the Committee minutes to the Manager, SS with copies to the Vice President, and/or General Manager, NNFD and the SRC Coordinator.

The Manager, SS shall appoint the members of the Safety Audit Sub-committee (SAS). The SAS shall be comprised of at least two individuals, one of whom shall be designated as Chairman and he shall report to the Chairman, SRC. The SAS shall audit site operations at least three times annually, with successive audits separated by at least two months. Additional audits may be performed at any time. The SAS Chairman shall develop the audit report and submit it to the SRC Chairman. The SRC Chairman shall submit the audit report to the Manager, SS with appropriate comments, with a copy to the Licensing & Compliance Officer.

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11.2 EDUCATION AND EXPERIENCE OF KEY PERSONNEL

11.2.1 Manager, Environment, Safety, & Health - Philip R. Rosenthal

Education:

B.S. - Mechanical Engineering, 1959  
University of Maryland, College Park, Maryland

A.S. - Mathematics, 1956  
Baltimore Junior College, Baltimore, Maryland

Graduate Studies, Drexel Institute of Technology  
Nuclear Engineering, 1962-1963  
Philadelphia, Pennsylvania

Experience:

(May, 1992 -Present) Babcock & Wilcox, Nuclear Environmental  
Services, Manager, Environment, Safety, &  
Health

Responsibilities: (See 11.1.2)

(1991 - 1992) President and COO for REES Corporation

Mr. Rosenthal was responsible for the preparation of Decommissioning  
Funding Plans for two uranium fuel fabrication facilities. Project  
Manager for the preparation of Decommissioning Plans for the same  
facilities.

(1970 - 1991) ABB Combustion Engineering, Inc.  
Program Manager, Radiological and Industrial  
Safety, January 1989 to October 1991

Mr. Rosenthal was responsible for specifying radiological, criticality,  
industrial safety and environmental protection programs and standards  
for Combustion Engineering's Windsor and Hematite Nuclear Fuel Manu-  
facturing facilities. Responsible for emergency planning at the  
Windsor site. Responsible for liaison activities with regulators

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including NRC, EPA, and OSHA. Program Manager for Nuclear Fuel Manufacturing decontamination and decommissioning activities.

(1988 - 1989) Manager, Radiological and Industrial Safety

Mr. Rosenthal was responsible for the radiological protection, health physics, and industrial safety programs at Combustion Engineering's Windsor and Hematite Nuclear Fuel Manufacturing facilities. Ensured that the necessary engineering and administrative controls were in place. Directed the development of a set of Radiological Protection Instructions for the Windsor fuel manufacturing facility.

1974 - 1988) Manager, Radiological Protection Services

Mr. Rosenthal was responsible for C-E operations involving decommissioning, environmental control, radioactive waste disposal, and the transportation of radioactive materials. Administered NRC licenses for byproduct, source, and special nuclear materials. Responsible for providing health physics and radioactive material control services for C-E field services activities. Directed the development of Radiological Protection Instructions for the Windsor based Nuclear Services Center.

Also during this time period, served as Project and Program Manager for activities ranging from; dose reduction programs, steam generator replacement projects, transportation of spent fuel and high level waste characterization, decontamination and decommissioning of facilities and environmental areas including work with the Atomic Energy Control Board, Environment of Canada, and the New Brunswick Health Department.

(1970 - 1974) Supervisor of Mechanical Development

Mr. Rosenthal was responsible for activities relating to the mechanical development of pressurized water reactor systems and components such as fuel assemblies, control element assemblies, control element drive mechanism, valves and seals. Responsible for the design, construction, and operation of test facilities used during the evaluation and development programs.

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(1964 - 1970) Senior Project Engineer,  
General Dynamics Corporation, Electric Boat Division

Mr. Rosenthal was responsible for the design, procurement, test and evaluation of submersible sea water pump motor. Also responsible for the assembly of a prototype submarine reactor plant. Prepared the installation procedures for the major reactor plant components and was responsible for the design of special handling equipment.

Mr. Rosenthal was Refueling Director responsible for the development of refueling procedures, tools and equipment to be used during the refueling of submarine reactors. Directed the refueling of six naval reactor plants.

(1958 - 1962) Mechanical Engineer  
United States Navy (Civilian Employee)

Mr. Rosenthal was responsible for technical control and executive of the department's nuclear engineering research and development program. Investigated reactor designs, fuel fabrication methods, reactor control schemes, radioactive waste systems, thermionic and thermoelectric concepts for application to existing requirements.

(1958 - 1962) Reactor Systems Engineer  
Martin-Marietta Corporation

Mr. Rosenthal was responsible for the design and fabrication of a liquid radioactive waste disposal system. Performed analysis, procured components and prepared fabrication instructions for reactor components. Provided engineering liaison with the manufacturing organization during the construction of portable nuclear power plants.

Professional Affiliations:

- American Nuclear Society
- Health Physics Society
- Uranium Section Steering Committee
- Member, Uranium Bioassay Committee

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11.2.2 Supervisor, Health Physics - David L. Spangler

Education:

- B.S. - Biology, Core Study - Health Physics/Nuclear Science Engineering, Virginia Polytechnic Institute and State University, Blacksburg, Virginia
- Radioactive Material Shipping Regulatory Awareness
- Contamination and Hot Particle Control.

Experience:

(1991-Present) Babcock & Wilcox, Supervisor, Health Physics  
Nuclear Environmental Services, Lynchburg  
Technology Center, Lynchburg, Virginia

Mr. Spangler is responsible for administering the Health Physics Program at the site. This includes responsibility for external and internal exposure control, shipping and receiving of radioactive material, respiratory protection, radiological safety training, and maintaining support for licensed activities.

(1988-1991) Babcock & Wilcox, Health Physicist  
NNFD Research Laboratory, Lynchburg, Virginia

Mr. Spangler was responsible for administering and implementing the Health Physics Program at the site. His duties included shipping and receiving radioactive material, shipping low-level waste, developing and implementing programs and procedures for; external exposure, contamination control, area surveillance, and instrument calibration.

(1982-1988) Health Physicist, H. B. Robinson Nuclear Power  
Plant, Hartsville, South Carolina

Mr. Spangler was responsible for developing and implementing radwaste, volume reduction and shipping programs and procedures. He was responsible for training and supervising waste processing and packaging groups. Mr. Spangler's other duties included: area surveys, radiation work permits, ALARA programs, instrument calibration and technical training and qualification programs.

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Professional Affiliation:

American Nuclear Society (Member)  
Health Physics Society (Member)

11.2.3 Industrial Safety Officer - Same as paragraph 11.2.5.

11.2.4 Accountability Specialist - Kenneth D. Long

Education:

Graduate - White Sulphur Springs High School, 1958  
Certificate - Bookkeeping, Central Virginia Community College, 1983

Experience:

(1974-Present) Babcock & Wilcox, Accountability Specialist NNFD  
Research Laboratory, Lynchburg, Virginia

Mr. Long, as the Accountability Specialist, is responsible for the accurate accounting of all Special Nuclear, Source, and Byproduct material at the site. He is responsible for recording all transfers of SNM that are made within the site and for preparing the reports and records of off site transfers. He prepares all NRC/DOE 741 Transaction Forms. He is responsible for the timely completion of inventories of licensed material. He initiates the paper work required for all shipments of licensed material.

In addition to his normal duties he is a Document Custodian. In this capacity, he is responsible for the safe storage of all classified DOE and DOD documents at the site. He is also an authorized classifier and an authorized courier of classified material.

(1970-1974) Babcock & Wilcox, Shipping & Receiving Clerk  
Lynchburg Research Center, Lynchburg, Virginia

Mr. Long was responsible for the shipment and receipt of all materials at the site. This assignment included the processing of all the necessary forms and documents used for shipping and receiving licensed materials as well as the many items that are required for operation of a research and development laboratory.

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(1967-1970) Babcock & Wilcox, Technician  
Lynchburg Research Center, Lynchburg, Virginia

Mr. Long was a technician in the Plutonium Development Laboratory during this period. He performed chemical operations utilizing uranium and plutonium materials and was responsible for the accountability of SNM materials into and out of his area.

Professional Affiliations:

Institute of Nuclear Materials Management (Senior Member)  
Nuclear Materials Control Committee, B&W (Secretary)  
American Nuclear Society, Virginia Chapter (Member)

11.2.5 Licensing & Compliance Officer - Charlie C. Boyd

Education:

B.S. - Physics, U. S. Naval Academy, 1976  
Nuclear Criticality Safety Short Course, 1987  
Nuclear Criticality Safety Workshop, 1986

Additional Training:

Government Institutes, Inc.  
OSHA Compliance, 1991  
Preparing for EPA/OSHA Inspections, 1991  
Industrial Hygiene for Non-Industrial Hygienists, 1992  
Professional Certification:  
Professional Quality Assurance Auditor, 1989

Experience:

(1991-Present) Babcock & Wilcox, Licensing & Compliance Officer,  
Nuclear Environmental Services, Lynchburg  
Technology Center, Lynchburg, Virginia

Responsible for coordination of all licensing activities at the Lynchburg Technology Center and for the regulatory compliance auditing system at NNFD. Responsible for Industrial Safety & Hygiene at the Site since May, 1991.

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(1989-1991) Babcock & Wilcox, Licensing & Compliance Officer,  
NNFD Research Laboratory, Lynchburg, Virginia

Responsible for coordination of all licensing activities at the NNFD Research Laboratory and for the regulatory compliance auditing system at NNFD. Responsible for Industrial Safety & Hygiene at the Site since May, 1991.

(1987-1989) Babcock & Wilcox, Licensing & Compliance Officer,  
NNFD, Lynchburg, Virginia

Responsible for coordination of all licensing activities at NNFD and for the establishment of a regulatory compliance auditing system.

(1984-1987) Babcock & Wilcox, Nuclear Safety & Licensing  
Officer, NNFD, Lynchburg, Virginia

Responsible for nuclear criticality safety and coordination of all licensing activities for NNFD.

(1985-1986) Babcock & Wilcox, Lead Engineer, NNFD, Lynchburg,  
Virginia

Responsible for the development of process and production of control rods for NNFD's Advanced Reactor Development Section.

(1984-1985) Babcock & Wilcox, Lead Engineer, NNFD, Lynchburg,  
Virginia

Developed processes and procedures for fuel preassemblies within NNFD's Advanced Reactor Development Section.

(1976-1984) Officer, U. S. Marine Corps

Held positions ranging from Platoon Commander to Marine Amphibious Brigade Communications Electronic Officer. Responsibilities ranging from planning, coordinating, deploying, and operating communications assets of a Brigade size task force involving local and world-wide communications to planning and coordinating military and high school testing for the state of South Carolina, fourteen counties in Georgia, and the Panama Canal Zone.

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Professional Affiliations:

National Fire Protection Association (Member)

11.2.6 Nuclear Criticality Safety Specialist - Francis M. Alcorn

Education:

B.S. - Nuclear Engineering, North Carolina State College, 1957  
M.B.A - Business Administration, Lynchburg College, 1974  
- Graduate study in Nuclear Engineering, University of Virginia

Experience:

(1989-Present) Babcock & Wilcox, Manager, Nuclear Criticality Safety Unit, NNFD, Lynchburg, Virginia

(1971-1989) Babcock & Wilcox, Supervisor, Nuclear Criticality Safety Group, NNFD Research Laboratory, Lynchburg, Virginia

This unit is the Company's central organization which provides guidance, develops and validates the analytical methods needed for criticality evaluations, does criticality calculations, performs nuclear safety audits, and gives assistance to the various divisions of the Company and the Company's customers in matters related to nuclear criticality safety. In addition to his responsibility as manager of this group, he is the Nuclear Criticality Safety Specialist for the Site.

(1969-1971) Babcock & Wilcox, Criticality Specialist, Nuclear Safety Engineer, Lynchburg Research Center, Lynchburg, Virginia

Transferred to the LRC as Nuclear Criticality Safety Specialist for Babcock & Wilcox's Naval Nuclear Fuel Plant, Commercial Nuclear Fuel Plant, and the LRC. He was appointed Nuclear Safety Officer for the LRC.

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(1964-1969) Babcock & Wilcox, Power Generation Division,  
Lynchburg, Virginia

Mr. Alcorn was a physicist in the PWR Development Section and was responsible for determining the most economical method for utilizing plutonium as a recycle fuel in B&W's pressurized water reactor concepts. In addition, he was Nuclear Criticality Safety Advisor to the Company's Naval Nuclear Fuel Division.

(1961-1964) Babcock & Wilcox, Nuclear Power Generation Division  
Lynchburg, Virginia

He has been concerned with core neutron physics analysis and design of the Consolidated Edison Reactor, the Liquid Metal Fuel Reactor, the Babcock & Wilcox Test Reactor, the Advanced Test Reactor, the Heavy Water-Organic Cooled Reactor Concept, and Babcock & Wilcox Pressurized Water Reactor Concepts. He developed methods for and performed calculations for criticality, fuel depletion, nuclear safety coefficients, power profiles, nuclear fuel costs and critical experiment analysis. He has also worked in the areas of kinetics safety analysis.

(1957-1960) Babcock & Wilcox, Atomic Energy Division  
Lynchburg, Virginia

He functioned as a nuclear engineer doing both core neutron physics and shielding calculations.

(1960-1961) General Nuclear Engineering Corporation,  
Staff Physicist

Mr. Alcorn engaged in core neutron physics design and analysis of the Boiling Nuclear Superheat Reactor. He also wrote physics articles for Power Reactor Technology which were published by GNEC for the AEC.

Professional Affiliations:

Sigma Pi Sigma (Member)  
Tau Beta Pi (Member)  
American Nuclear Society - Past Chairman of ANS Nuclear  
Criticality Safety Division  
- Member Standards Subcommittee ANS-8.

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11.2.7 Health Physicists

11.2.7.1 Health Physicist - Carl R. Yates

Education:

B.S. - Biology, University of Pittsburgh,  
Johnstown, Pennsylvania, 1979

M.S. - Biology, West Virginia University,  
Morgantown, West Virginia, 1981

Additional Training - "Radioactive Sample Analysis,"  
Gaithersburg, Maryland, 1989  
- "Environmental Radiation Surveillance,"  
Boston, Massachusetts, 1983.

Experience:

(1991-Present) Babcock & Wilcox, Health Physicist,  
Nuclear Environmental Services, Lynchburg  
Technology Center, Lynchburg, Virginia

Mr. Yates is responsible for tracking and reviewing the Personnel Dosimetry records of the Lynchburg Technology Center employees, ensuring all health physics instruments are calibrated accurately and in a timely manner, and managing the environmental monitoring program.

(1988-1991) Babcock & Wilcox, Health Physicist,  
NNFD Research Laboratory, Lynchburg, Virginia

Mr. Yates is responsible for tracking and reviewing the Personnel Dosimetry records of the NNFD Research Laboratory employees, ensuring all health physics instruments are calibrated accurately and in a timely manner, and managing the environmental monitoring program.

Additional responsibilities include preparation of health physics technical procedures and various radiation work permits.

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(1986-1988) Science Applications International Corporation  
(SAIC), Radiological Scientist, Rockville,  
Maryland

Mr. Yates was responsible for the on-site categorization of fuel pool-stored components for compliance with 10 CFR 61, scaling factor determination, and studies involving the behavior of radioiodine in sampling lines at operating power stations.

Additional responsibilities included writing the quality control data report for the radiological laboratory, and acting as Project Manager for the EPA and NIST intercomparison programs.

(1981-1986) NUS Corporation, Environmental Scientist/  
Project Manager, Gaithersburg, Maryland and  
Pittsburgh, Pennsylvania

Mr. Yates was responsible for conducting on-site environmental surveys for several Department of Energy sites as a member of the DOE/NUS Environmental Survey Team, writing annual reports for various nuclear power plant's environmental monitoring programs, writing technical procedures, sample collection auditing, and preparing the environmental study plan for a candidate high-level nuclear waste repository site.

Professional Affiliations:

American Nuclear Society (Member)  
Health Physics Society (Member)

11.2.7.2 Health Physicist - Teofil Grochowski

Education:

B.S. - Nuclear Medicine Technology, University of Virginia Medical Center/Lynchburg College, 1986  
- Certificate in Nuclear Medicine Technology, University of Virginia Medical Center, 1985  
B.S. - Biochemistry, Lynchburg College, 1985  
A.S. - Science, Central Virginia Community College, 1983

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Experience:

(1991-Present) Babcock & Wilcox, Health Physicist,  
Nuclear Environmental Services, Lynchburg  
Technology Center, Lynchburg, Virginia

Primary responsibilities include administration of the respiratory protection program, bioassay program, radiation safety training of new employees, technical procedure development, preparation of radiation work permits, and instrument calibrations. Also appointed as the alternate site Radiological Safety Officer.

(1986-1991) Babcock & Wilcox, Health Physicist, NNFD  
Research Laboratory, Lynchburg, Virginia

Primary responsibilities include administration of the respiratory protection program, bioassay program, radiation safety training of new employees, technical procedure development, preparation of radiation work permits, and instrument calibrations. Also appointed as the alternate site Radiological Safety Officer.

Professional Certification:

Certified Nuclear Medicine Technologist  
Nuclear Medicine Technology Certification Board  
Registered Technologist, Nuclear Medicine  
American Registry of Radiologic Technologists

Professional Affiliations:

Health Physics Society (Plenary Member)  
Society of Nuclear Medicine (Associate Member)  
Virginia Chapter, Health Physics Society (Member)  
Virginia Chapter, American Nuclear Society (Member)  
Virginia Society for the Advancement of Nuclear Medicine (Member)  
Virginia Academy of Science (Member)  
Society of Nuclear Medicine (Technologist Member)

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11.2.7.3 Health Physicist - J. Todd Whitaker

Education:

B.S. - Health Physics, Francis Marion College, Florence, S.C., 1987

Additional Training:

September 25-29, 1989, Inspection Procedures (40 hours) sponsored by the Nuclear Regulatory Commission in Orlando, Fl.

May 5, 1990, Radiation Safety in Gauge Operation (8 hrs) sponsored by Troxler Electronics, Inc. in Research Triangle Park, NC.

June 11-15, 1990, Licensing Practices and Procedures (40 hours) sponsored by the Nuclear Regulatory Commission in Atlanta, Ga.

August 13-17, 1990, Medical Uses Of Radionuclides (40 hours) sponsored by the Nuclear Regulatory Commission and Oak Ridge Associated Universities in Oak Ridge, Tn.

July-August 1991, Five Week Health Physics Course (200 hours) sponsored by the Nuclear Regulatory Commission and Oak Ridge Associated Universities in Oak Ridge, Tn.

September 19, 1991, Troxler Electronics, Inc. Radiation Safety Officers Course (8 hours) at Research Triangle Park, NC.

Experience:

(1991 - Present) Babcock & Wilcox, Nuclear Environmental Services  
Lynchburg Technology Center, Lynchburg, Virginia

Mr. Whitaker is responsible for the radiation safety training program and the instrument maintenance and calibration program for the site. Additional responsibilities include preparation of technical procedures and radiation work permits.

(1989 - 1991) State of North Carolina, Department of  
Environment, Health, and Natural Resources,  
Division of Radiation Protection, Radioactive

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Materials Section, Raleigh, North Carolina,  
Health Physics Inspector

Mr. Whitaker's responsibilities were inspecting radioactive material licenses throughout the state of North Carolina for regulatory compliance, write and amend radioactive material licenses, interpret state, NRC, and DOT regulations, and consulting with licensees and the general public. Mr. Whitaker was also a member of the state emergency response team for responding to radiation emergencies. Additional responsibilities included calibrating survey meters used by the division.

(1987 - 1989) RSO, Inc. (Radiation Service Organization),  
Health Physicist, Laurel, Maryland

Mr. Whitaker's responsibilities included radiation safety surveys and audits. Mr. Whitaker was the project manager for a radioactive waste disposal contract at the U.S. Agricultural Research Center in Beltsville, MD. Mr. Whitaker also performed leak testing on over 300 radioactive sealed sources and performed calibration of portable survey meters. Additional responsibilities included environmental sampling, air sampling, and bioassay's.

Professional Affiliations:

Health Physics Society

### 11.3 PROCEDURES

- 11.3.1 Area Operating Procedures (AOP) - All operations with licensed material shall be conducted in accordance with Area Operating Procedures or a Radiation Work Permit. Area Operating Procedures are prepared by any technically competent person. The proposed procedure is delivered to the Licensing & Compliance Officer who ensures that the procedure is in the proper format. The Licensing & Compliance Officer routes the procedure to the Nuclear Criticality Safety Specialist who reviews it to assure that any nuclear criticality safety issues are properly addressed. If the Nuclear Criticality Safety Specialist has additions or corrections, he notes them on the procedure and forwards it to the Supervisor, Health Physics. If the Nuclear Criticality Safety Specialist approves it, he signs the procedure in the space provided

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and forwards it to the Supervisor, Health Physics. The Supervisor, Health Physics reviews it for proper radiological content. If he has additions or corrections, he notes them on the procedure and forwards it to the Industrial Safety Officer. If the Supervisor, Health Physics approves the procedure, he signs the procedure in the space provided and forwards it to the Industrial Safety Officer. The Industrial Safety Officer reviews it to assure that any industrial safety issues are properly addressed. If the Industrial Safety Officer has additions or corrections, he notes them on the procedure and forwards it to the Licensing & Compliance Officer. If the Industrial Safety Officer approves it, he signs the procedure in the space provided and forwards it to the Licensing & Compliance Officer. The Licensing & Compliance Officer reviews it for general safety and determines its impact on other work and facilities. The Licensing & Compliance Officer is responsible for resolving all additions or changes recommended by the previous reviewers. When the procedure is approved by the four reviewers, the Licensing & Compliance Officer forwards it to the Safety Review Committee. The Safety Review Committee (SRC) may approve the procedure as written, approve the procedure conditionally with specific changes to be made prior to issuance or the SRC can disapprove it. The SRC coordinator signs for the SRC when approval is voted. The procedure may be implemented subsequent to SRC approval.

Revisions to AOP's will follow this same approval route, except that the revised procedure may be implemented after receiving the approval signatures of the Nuclear Criticality Safety Specialist, Supervisor, Health Physics, Industrial Safety Officer, and the Licensing & Compliance Officer. The revised procedure will be placed on the agenda for the next regularly scheduled meeting of the SRC. AOP manuals shall be placed in areas where the procedures apply.

- 11.3.2 Technical Procedures - Technical procedures provide detailed technical standards and instructions for performing specific tasks. Pursuant to this license application, they are not intended for use by operations personnel and are not distributed in the same manner as AOP's. Neither are they necessarily approved by the Safety Review Committee.

Technical procedures for Health Physics and Nuclear Criticality Safety are reviewed and approved by a Health Physicist and the Nuclear Criticality Safety Specialist, respectively, or by their designated alternates. The distribution list for each procedure is specified in the procedure.

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## 11.4 TRAINING

### 11.4.1 General Radiation Protection Training

The site provides three training programs covering the nature, use and control of radiation, and radioactivity. These courses are presented to ensure that all site personnel receive training appropriate to their activities and to fulfill obligations under the NRC license to provide such training.

The courses consist of a series of lectures intended to present the proper background and technical base to allow workers to understand the principles of radiation safety. The Supervisor, Health Physics or his designated alternate administers the course and, in general, teaches each course. Where practical, basic general procedures and federal regulations are included and discussed. Training aids, such as motion pictures and self-study materials, are used as appropriate.

Program 1 is intended for site workers and non-site workers who will be authorized access to the restricted area. Program 2 is intended for site and non-site workers who may enter the restricted and controlled areas but who will not be permitted to work with licensed material without supervision. Program 3 is intended for authorized users (those who will be authorized to work with licensed material and to supervise such work).

Training in area operating procedures and special area procedures is the responsibility of the Area Supervisor. This training should be accompanied with appropriate formal and on-the-job training as the job requirements dictate.

### 11.4.2 Program 1

This course is presented to site workers and non-site workers who will be granted access to the restricted area but who will not be granted unescorted access to the controlled areas. The course provides an introduction to radiation and radioactivity (understandable to a non-technical person) and a thorough coverage of safety rules and procedures, including the site emergency procedures. Subjects include the types of radiation, ALARA, radiation effects on humans, decontamination procedures, radiation exposure to females, warning signs, basic health

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physics rules, a history of radiation protection, worker's rights and responsibilities, and health physics terms.

11.4.3 Program 2

This course is presented to site workers and non-site workers who will be granted unescorted access to the restricted area and controlled areas but who will not be permitted to work with radioactive materials without supervision. This course is intended to provide the workers with a knowledge of the hazards of working in radiation and controlled areas and ways to minimize their dose. Subjects include types of radiation, radiation exposure limits, ALARA, personnel dosimetry and its use, dose calculation, biological effects, radiation exposure to females, radiation protection measures, warning signs and labels, radiation work permits, emergency procedures, rights and responsibilities of workers, and health physics terms.

11.4.4 Program 3

This course is presented to site workers and non-site workers who will be granted unescorted access to the restricted area and controlled areas and will be permitted to work with radioactive materials and supervise such work. This course is intended for meeting the requirements for designation of a worker as an authorized user. Subjects include fundamentals of radiation, external and internal radiation protection, biological effects, radiation detection, instrumentation, contamination control, license requirements, site organization, rights and responsibilities under 10 CFR 19, ALARA, dose calculation, personnel dosimetry requirements and use, posting and labeling, and health physics terms.

11.4.5 Respiratory Protection Training

Training in respiratory protection techniques will be required of all workers before the use of such equipment will be allowed. This training will be carried out by a qualified individual, as defined in NUREG-0041 (Section 12.1), who will document that such training has been completed. Those persons who direct the work of workers using respiratory protection will be included in the training courses. Biennial retraining will be scheduled, at the discretion of the qualified individual, to ensure that a high degree of proficiency in the use of respiratory protective devices is maintained.

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Training in respiratory protection shall include the following subjects:

- a. Discussion of the airborne contaminants present in the work environment including their physical properties, physiological actions, toxicity, means of detection, and maximum permissible concentrations (MPC's).
- b. Discussion of the importance of selecting the proper respirator based on the hazard and the dangers of using respirators for a purpose other than that intended.
- c. Discussion of the construction, operating principles, and limitations of the available respirators.
- d. Discussion of the use of engineering controls as a substitute for respiratory protection and the need to make every reasonable effort to reduce or eliminate the need for respiratory protection.
- e. Instruction in methods to be used to determine that the respirator is in proper working order.
- f. Instruction in fitting the respirator properly, field testing for proper fit, and factors that may influence a proper fit.
- g. Instructions in the proper use and maintenance of the respirator.
- h. Discussion of the uses of various cartridges and canisters available for air-purifying respirators.
- i. Review of radiation and contamination hazards, including a review of other protective equipment that may be used with respirators.
- j. Instruction in emergency actions to be taken in the event of respirator malfunction.
- k. Classroom instruction to recognize and cope with emergency situations while working with a respirator.
- l. Any additional training as needed for special use.

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- m. The wearer must pass a written examination on the material presented on respiratory protection.

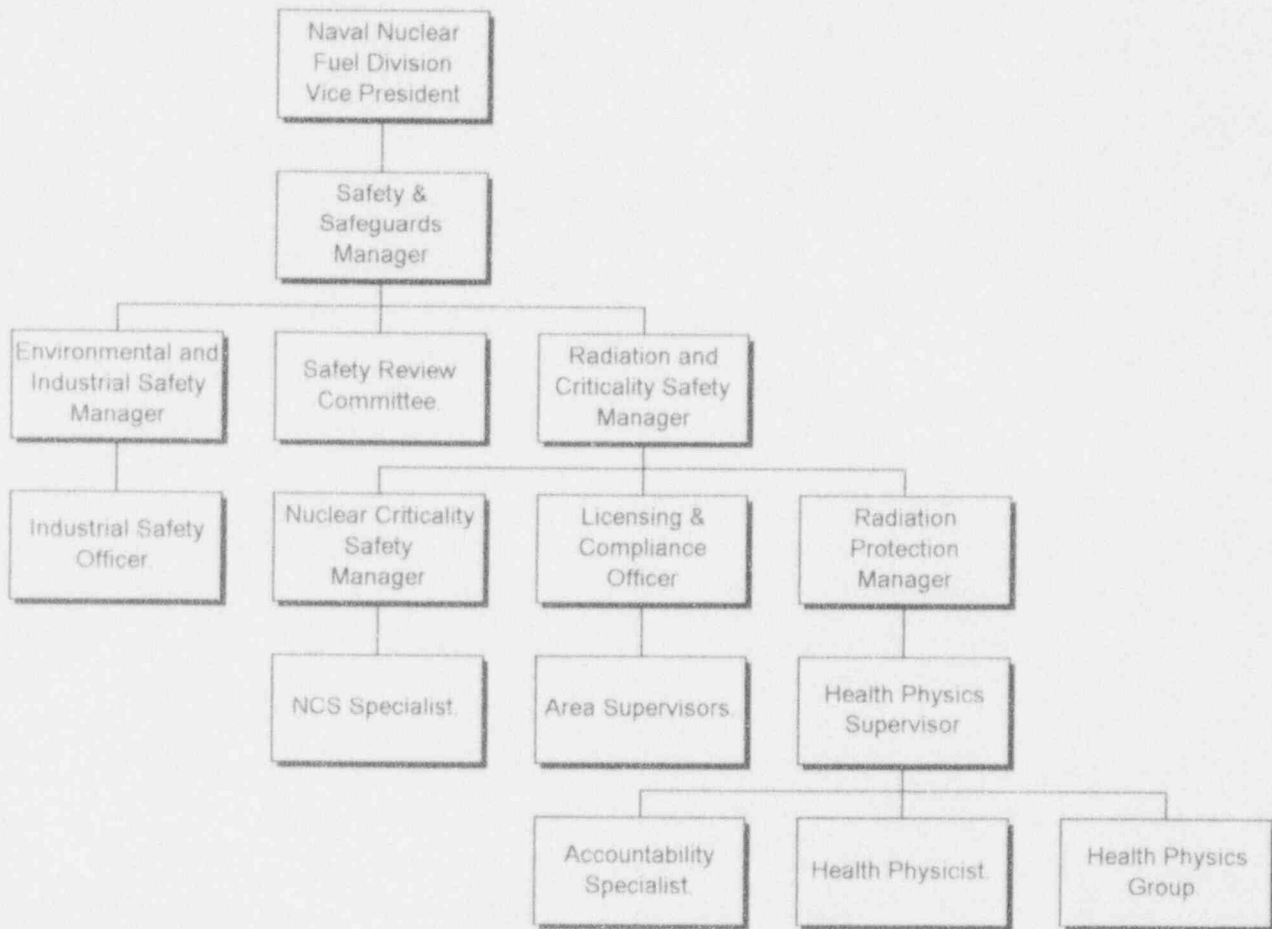
11.5 FACILITY CHANGE

Changes and modifications to buildings, exhaust ventilation systems, gas supply systems, emergency electrical systems, etc. are requested on Form RL-229, "Facilities Work Order Form" (Figure 11-2). All work orders are forwarded to the Plant Engineering Supervisor. The Plant Engineering Supervisor determines if the request involves a facility change. If a facility change is involved, the work order is forwarded to the Licensing & Compliance Officer. It is the Licensing & Compliance Officer responsibility to determine that all safety and licensing considerations have been addressed and if the request must be approved by the Safety Review Committee. Space is provided on the form for the approval signatures of the Supervisor, Health Physics, the Industrial Safety Officer, and the Licensing & Compliance Officer.

Completed forms are kept on file by the Plant Engineering Supervisor and are audited once a month by the Supervisor, Health Physics.

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FIGURE 11-1



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### 12.3 EXTERNAL RADIATION - PERSONNEL MONITORING

12.3.1 Administrative Exposure Control - Limits for external radiation exposure are set forth in 10 CFR 20.101 and these general limits are used at the site. The applicable exposure limits to be used for operations at the site are:

1. Whole body - 300 mRem/week (with long-term exposure controlled within the 1.25 Rem/quarter limit by the worker's immediate supervisor)
2. Skin of the whole body - 1.5 Rem/week
3. Hands and forearms, feet and ankles - 3.0 Rem/week.

The Manager, Radiation Protection has the authority to approve whole body exposures up to, but not exceeding, 3.0 Rem/calendar quarter. In emergencies, higher exposures may be authorized in accordance with the Radiological Contingency Plan.

12.3.2 Personnel Monitoring for Site and Non-site Workers - All site and non-site workers accessing the restricted area will be issued a film badge or a TLD. SRD's shall be issued to those workers expected to receive greater than 10% of the applicable limits set forth in 10 CFR 20. This dosimetry will be worn by the workers when they are in the restricted area. When the workers leaves the restricted area they will place their dosimetry in a location provided for this purpose.

12.3.3 Visitor Monitoring and Escort Requirements - Visitors to the restricted area will be issued a TLD. This dosimetry will be worn by the visitor when they are in the restricted area and will be surrendered when they depart the site. Visitors must be escorted by a site worker when in the restricted area.

#### 12.3.4 Monitoring Devices

The primary device used for monitoring exposure on site is the TLD or film badge. The exposure measured by this badge (reported in units of dose equivalent) becomes a part of the workers permanent exposure record.

In general, the worker should wear the dosimeters on the portion of the whole body expected to receive the highest dose (with the exception of extremity dosimetry issued in special cases). The film or TLD badge should always be worn in the proper orientation to ensure that exposure to non-penetrating radiation (e.g., beta radiation) is recorded. For

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## 12.5 REPORTS AND RECORDS

The following records will be maintained by the Health Physics Group for the periods indicated.

Health Physics Supervisor audits	2 years
Shipping and receiving RM forms	5 years
Waste disposal records	(*)
Personnel dosimetry records	(*)
Results of Bioassays and Whole Body Counting	(*)
Releases to the environment	(*)
Radiation survey data	2 years
Contamination survey data	2 years
Radiation Work Permits (completed)	5 years
Radiation detection instrument calibration	2 years
Leak tests of sealed sources	2 years
Worker training	(*)
Worker retraining	(*)
Airborne radioactivity sampling data	(*)
NRC-4 forms	(*)
NRC-5 forms	(*)

\* Indicates that the record will be retained until the NRC authorizes its disposition.

## 12.6 INSTRUMENTS

12.6.1 Types - The commitment of site management to an effective radiation protection program includes the obligation to provide the adequate equipment and supplies for such a program. It is the responsibility of the Manager, Radiation Protection and the Supervisor of Health Physics to ensure the appropriate radiation protection instrumentation is available for use on site. In addition, the Health Physics Group has the responsibility to ensure that this instrumentation is used properly, and is calibrated, maintained, and repaired as necessary. Minimum instrumentation requirements for maintaining an effective radiation protection program are listed in Tables 12-1 and 12-2. Other specialized instrumentation may not be included in this list. However, the exclusion of these instruments does not imply that their availability does not enhance the effectiveness of the radiation protection program.

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The Supervisor, Health Physics shall be responsible for evaluations to determine the location and amount of deposition; to provide data necessary for estimating internal dose rates, retention functions, and dose commitments; and to determine whether work restrictions or referrals for therapeutic treatment are required for any case where a result indicating a greater than 10% MPOB deposition of a radionuclide is verified.

- 12.8.2 External Occupational Exposure - Personal monitors (TLD's or other suitable devices) are provided to measure the radiation exposure of visitors and workers.

The Area Supervisors are responsible for keeping exposures below 300 millirem per week and 1250 millirem per quarter. The Supervisor, Health Physics may approve weekly exposures above 300 millirem, but the quarterly limit of 1250 millirem shall not be exceeded without the approval of the Manager, Radiation Protection. If a worker has received the quarterly limit and the Manager, Radiation Protection has not authorized exceeding the limit, the worker shall be restricted to prevent further exposure for the remainder of the quarter.

12.8.3 Airborne Activity

- 12.8.3.1 Air Monitoring Program - Air monitoring in operating areas of the site is accomplished with continuous monitors in predetermined, fixed locations. A monitor is placed in each radioactive materials handling area in which there is a potential for the release of airborne radioactivity. Locations are selected based upon the ability of the monitor to provide a reasonable evaluation of the airborne activity in a particular area and to provide adequate warnings to those in the area of changing conditions. The determinations are made by the Health Physics Group based upon the operations in the area, the potential for release, the quantity and chemical form of the material.

Alarms are set in accordance with a particular operation, the material being handled, and the potential for release. Actual alarm points are set as low as possible commensurate with the ambient radiation levels in the area. Personnel are instructed through procedures and training to evacuate, up wind, if an air monitor alarms and to notify the Health Physics Group. Re-entry is controlled by the Health Physics Group.

- 12.8.3.2 Effluent Monitors - Potentially contaminated air from chemical hoods, hot cells, and glove boxes is discharged ultimately through the 50-meter stack. Generally, exhaust air containing beta-gamma activity is passed through a single-stage HEPA filter which is sufficient to

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14.0 NUCLEAR CRITICALITY SAFETY

14.1 ADMINISTRATIVE AND TECHNICAL PROCEDURES

The ultimate responsibility for nuclear criticality safety rests with the Manager, Radiation and Criticality Safety. However, first-line responsibility is with the Licensing & Compliance Officer supported by the Nuclear Criticality Safety Specialist.

The Nuclear Criticality Safety Specialist is responsible for establishing the nuclear criticality safety limits for the site, assessing potential changes to these limits, ensuring the validity of assumptions, and the accuracy of results. Educational programs may be developed and implemented if and when the Nuclear Criticality Safety Specialist deems them necessary.

This function does not in any way relieve the Licensing & Compliance Officer of his responsibilities for ensuring the safety of operations, nor will it eliminate the necessity for the reviews by the Safety Review Committee required by the license.

Once a quarter the Nuclear Criticality Safety Specialist or qualified person designated by him will inspect all site operations where special nuclear materials are being processed. Other areas shall be inspected less frequently; however, all areas shall be inspected at least once a year. He shall consider area operations when scheduling these inspections and shall, if necessary, schedule his inspection at more frequent intervals. His consideration should include inspection of new facilities, inspection of hazardous non-routine operations, an audit of nuclear criticality safety records, a check for area posting and a review of current practices.

A written report is to be filed with the Manager, Radiation and Criticality Safety quarterly with a copy to the Licensing & Compliance Officer and Manager, Nuclear Criticality Safety. The report shall be brief, concerning itself with inspections made during the quarter and with the nuclear criticality safety activity of the quarter.

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