



May 18, 1995

License No. 06-00217-06  
Docket No. 030-03754

030-03754

U. S. Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, PA 19406-1415

Attention: Licensing Assistance Section

Subject: **Broad Scope License No. 06-00217-06 Renewal Application**

Enclosures: (see list on Page 2)

Dear Sirs:

Combustion Engineering, Inc. (CE), provides its application for renewal of the subject license.

Enclosure (1) is the completed NRC Form 313. Enclosure (2) provides the supplemental information requested in Form 313.

As discussed previously with Region I management, CE seeks to combine, with the subject broad scope license, the Special Nuclear Materials Laboratory activities currently authorized under License No. SNM-1067. The enclosed application adds those activities. Upon NRC approval of this license renewal, CE will request NRC headquarters to remove those activities from SNM-1067.

With this renewal application, CE submits as Enclosure (3) the Decommissioning Funding Plan for this license, prepared using the guidance of Regulatory Guide 3.66, dated June 1990. That Plan includes both the previous activities of the broad scope license and the SNM Laboratory activities which would be transferred from SNM-1067. The Plan also includes decommissioning release criteria (see Section 4.0). Enclosure (4) provides a certification of financial assurance.

In addition, the information requested in NRC Information Notice 90-09, "Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Materials Licensees" is provided in Section 11 of Enclosure (2).

ITEM # 166

ABB Combustion Engineering Nuclear Power

MAY 19 1995

REC'D IN LAS

Combustion Engineering, Inc.  
1000 Prospect Hill Road  
West Office Box 400  
Windsor, Connecticut 06095-0500

Telephone (203) 686-1911  
Fax (203) 285-9512  
Telex 99297 COMBEN WSOE

121790  
B/120

Finally, Enclosure (5) provides a check payable to the U. S. Nuclear Regulatory Commission in the amount of \$ 6,810.00 as the renewal application fee in accordance with 10 CFR 170. The applicable fee categories are summarized in Section 12 of the enclosed supplemental information.

We trust that you will find this application in order. Two copies of this document are provided for your use. If you have any questions concerning this matter, please contact me at (203) 285-5285.

Sincerely,

COMBUSTION ENGINEERING, INC.



Stephen M. Sorensen  
Radiation Safety Officer

List of Enclosures:

- (1) Complete NRC Form 313, dated May 18, 1995
- (2) Combustion Engineering, Inc., Broad Scope Radioactive Materials License Renewal Application Supplemental Information, NRC License No. 06-00217-06, dated May 18, 1995
- (3) Combustion Engineering, Inc., Decommissioning Funding Plan, License No. 06-00217-06, dated May 18, 1995
- (4) Certification of Financial Assurance, dated May 18, 1995
- (5) Combustion Engineering, Inc., Check No. 053681, dated May 17, 1995, payable to U. S. Nuclear Regulatory Commission, in the amount of \$ 6,810.00

APPLICATION FOR MATERIAL LICENSE

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 3.38 HOURS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH BRIBS 7740 U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON DC 20545 AND TO THE PAPERWORK REDUCTION PROJECT 0780-PLD OFFICE OF MANAGEMENT AND BUDGET WASHINGTON DC 20503

INSTRUCTIONS SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW **030-03754**

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS  
U.S. NUCLEAR REGULATORY COMMISSION  
WASHINGTON, DC 20545

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS

IF YOU ARE LOCATED IN

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND OR VERMONT, SEND APPLICATIONS TO

LICENSING ASSISTANT SECTION  
NUCLEAR MATERIALS SAFETY BRANCH  
U.S. NUCLEAR REGULATORY COMMISSION, REGION I  
475 ALLIANCE ROAD  
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA SEND APPLICATIONS TO

NUCLEAR MATERIALS SAFETY SECTION  
U.S. NUCLEAR REGULATORY COMMISSION, REGION II  
101 MARKET STREET, NW, SUITE 200  
ATLANTA, GA 30303

IF YOU ARE LOCATED IN

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO OR WISCONSIN, SEND APPLICATIONS TO

MATERIALS LICENSING SECTION  
U.S. NUCLEAR REGULATORY COMMISSION, REGION III  
789 ROOSEVELT ROAD  
ELEN BATH, E 05137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH OR WYOMING, SEND APPLICATIONS TO

MATERIAL RADIATION PROTECTION SECTION  
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV  
811 RYAN PLAZA DRIVE, SUITE 800  
ARLINGTON, TX 76011-8004

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO

NUCLEAR MATERIALS SAFETY SECTION  
U.S. NUCLEAR REGULATORY COMMISSION, REGION V  
1480 MARIA LANE  
WALNUT CREEK, CA 94596-5388

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS

1. THIS IS AN APPLICATION FOR (Check appropriate item)

☐ A. NEW LICENSE

☐ B. AMENDMENT TO LICENSE NUMBER

☒ C. RENEWAL OF LICENSE NUMBER 06-00217-06

2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip Code)

Combustion Engineering, Inc.  
1000 Prospect Hill Road  
Windsor, CT 06095-0500

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

Combustion Engineering, Inc.  
1000 Prospect Hill Road  
Windsor, CT 06095-0500

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Mr. Stephen M. Sorensen

TELEPHONE NUMBER  
(203) 285-5285

SUBMIT ITEMS 5 THROUGH 11 ON 8 1/2 x 11 PAPER THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE

5. RADIOACTIVE MATERIAL

a. Name and mass number b. Chemical and/or physical form, and c. maximum amount which will be possessed at any one time

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

9. FACILITIES AND EQUIPMENT

10. RADIATION SAFETY PROGRAM

11. WASTE MANAGEMENT

12. LICENSEE FEES (See 10 CFR 170 and Section 170.37)

FEE CATEGORY 1D,2C,3L,3N,3P AMOUNT ENCLOSED 6,810.00

13. CERTIFICATION (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 20, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948, 62 STAT. 761 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION

SIGNATURE - CERTIFYING OFFICER

TYPED/PRINTED NAME

TITLE

DATE

*Stephen M. Sorensen*

Stephen M. Sorensen

Radiation Safety Officer

5/18/95

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS
AMOUNT RECEIVED	CHECK NUMBER		

APPROVED BY

DATE

**Combustion Engineering, Inc.**  
1000 Prospect Hill Road  
Windsor, CT 06095-0500

**Broad Scope Radioactive Materials License Renewal Application  
Supplemental Information**

**NRC License No. 06-00217-06**  
Docket No. 030-03754



## Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
	Introduction	3
1	License Application	3
2	Applicant's Name and Mailing Address	3
3	Addressees Where Licensed Material Will Be Used or Possessed	3
4	Person to be Contacted About the Application	4
5	Radioactive Material	5
6	Purpose of Use of Licensed Material	7
7	Management Control and Responsibility	7
	7.1 Senior Management	7
	7.2 Radiation Safety Committee	11
	7.3 Radiation Safety Officer	15
	7.4 Radiation Safety Office Staff	21
8	Training for Individuals Working in or Frequenting Restricted Areas	21
9	Facilities and Equipment	21
10	Radiation Safety Program	44
	10.1 Previous Licenses	44
	10.2 Administrative Procedures	44
	10.3 Licensed Material Inventory and Accountability	47
	10.4 Audits and Appraisals	48
	10.4.1 Management and Radiation Safety Committee	48
	10.4.2 Radiation Safety Officer and Staff	48
	10.5 Safety Evaluations of Proposed Users and Uses	49
	10.6 Exposure Control and Monitoring	52
	10.6A.1 External - Non-SM/SNM Activities	52
	10.6A.2 Internal - Non-SM/SNM Activities	52
	10.6B.1 External - SM/SNM Activities	53
	10.6B.2 Internal - SM/SNM Activities	53
	10.7 Environmental Monitoring	60
	10.8 ALARA Program	60
11	Waste Management	62
12	License Fees	64
13	Certification	64

**Broad Scope Radioactive Materials License Renewal Application  
Supplemental Information  
NRC License No. 06-00217-06**

**Introduction**

This document provides supplemental information in support of Combustion Engineering's (CE) License Renewal Application. This information supplements that of the associated completed U.S. Nuclear Regulatory Commission (NRC) Form No. 313, "Application for Materials License". The Section numbers herein correspond to the Item Numbers of that form. This application was completed using the guidance of the NRC's "Standard Review Plan For Applications for Licenses of Broad Scope [Regulatory Guide 10.5, Revision 3] [Applications for Licenses of Broad Scope], dated June 1994.

The following Sections 1 through 4 are given in the completed NRC Form 313, and reiterated below.

**1 License Application**

This is an application for Renewal of License Number 06-00217-06.

**2 Applicant's Name and Mailing Address**

Combustion Engineering, Inc.  
1000 Prospect Hill Road  
Windsor, CT 06095-0500

**3 Addressees Where Licensed Material Will Be Used or Possessed**

The location of use or possession of material associated with this license is the same address as given in Section 2.

#### **4 Person to be Contacted About the Application**

Mr. Stephen M. Sorensen  
Radiation Safety Officer  
Combustion Engineering, Inc.  
1000 Prospect Hill Road  
Windsor, CT 06095-0500

Telephone: (203) 285-5285  
Facsimile: (203) 285-2540

The following Sections 5 through 11 provide supplemental information in accordance with NRC Form 313.

## 5 Radioactive Material

The following categories of radioactive material, with corresponding forms and possession limits, are requested:

Byproduct, Source, and/or Special Nuclear Material	Chemical and/or Physical Form	Possession Limit
A. Any byproduct material with Atomic Numbers 1 through 83	A. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, reactor coolant samples, or calibration sources	A. 50 Curies
B. Any byproduct material with Atomic Numbers 84 through 103	B. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or, reactor coolant samples	B. Not to exceed 3 millicuries per nuclide and 30 millicuries total
C. Cesium 137	C. Sealed Sources	C. 215 Curies
D. Americium 241	D. Sealed neutron sources	D. Not to exceed 1 Curie per source and 10 Curies total
E. Americium 241	E. Sealed neutron sources	E. Not to exceed 10 Curies per source and 100 Curies total
F. Neptunium 237	F. Oxide Wires	F. Not to exceed 0.5 millicuries per wire and 5 millicuries total
G. Uranium 233	G. Any	G. 1 gram
H. Uranium 235	H. Any	H. 7 grams
I. Uranium 235	I. Fission chambers (sealed)	I. Not to exceed 1.7 grams per chamber and 13.6 grams total
J. Plutonium	J. Any	J. 1 milligram
K. Uranium 235	K. Any	K. 341 grams, including < 5Kg UF <sub>6</sub>
L. Natural and/or Depleted Uranium	L. Any	L. 10,000 KgU, including < 5Kg UF <sub>6</sub>

## Information Concerning Sealed Sources

The following additional information is provided concerning sealed sources:

Sealed Sources	Sealed Source Storage Container or Device
C. Cesium 137 - Listed Below	C. Cesium 137 - Listed Below
1. Technical Operations, Inc. - Model SK1936, S/N S-171 - 2.0 Curies	1. Gamma Densitometer - Model 660
2. International Chemical and Nuclear - Model 375, S/N 771 - 1.19 millicuries	2. Lead Pig - Calibration Source
3. Technical Operations, Inc. - Model FM6, S/N 181, S/N 182 - 30 Curies each	3. Gamma Densitometer - Model 789
4. Measurements, Inc. - Model SK2085, S/N S-274 - 10 Curies	4. Gamma Densitometer - Model 807 #35
5. New England Nuclear - Model NER-401H, S/N CS-160 - 9.75 millicuries	5. Lead Pig - Calibration Source
6. ORNL Model S-136	6. Gamma Densitometer - Model 755
7. ORNL Model S-137	7. Gamma Densitometer - Model RTR-N #221
8. ORNL Model S0169	8. Lead Pig - Calibration Source
D. Americium 241 - Listed Below	D. Americium 241 - Listed Below
1. Monsanto Research Corp. - Model 2723A - 1 Curie	1. DOT 7A Container - Certificate # USA/0043/S
E. Americium 241 - Listed Below	E. Americium 241 - Listed Below
1. Monsanto Research Corp. - Model 2727B - 10 Curies	1. DOT 7A Container - Certificate # USA/0031/S

## **6 Purpose of Use of Licensed Material**

The following lettered paragraphs correspond to those of the possession limits in Section 5:

- A. through D. Research and development as defined in 10 CFR 30.4; possession incident to maintenance, repair, decontamination, and study of reactor components.
- E. Testing and calibration of boron measuring devices and for distribution to persons holding operating reactor licenses and/or to persons authorized to receive the licensed materials pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- F. through I. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed materials pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- J. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.
- K. through L. Research and development using Special Nuclear Material and Source Material in Buildings 2, 5, 6 and 18.

## **7 Management Control and Responsibility**

### **7.1 Senior Management**

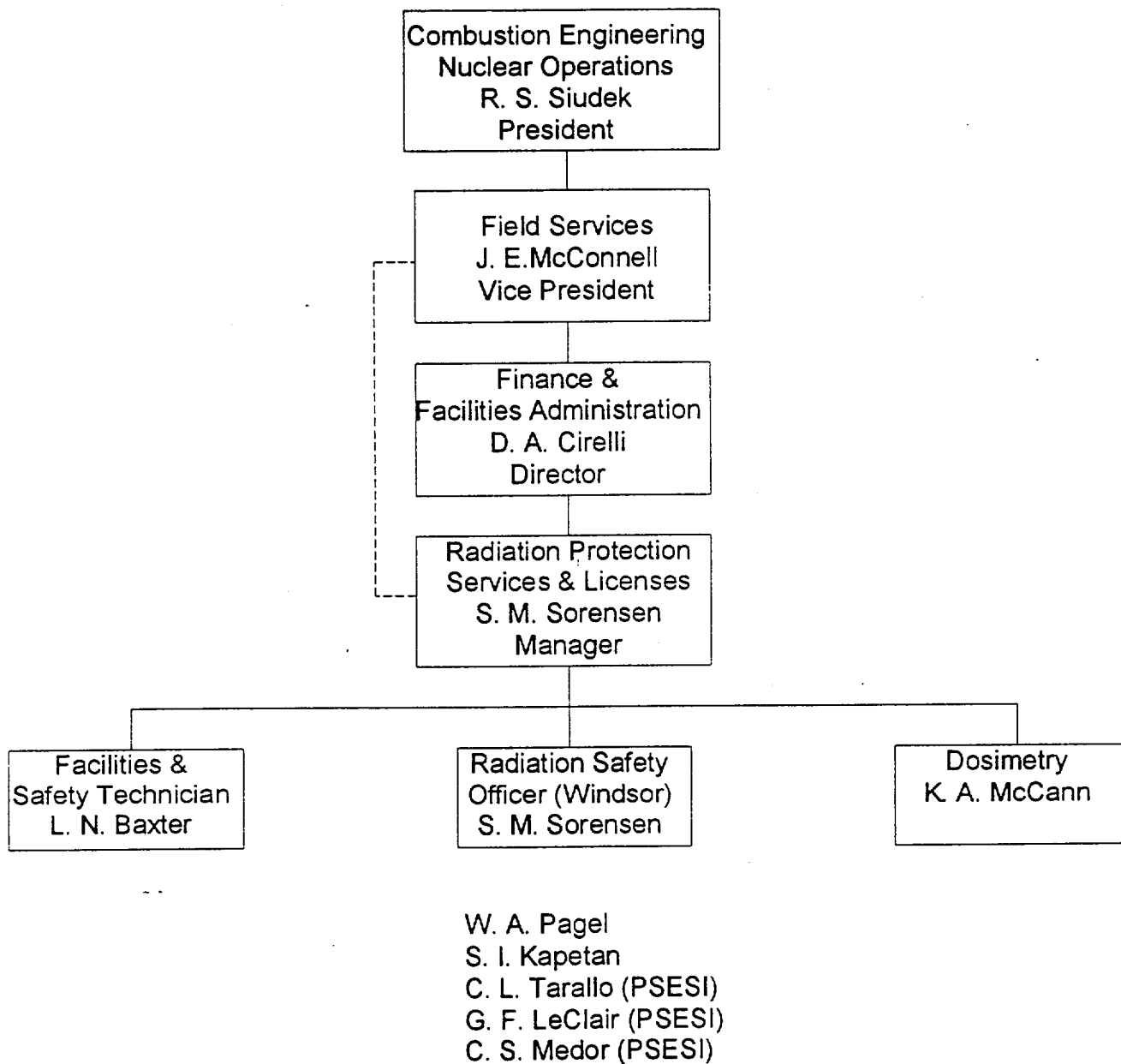
Combustion Engineering senior management appreciates the need for strong management controls for an effective radiation safety program for its broad scope license. The Radiation Safety Committee and the Radiation Safety Officer have been delegated sufficient authority, organizational freedom and management prerogative to communicate with and direct personnel of the radiation safety staff and others regarding NRC regulations and license provisions.

Figure 7.1-1 provides an organization chart depicting the organizational relationships of personnel related to radiation safety for this license application.

Figure 7.1-2 provides the signed certification of the Radiation Safety Officer.

Senior management oversight ensures sufficient mechanisms are in place for adequate control over licensed broad scope activities. These include regular meetings of the Radiation Safety Committee, including regular reports to senior management. Annual audits of the program are performed and reports to senior management are provided to assure safe operations and compliance with regulatory requirements. Section 10 provides further information concerning the radiation safety program.

**Figure 7.1-1  
Organization Chart**





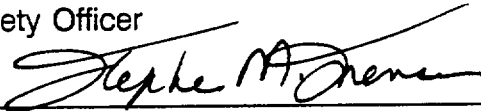
**Figure 7.1-2**  
**Radiation Safety Officer Certification**

We certify that the individual named in this license to perform the function of Radiation Safety Officer:

1. Has read and understands the NRC regulations applicable to this license and the specific conditions in the license;
2. Has sufficient technical knowledge to perform the duties of a Radiation Safety Officer;
3. Has and will continue to have sufficient time to perform the duties of the Radiation Safety Officer;
4. Has and will continue to get sufficient resources to accomplish the tasks of the Radiation Safety Officer;
5. Is completely willing to perform the functions of the Radiation Safety Officer; and
6. Has and will continue to receive the support of the management of this license in ensuring that all licensed activities will be conducted in accordance with NRC regulations and the specific terms of the license.

Radiation Safety Officer

Applicant

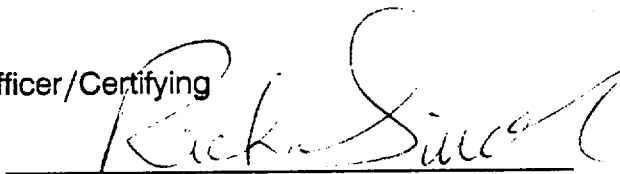


Date 5-18-95

S. M. Sorensen  
Radiation Safety Officer

Corporate Officer/Certifying

Official



Date 5-18-95

R. S. Siudek  
Vice President, Combustion Engineering, Inc.  
President, ABB Combustion Engineering Nuclear Operations

## 7.2 Radiation Safety Committee

Combustion Engineering has established a Radiation Safety Committee (RSC) in accordance with paragraph 33.13(c)(1) of 10 CFR 33 for this Type A broad scope license application. The following statement empowers that committee:

### Statement Empowering Radiation Safety Committee

The Radiation Safety Committee is empowered to oversee the licensed program and is responsible for control and direction of the radiation safety program and the Radiation Safety Officer, including the establishment of appropriate policies and procedures to assure control of procurement and use of radioactive material, completion of safety evaluations of proposed uses and users, and overall development and implementation of the radiation safety program.

The membership of the RSC consists of:

Director, Finance and Administration (Chairman)<sup>(1)</sup>  
Manager, Radiation Protection Services / Radiation Safety Officer  
Lead Senior Health Physics Technician  
Supervisor of Chemistry Services  
One (1) other Scientist or Engineer<sup>(2)</sup>

The Chairman of the RSC is the Director, Finance and Administration, who is also the management representative; this person is named in the resume given in Figure 7.2-1. The Radiation Safety Officer is also the Manager, Radiation Protection Services.

An individual's membership on the Radiation Safety Committee may be changed without prior notification of the NRC, providing that the new member meets the training and experience requirements for the position. The specific responsibilities of the Radiation Safety Committee are given in Figure 7.2-2.

A quorum of the RSC consists of at least three members: the RSO, a Lead Senior Health Physics Technician, and at least one other member.

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<sup>(1)</sup> This member shall represent the organization's interest from a business, legal and financial standpoint.

<sup>(2)</sup> This member must have at least five (5) years of experience in the use of radioactive materials.

**Figure 7.2-1**  
**Resume of:**  
**Dese A. Cirelli**  
**Chairman, Radiation Safety Committee**

**Education:**

B. S. - Accounting, Fairleigh Dickinson University, 1975

Manager of Managers Program, ABB Institute

Graduate Studies (30 Credit Hours) - accounting theory and management information systems, Fairleigh Dickinson University and Hartford Graduate Center

**Experience:**

COMBUSTION ENGINEERING, INC. 1988 to Present

Director, Finance and Administration 1993 to Present

Responsible for the financial, facilities and radiological protection services organizations of a multi-million dollar field and engineering service business.

Manager, Government Accounting 1988 to 1993

Responsible for the financial management of utility and government sponsored energy research programs with annual revenues approaching \$50 million. Responsible for compliance with regulatory requirements concerning financial disclosure and reporting. Single point of contact on all financial audit issues initiated by various government agencies.

UNITED TECHNOLOGIES CORPORATION 1984 to 1988

Supervisor, Subcontract Management

Planned and participated in financial audits of companies supplying materials and services under government sponsored military aircraft engine programs. Particular focus placed on detailed examinations of cost determination, and formal reporting in support of contract negotiations.

Supervisor, Financial Planning

1978 to 1984

Responsible for the preparation of budgets, financial plans, monthly reporting and analysis in support of a multi-million dollar aircraft engine manufacturing business. Also responsible for financial systems supporting process. Previously held positions in Capital Planning/Investment Analysis and Contract Pricing.

**BABCOCK AND WILCOX**

Plant Controller

1975 to 1978

Full responsibility for manufacturing plant financial records and books of account. Prepared monthly financial statements, conducted closings, prepared budgets, reported results.

**Professional Societies:**

National Contract Management Association, Central Connecticut Chapter - Executive Board, 1990 to 1993. Elected Vice President for 1994 term. Frequent lecturer on topics dealing with contracting with the Federal Government.

**Figure 7.2-2**  
**Duties and Responsibilities of the Radiation Safety Committee**

1. Meet as often as necessary to conduct business, but not less than quarterly.
2. Conduct annual reviews and audits of the radiation safety program, and devote sufficient time, along with the Radiation Safety Officer (RSO) and the Radiation Safety Office Staff (RSOS), to reviewing records, reports from the RSO, results of NRC inspections and written safety procedures, and observing audits performed by the RSO and RSOS to ensure the adequacy of management control systems. These reviews may be conducted by an independent auditor, however, this does not relieve the Radiation Safety Committee (RSC) of the responsibility to ensure that the reviews are conducted in accordance with regulations. Examples of annual program review include, but are not limited to, the following:
  - a. Review of radiation work permits.
  - b. Review of letters of agreement with offsite emergency response agencies.
  - c. Review of procedures for controlling and maintaining inventories, procurement of radioactive material, individual user and institutional cumulative possession limits, transfer of radioactive materials within the institution, and transfer of radioactive material to other persons/licensees.
  - d. Review of audit findings by the RSO/RSOS.
3. Review safety evaluations of proposed users and uses. Uses are evaluated as part of the Radiation Work Permit process. Special use safety evaluations are performed on a case-by-case basis. Users are evaluated via the training program.
4. Develop procedures and criteria for training and testing each category of worker.
5. Establish methods for maintaining records of the committee's proceedings and safety evaluations of proposed users and uses of radioactive materials.
6. Develop safety manuals as necessary to ensure proper program implementation and good health physics practices. The "safety manuals" that Combustion Engineering uses for this license are termed "Radiation Protection Instructions".
7. Maintain a list of current committee members and their appropriate training and experience.

### **7.3 Radiation Safety Officer**

Combustion Engineering has appointed a Radiation Safety Officer (RSO) in accordance with paragraph 33.13(c)(2) of 10 CFR 33 for this Type A broad scope license application. The RSO is responsible for oversight of the day-to-day radiation protection program established by the RSC. He is also responsible for communication with senior management and the RSC regarding program implementation and compliance status and he is available to provide advice and assistance on radiological safety matters.

The required education and experience of the RSO are an academic degree in the physical or biological sciences or engineering, or equivalent experience, and at least 5 years experience with a broad spectrum of radioactive materials. A listing of the duties and responsibilities of the RSO is given in Figure 7.3-1.

The resume of the Combustion Engineering RSO for this license application, Mr. Stephen M. Sorensen, is given in Figure 7.3-2. Mr. Sorensen is a full time employee of Combustion Engineering.

The RSO can be contacted during emergencies via telephone (on site phone system or home phone during off-hours, or via a beeper). The RSO's primary obligations are his RSO duties, however he also serves in a management role (Manager, Radiation Protection Services) for the Building 2 Complex, and as Technical Director for the NVLAP Accredited Dosimetry System.

**Figure 7.3-1**  
**Duties and Responsibilities of Radiation Safety Officer**

1. Surveillance of overall activities involving radioactive material, including monitoring and surveys of all areas in which radioactive material is used.
2. Determine compliance with rules and regulations, license conditions, and conditions of project approvals authorized by the Radiation Safety Committee.
3. Monitor and maintain absolute and other special filter systems associated with the use, storage and disposal of radioactive material.
4. Provide necessary information on all aspects of radiation protection to personnel at all levels of responsibility, pursuant to 10 CFR 19.32, and 10 CFR Part 20.
5. Proper delivery, receipt, and conduct of radiation surveys of all shipments of radioactive material arriving at or leaving the site within the scope of this license, including proper packaging and labeling of that radioactive material.
6. Distribute and process personnel monitoring equipment, determine the need for evaluation of bioassays, monitor personnel exposure and bioassay records for trends and high exposures, and notify individuals and their supervisors of exposures approaching maximum permissible amounts and recommend appropriate remedial action.
7. Conduct training programs and otherwise instruct personnel in the proper procedures for the use of radioactive material prior to use, at periodic intervals (refresher training) and as required by changes in procedures, equipment and regulations, etc.
8. Supervise and coordinate the radioactive waste disposal program, including effluent monitoring and maintenance of waste storage and disposal records.
9. Store radioactive materials not in current use, including wastes.
10. Perform or arrange for leak tests on all sealed sources and calibration of radiation survey instruments.
11. Maintain an inventory of all radioisotopes on site and limit the quantity of radionuclides on site to the amounts authorized by the license.
12. Immediately terminate any activity that is found to be a threat to public health and safety or property.

13. Supervise decontamination and recovery operations.
14. Maintain other records not specifically designated above, e.g., receipt, transfer, and survey records as required by 10 CFR 30.51, "Records," and 10 CFR Part 20, Subpart L, "Records" (guidance is provided in NUREG-1460, dated November 1992, "Guide to Reporting and Record Keeping Requirements").
15. Periodic meetings with and reports to Combustion Engineering management and the Radiation Safety Committee.



**Figure 7.3-2**  
**Resume of:**  
**Stephen M. Sorensen**  
**Radiation Safety Officer**

**Education:**

Hoosic Valley Central High School - College Preparatory, 1959 - 1963  
Rensselaer Polytechnic Institute - Engineering, 1963 - 1964  
U. S. Naval Nuclear Power School and Prototype - Nuclear Engineering, 1966  
U. S. Navy - Various Electronic and Electro-mechanical Service Schools, 1965 - 1972  
Panasonic TLD Symposia, yearly 1988 - 1994  
Panasonic Dosimetry School, University of Michigan, 1988  
Dale Carnegie Management Seminar, 1975

**Experience:**

COMBUSTION ENGINEERING, INC. 1980 to Present

Manager, Radiological Protection Services 1988 to Present

Responsibilities include the duties of the Radiation Safety Officer and management of the Windsor Site NRC Broad Scope Radioactive Materials License. An average of nine Radiation Protection personnel reporting. Also responsible for administrative support and oversight of Outage Services Radioactive Materials Facility in Chattanooga, Tennessee.

Radiation Safety Officer 1986 - 1988, & 1994 to Present

Duties and responsibilities included oversight, review and maintenance activities associated with NRC Broad Scope Radioactive Materials License.

As a Special Project, assisted in the preparation of the Decommissioning Plan for the CE Canada Nuclear Fuel Manufacturing Facility. Acted as Radiation Safety Officer and later as Project Manager. This project was successfully completed and the site released for unrestricted use in November 1987.

Section Manager, Professional Recruiting Services 1984 - 1986

Responsible for the development, operation and maintenance of computerized recruiting system. Directed staffing efforts of department to supply temporary Health Physics, Engineering and Instrumentation personnel for Nuclear, Fossil and Industrial customers.

Nuclear Services Site Manager

1982 - 1984

Duties expanded to include more extensive customer presentations and technical assistance. Performed duties of shift coordinator during thermal shield removal and core barrel repair at Florida Power and Light Company's St. Lucie plant.

Senior Nuclear Service Engineer

1980 - 1982

Responsible for assisting in development of Health Physics/Chemistry/Instrumentation and Control Technical Services Section, providing services and consultation to nuclear power generating facilities. Performed duties of Health Physics Site Coordinator as required.

RAD SERVICES, INC.

1976 - 1980

Corporate Safety and Radiation Safety Officer

Responsible for NRC Byproduct Materials License for Radioactive Waste Storage Facility and Instrument Calibration and Repair Facility. Concurrently responsible for safety program for Hazardous Waste Division.

Quality Assurance Manager

Responsible for overall Quality Assurance for Nuclear Services Division and Instrument Services Division.

Personnel Manager

Responsible for the recruitment, hiring, personnel development and wage administration of over 300 technical and professional nuclear personnel encompassing sixteen contracts.

Marketing and Sales Manager

Responsible for sales efforts to nuclear power plants, providing Health Physics Technicians, Consultants, Instrumentation and Calibration Technicians, and Radiochemistry Technicians. Concurrently acted as Contract Administrator. Was responsible for increase of sales from \$ 2 million per year to \$ 12 million per year during 2½ years in this position.

APPLIED HEALTH PHYSICS, INC.

1973 - 1976

Marketing Manager

Responsible for advertising, sales and technical assistance for Health Physics related products and services.

### Decommissioning Coordinator

Responsible for on-site decontamination efforts during the decommissioning (for unrestricted release) of the W. R. Grace facility (6.5 acres plus structures) in Wayne, New Jersey. The facility had produced thorium bearing waste materials from a polishing powder manufacturing process.

### Health Physics Technician

Worked at various nuclear power plants performing routine and special functions, including: radiation, contamination and airborne surveys; waste packaging and shipping; work crew coverage; dosimetry and general employee instructor.

PRUDENTIAL INSURANCE COMPANY

1972 - 1973

Licensed Life and Health Insurance Agent during this period.

UNITED STATES NAVY

1965 - 1972

Served aboard two nuclear powered submarines. Attended schools in reactor, electrical and mechanical plant operations. Also trained in radiological controls and specialized electro-mechanical and electronic equipment repair and calibration. Participated in Project RIM (effects of ecological factors on small crew adjustment and performance) - Letter of Appreciation, 1969.

#### **7.4 Radiation Safety Office Staff**

The RSO is supported by a staff of health physics (HP) professionals who assist in the maintenance and control of the licensed program. This staff fluctuates according to need; at the time of this application, the staff consists of two lead senior HP technicians, one dosimetry program coordinator/lead senior HP technician and three junior HP technicians. Other staff is occasionally contracted as conditions warrant.

#### **8 Training for Individuals Working in or Frequenting Restricted Areas**

Combustion Engineering provides initial and refresher training to individuals who will use, or may come in contact with, radioactive material. Section 10.5 of this application describes the training program.

#### **9 Facilities and Equipment**

Combustion Engineering's Windsor site is an approximately 600 acre tract of land located in the town of Windsor, Connecticut. The Farmington River flows along the northern boundary of the site. The land adjacent to the North, East, South and West boundaries of the site consists of heavily wooded sections and open fields which have been cultivated for the production of broad leaf tobacco and other farm products. The land area within five miles of the site is somewhat rural, with rolling farmland interspersed among woodland tracts. In recent years, the area has become a bedroom community suburb of the greater Hartford area, with some light industry. Figure 9-1 shows the buildings and facilities presently located on the CE Windsor site.

Radioactive materials are used primarily in the following buildings: Buildings 1, 1A, 2, 2A, 3, and 5, 6, 16 and 18. Of these, Building 5 contains the Research and Development Laboratories. Buildings 1, 1A, 2 and 2A are used as part of CE Nuclear Operation's Field Operations' facilities. Source Material (SM) and/or Special Nuclear Material (SNM) is also used for laboratory activities in Buildings 2, 5 and 18. In addition, radioactive (SM and SNM) liquid waste processing is performed in Building 6.

The following descriptions and plans indicate where radioactive materials are normally used and controlled.

## Building 1 - High Radiation Storage and Refurbishment

Figure 9-2 depicts the buildings of the Building 2 Complex (i.e., Buildings 1, 1A, 2 and 2A). Figure 9-3 depicts Building 1. This building is used for three basic purposes:

- A. High Radiation Storage - The northeast corner of the building contains a high density concrete walled cell, as depicted in Figure 9-3. The area is used to store contained materials with dose rates of approximately 100 mr/hr or greater.
- B. Interim Extended Radioactive Waste Storage - The vault shown in the north west corner of Figure 9-3 is used to store radioactive waste awaiting disposal.
- C. Control Zone #5 - The east section of Building 1 contains a work zone with a single bank HEPA filtered exhaust system. This exhaust system recirculates air back into the building. Figure 9-4 depicts the control zone, and Figure 9-5 depicts the ventilation and sampling system.

## Building 1A - Storage

Occasionally, a temporary radioactive materials work area is set up in the northern half of this building. When the work is completed, the area is decontaminated as necessary, surveyed and released. Figure 9-6 depicts the northern end of Building 1A.

The southern half of this building is used primarily as an inventory area for packaged radioactive materials. The building layout and ventilation system for this building is shown in Figure 9-7.

Occasionally, a temporary tented controlled area is erected in the southeast corner of the building that is maintained under negative pressure by a portable HEPA filtered fan unit which exhausts back into the building. The tented area is used for visually inspecting containers containing radioactively contaminated equipment.

## Buildings 2/2A

Buildings 2 and 2A consist of approximately 15,000 square feet of floor space as depicted in Figure 9-8. The southern half of Building 2 is a two story structure with the second floor devoted entirely to office space. A shielded health physics counting room is located on the southwest corner of the first floor.

A high density concrete vault is located in the center of Building 2. The layout of this vault is depicted in Figure 9-9. The purpose of this area is calibration of instruments and thermoluminescent dosimeters (TLD) using sealed sources. The single entrance to this vault is controlled by a combination door lock which is controlled by health physics personnel.

As depicted in the layout of Figure 9-8, the northeast corner of Building 2 is comprised of a concrete walled area, identified as Cell 2, and an interconnecting wing to Building 2A. Cell 2, both the ground level and subterranean level, and Building 2A have been established as part of a single restricted area (see Figure 9-10). The subterranean level of Cell 2 is used primarily for decontamination and repair of reactor inspection equipment.

Airborne radioactive material in the cell is processed through a self-contained HEPA filtered air cleaning system. A portion of the air in the cell is exhausted outside the building via a single bank of HEPA filters. The system is continuously monitored whenever it is in operation. The ventilation system is depicted in Figure 9-11.

The areas at ground level of Cell 2, plus Building 2A, are used to refurbish, inspect, develop and store reactor servicing equipment and to train personnel in the use of the equipment. Controlled zones are established to handle unclad radioactive equipment. The controlled zones are of modular construction erected to accommodate the equipment and personnel. Each controlled zone is serviced by a circulating air system designed to move air from the controlled zone and discharge back into the building after it has been filtered by two banks of HEPA filters. One set of filters is located at the controlled zone; the other set is located just prior to the system discharge. The air between the two banks of filters is sampled through an isokinetic probe and connected to a continuous air monitor which will alarm if radioactive material is detected downstream of the first set of filters (see Figure 9-11).

Mechanical testing (e.g., seismic response or vibration testing) of reactor components is also performed in Building 2. Sealed simulated fuel rods containing SM (e.g., depleted uranium) are occasionally used for such testing and are stored in the building.

### Building 3 - KDL Laboratories

This building consists of approximately 60,000 square feet used for research and development of fossil fuels, boilers, and pollution control equipment. All radioactive materials used in this building will be encapsulated; either in the form of sealed sources as part of densitometer projectors or as materials sealed for x-ray diffraction analysis.

### Building 5 - Research and Development Laboratories

The Research and Development (R&D) Laboratories contain approximately 60,000 square feet of floor space. The main bay and each of the three wings of the structure contain office space which occupies a total of 27,000 square feet of the facility. The balance of the building is used for mechanical testing and research/development. Work in the laboratory areas is evenly divided among activities that require the handling of nonradioactive materials. Each area that uses radioactive materials (such as the Radiochemistry Laboratory, Metallography Laboratory, Mechanical Testing

Laboratories, Boronometer Test Area, etc.) is established and maintained as a separate restricted area.

Air from work areas in which radioactive materials with greater than 5,000 DPM/100 cm<sup>2</sup> loose activity are used is exhausted via stack lines equipped with single banks of HEPA filters (99.97 percent efficient for 0.3 micron particles). Each of the exhaust stacks is equipped with an isokinetic probe and sample collection system. Each exhaust system is tested in accordance with ANSI N510-1980 following HEPA filter replacement. The air and sampling air for each area are shown in Figures 9-13 and 9-14.

Radioactive liquid wastes generated are evaporated in fume hoods which discharge to the sampled exhaust stacks as previously described.

In addition, SM and SNM laboratory activities are performed in Building 5 and the adjoining Building 18. Building 5 contains the Analytical Chemistry Laboratories and Pellet Physical Testing Laboratory. The Analytical Chemistry Laboratories consist of a Uranium Analysis Laboratory, Environmental/Bioassay Laboratory, Radiochemistry Laboratory, Environmental Laboratory, and a Radiochemistry Counting Room. Chemical analysis of uranium fuel and various reactor core materials and components is conducted in the Analytical Chemistry Laboratories. Chemical analyses are performed to determine impurities in fuel pellets, such as analyses for aluminum, calcium, magnesium, chlorides, fluoride, silicon, iron, nickel, hydrogen, moisture and rare earths (e.g., europium, samarium, gadolinium, erbium, etc.). These laboratories also perform analyses which support operational activities such as environmental radiation monitoring, personnel bioassay, radiological protection, and waste water processing. The Pellet Physical Testing Laboratory is used for activities such as pellet resintering tests and immersion density tests.

#### Building 6 - Radioactive Liquid Waste Processing

Liquid effluents from SNM Laboratory activities in Building 5 drain to any one of ten 2,000 gallon retention tanks, located in Building 6. A schematic of the Building 6 liquid waste system is depicted in Figure 9-15. Before the retention tanks are discharged to the Site Industrial Stream, which flows into the Farmington River, a sample is withdrawn for gross alpha and beta analyses. If the sample results dictate, the liquid is diluted in the Building 6 Dilution Tanks prior to discharge.

Liquid effluents are discharged in accordance with the radionuclide concentration limits of Table 2 of Appendix B to 10 CFR 20.1001 - 20.2401. Where levels of activity would exceed these limits the water is diluted to less than the limit value before being discharged. An operational check of the instruments measuring the water level in the dilution tank(s) shall be performed on a monthly basis when the tank(s) are used during the month.

Building 6 is also used to store low level radioactive waste (see Chapter 11).

### Building 16 - Boronometer Test Area

A room in Building 16 is used for testing boronometers; sealed sources are used in this area.

### Building 18 - Test Loop

Building 18 contains a scale model reactor hydraulic test loop. Sealed simulated fuel rods containing source material (e.g., depleted uranium) are used in the test loop and are stored in the building.

### Facilities and Equipment - General

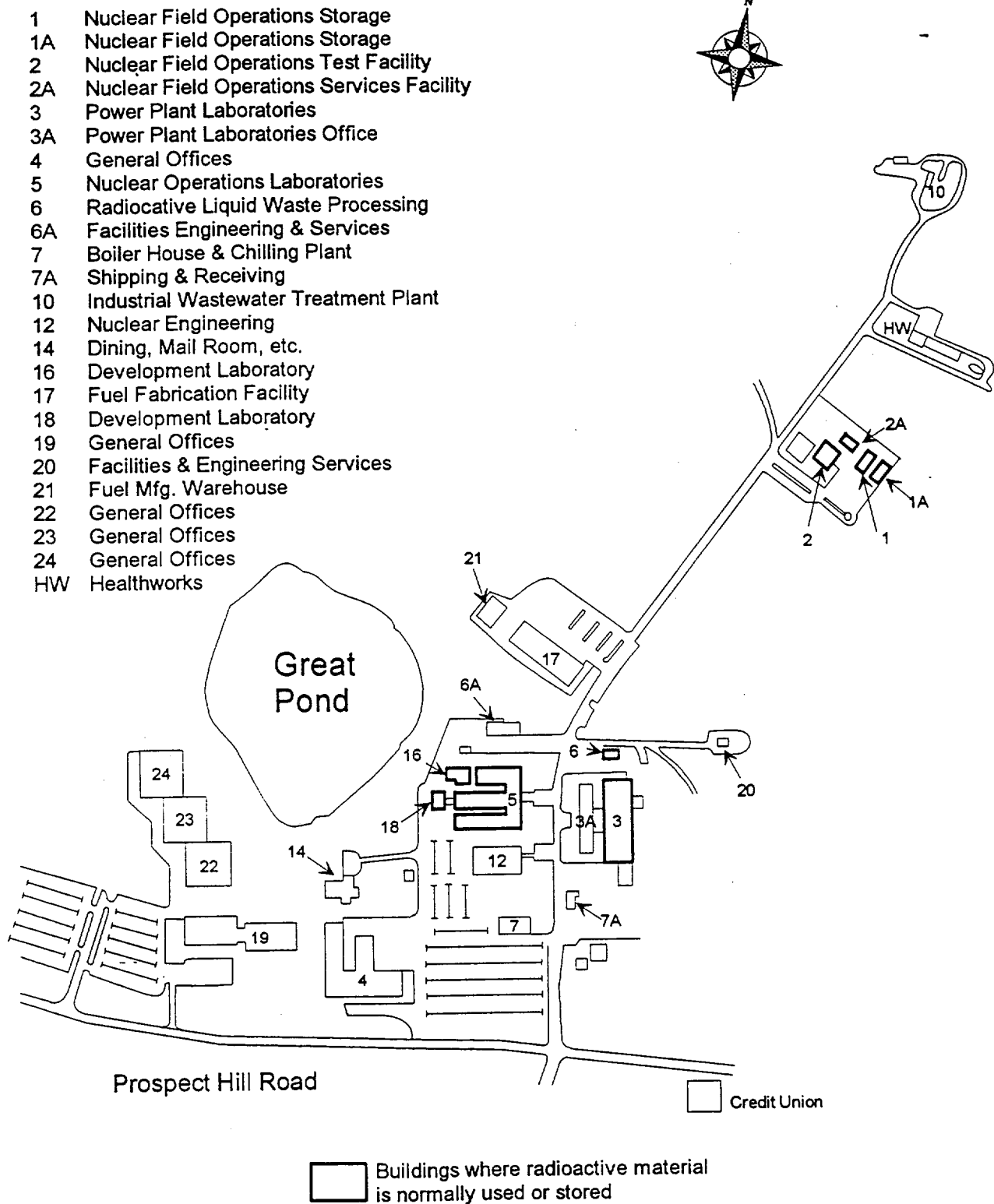
It is the practice of CE Nuclear Operations that, whenever unclad radioactive materials are used in the various research laboratories, the equipment involved is enclosed where practical, for the protection of personnel and the environment. Generally, laboratory or equipment areas where loose contamination may exceed 10,000 DPM/100 cm<sup>2</sup> are candidates for protective enclosures. These enclosures may be permanent construction, semi-permanent controlled areas, or temporary enclosures (e.g., tents). Typical examples of restricted areas utilizing permanent enclosures or controlled zones may be seen in Figure 9-16.

### Surveys and Counting Equipment

Figure 9-17 is a current listing of radiation survey, counting and sampling equipment used under this license. Calibration procedures are developed and used in accordance with ANSI N323-1980 and manufacturer's technical manuals as required. Equipment additions or deletions from this complement may be made as necessary without prior notification of the NRC, as long as such changes are reviewed and approved by the RSO or his designee. A typical calibration procedure is given in Figure 9-18 as an example for information.



**Figure 9-1**  
**Location of Buildings on the Windsor Site**



**Figure 9-2  
Building 2 Complex  
(Buildings 1, 1A, 2 and 2A)**

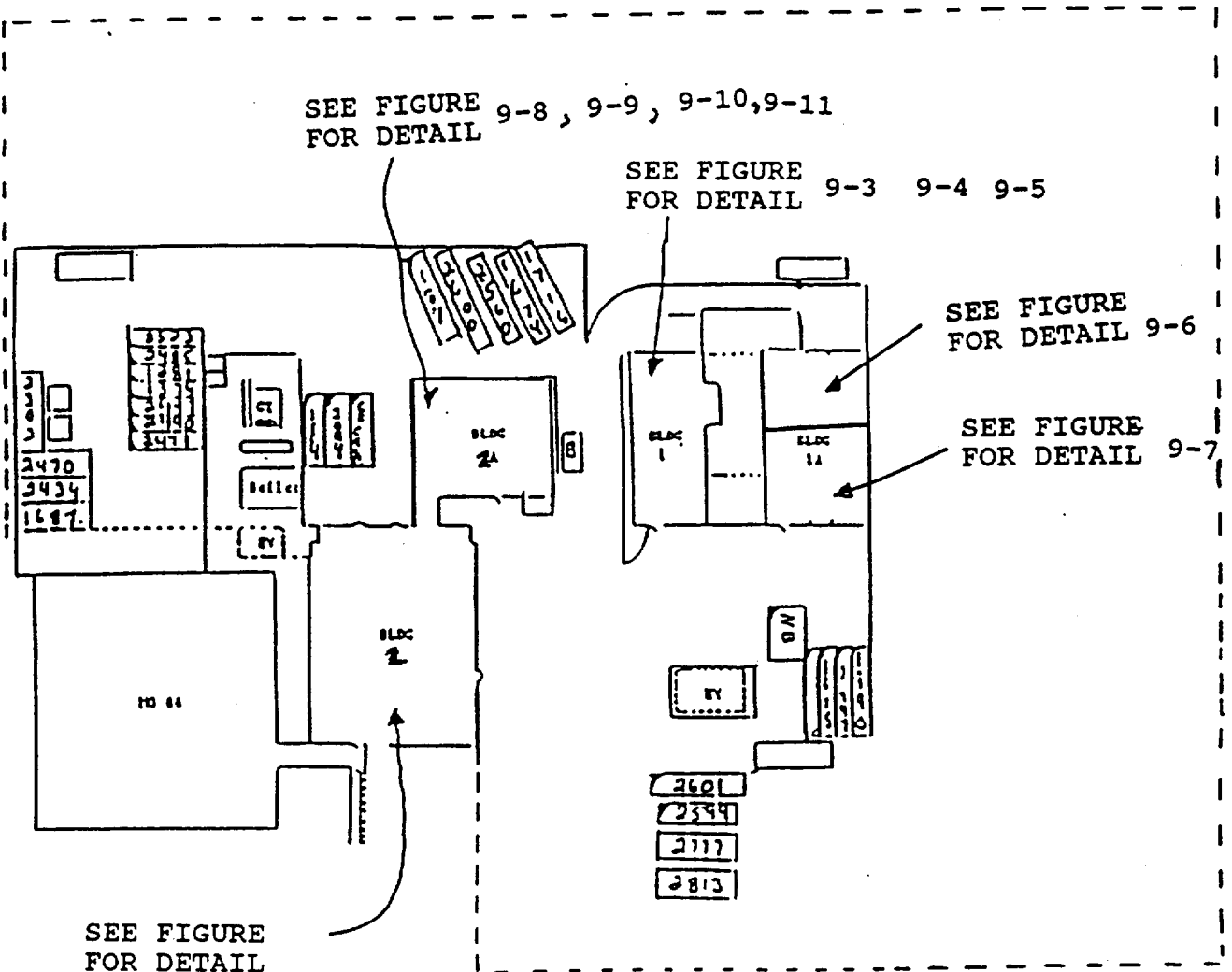


Figure 9-3  
Building 1  
(inside restricted area)

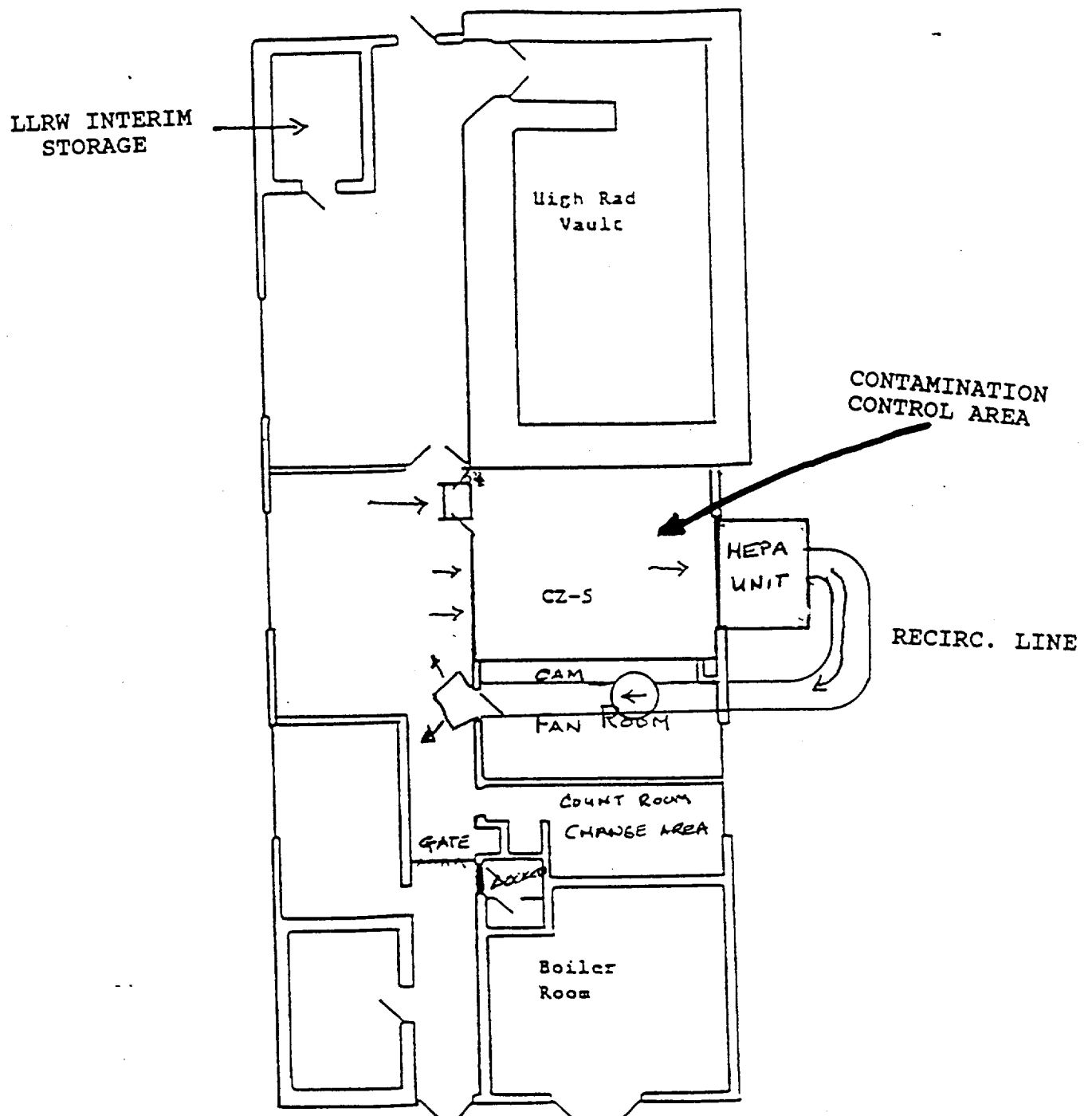


Figure 9-4  
Building 1  
Control Zone #5

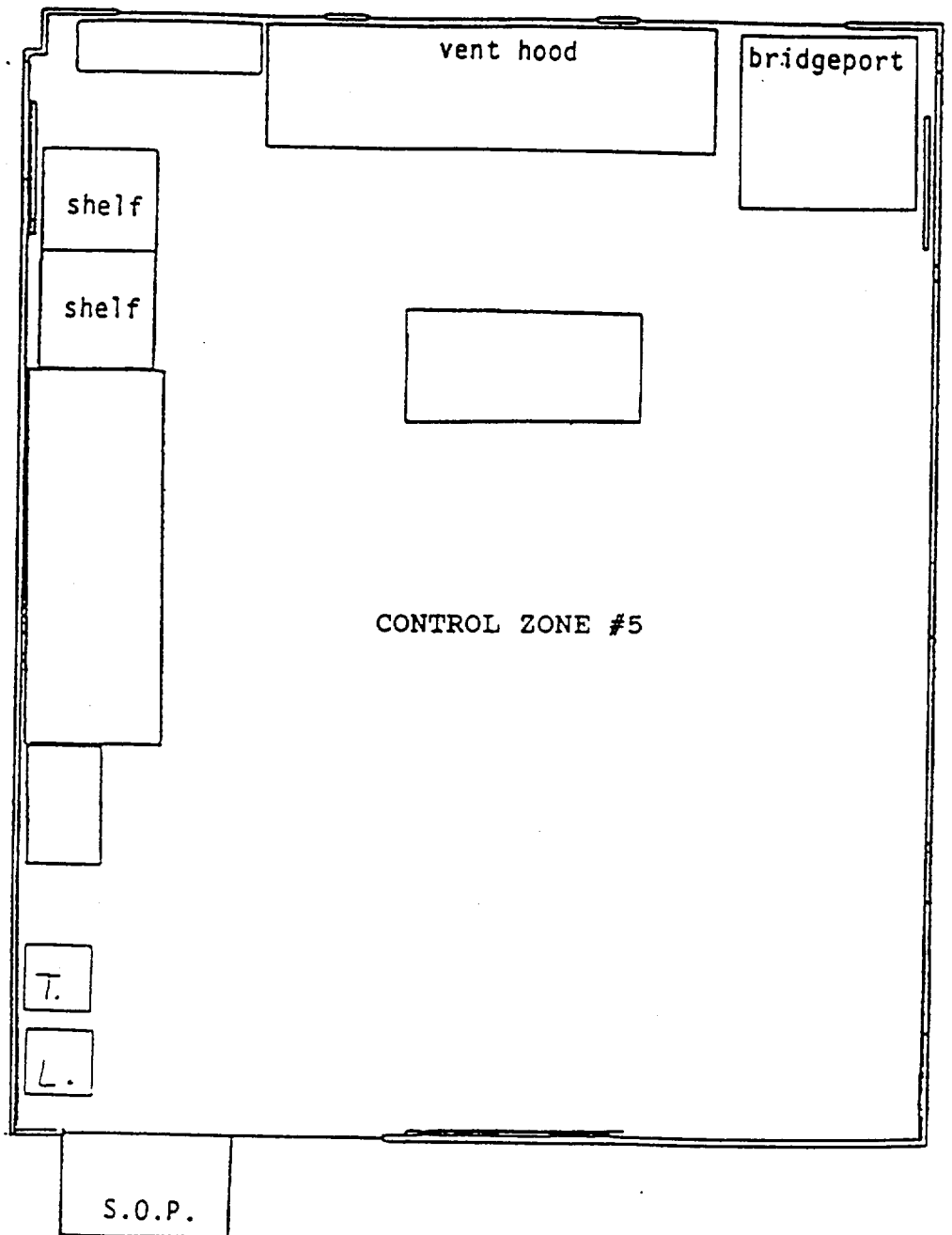




Figure 9-6  
Building 1A - North End

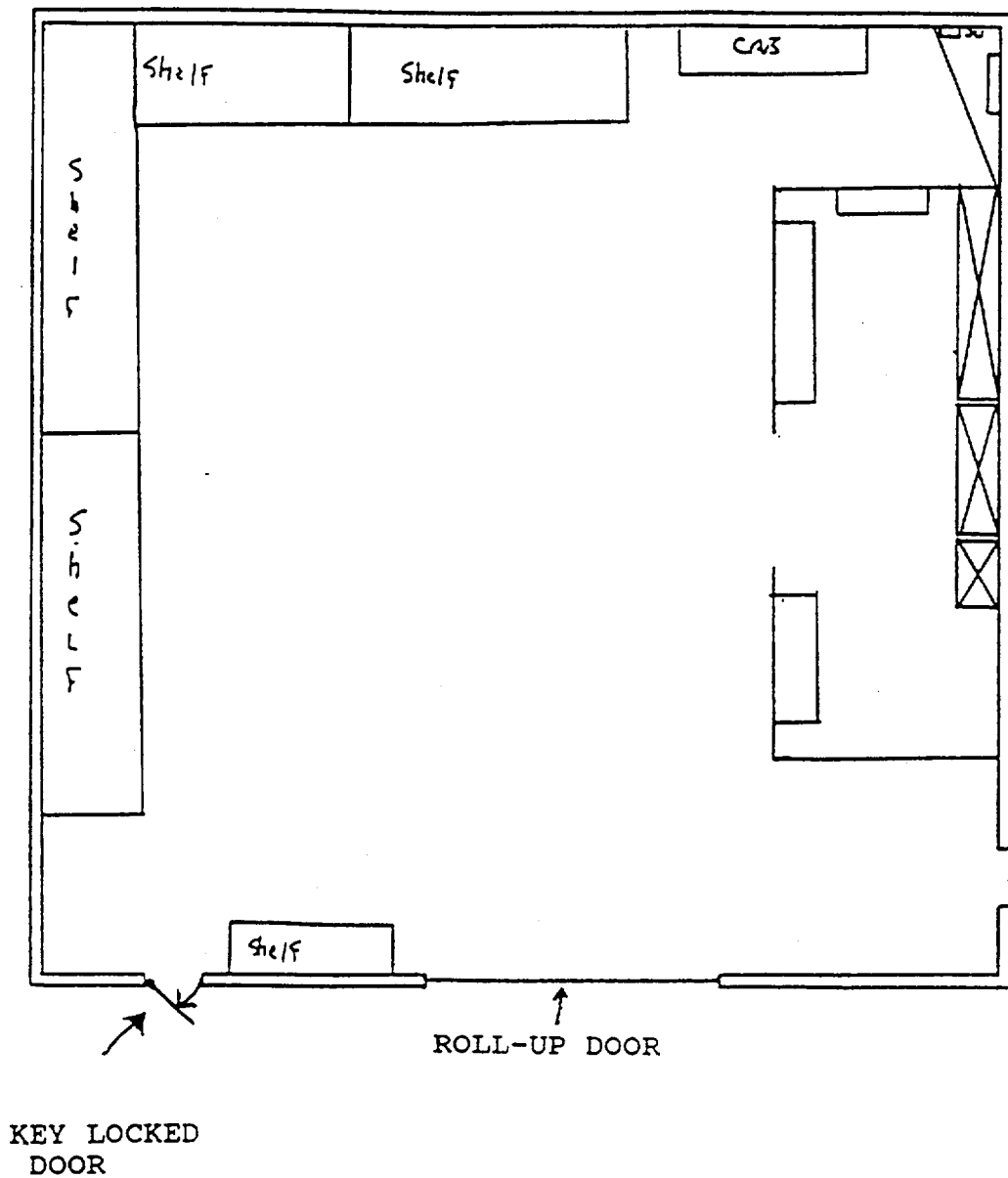
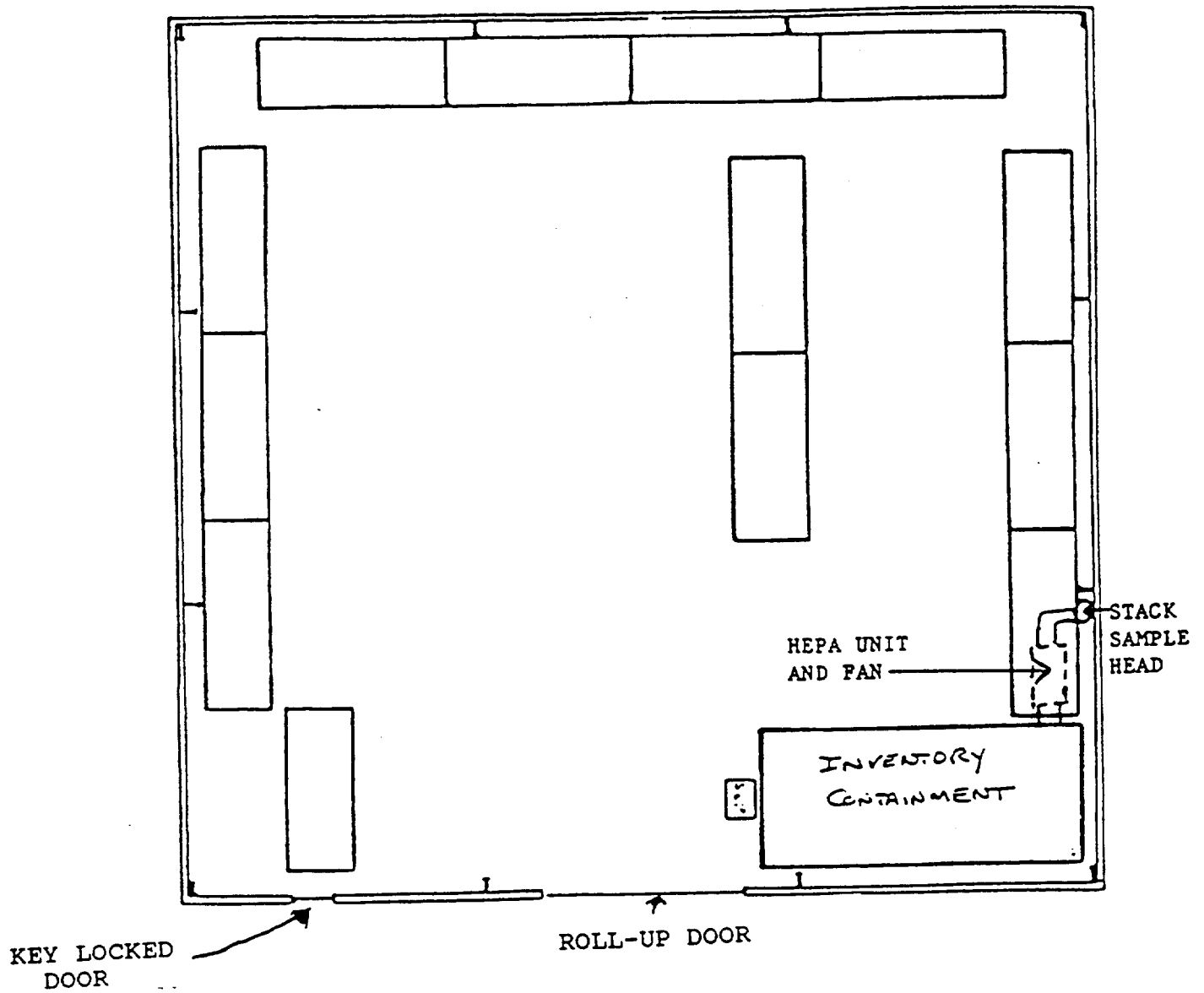
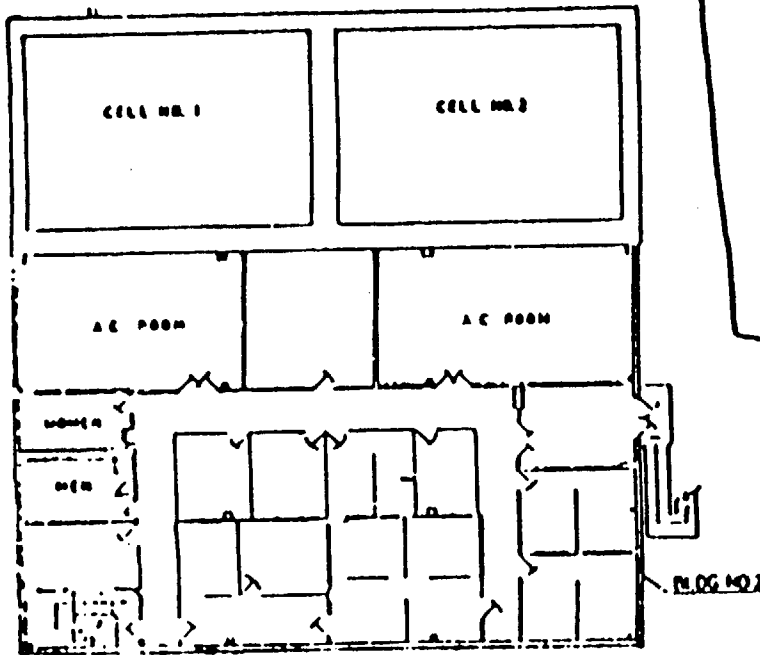


Figure 9-7  
Building 1A  
South End  
Inventory and Control Area

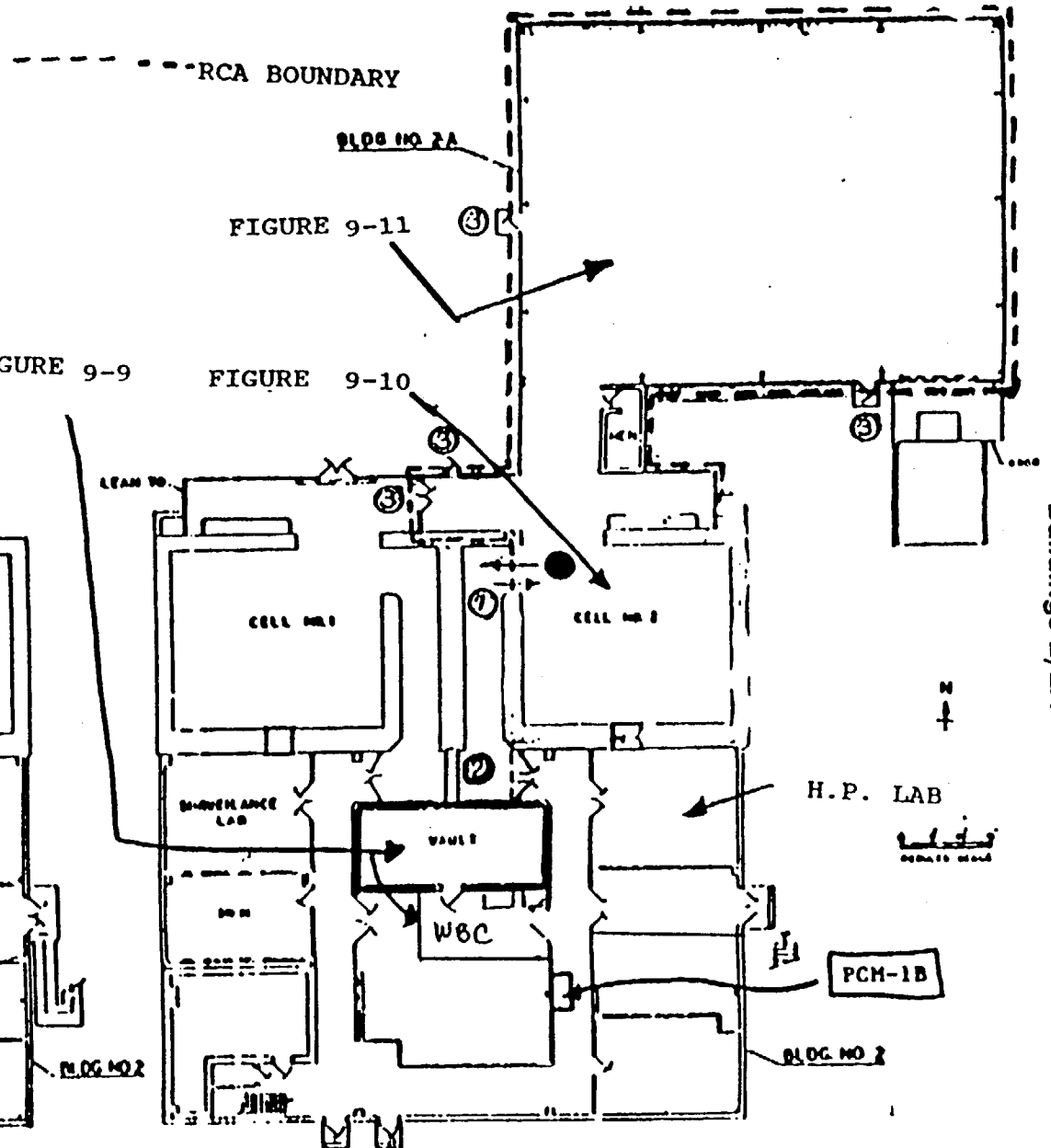


- ① NORMAL ENTRANCE
- ② NORMAL EXIT & FRISKER STA
- ③ EMERGENCY EXIT

FIGURE 9-8  
BUILDING 2/2A  
LAYOUT



SECOND FLOOR PLAN



FIRST FLOOR PLAN

Figure 9-8  
Buildings 2/2A



Figure 9-9  
Building 2 Calibration Vault

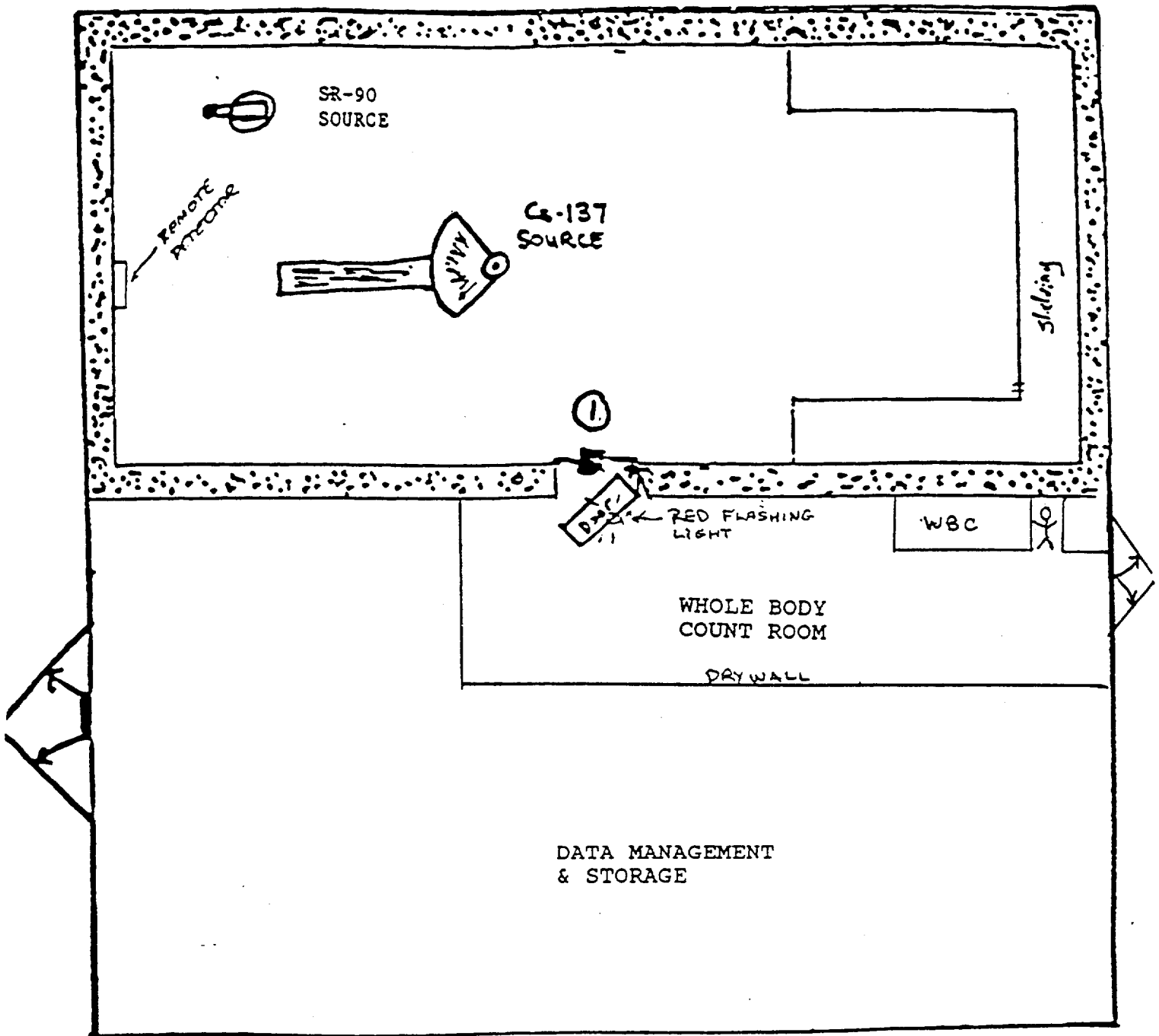


Figure 9-10  
Building 2 Cell 2 Control Zone Layout

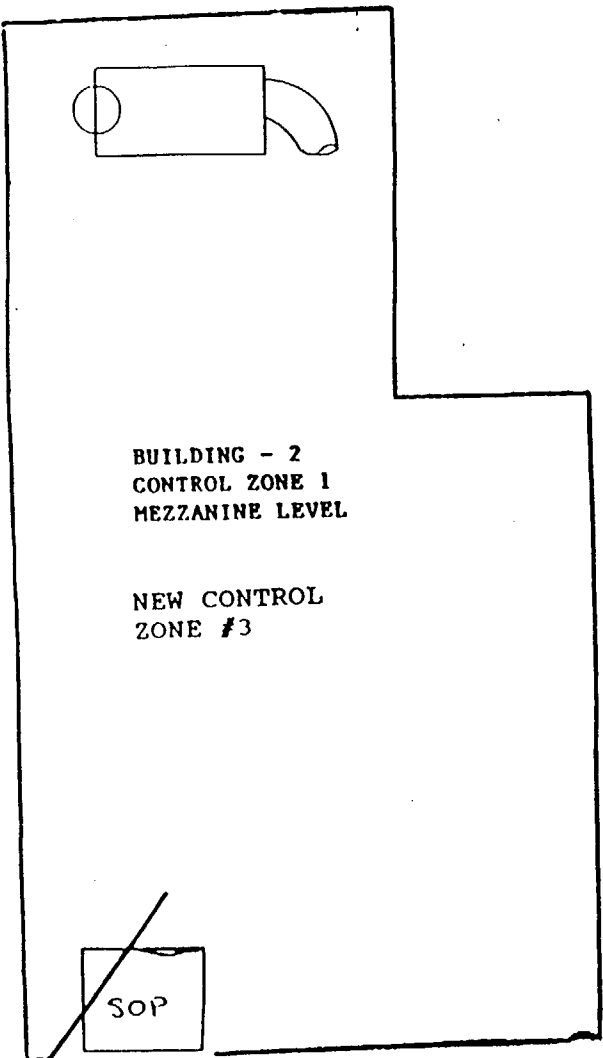
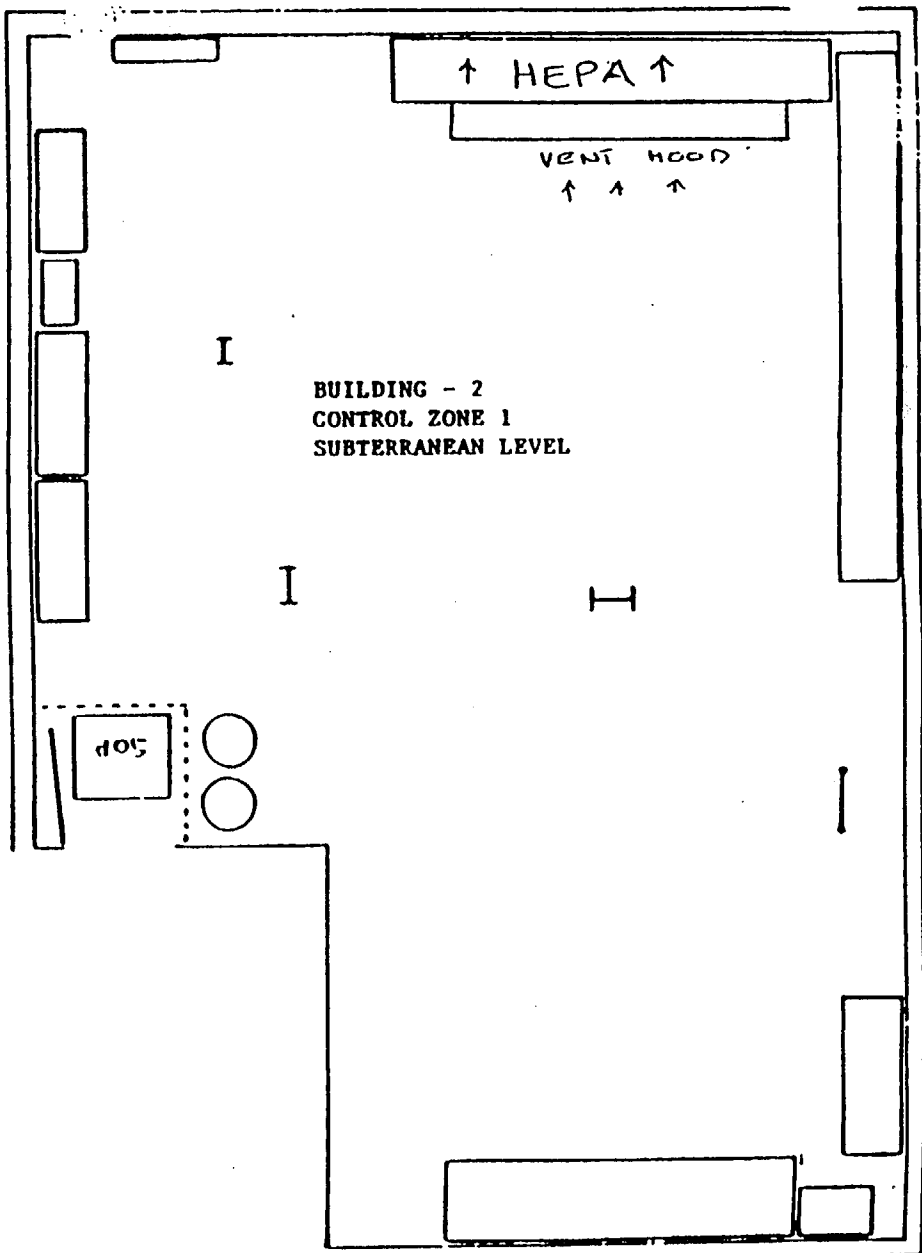


Figure 9-11  
Building 2A Cell 2 Control Zone Air Handling Systems

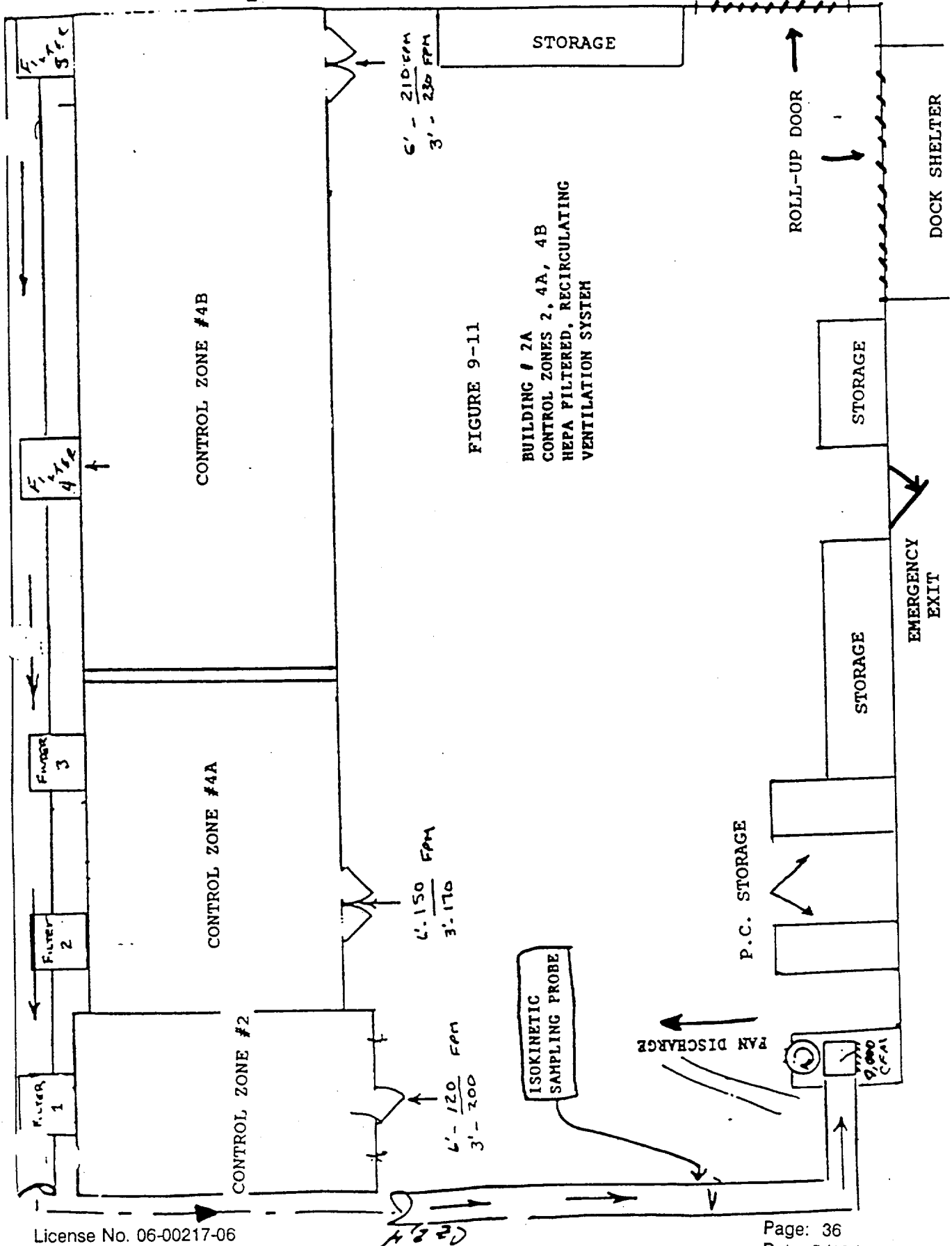
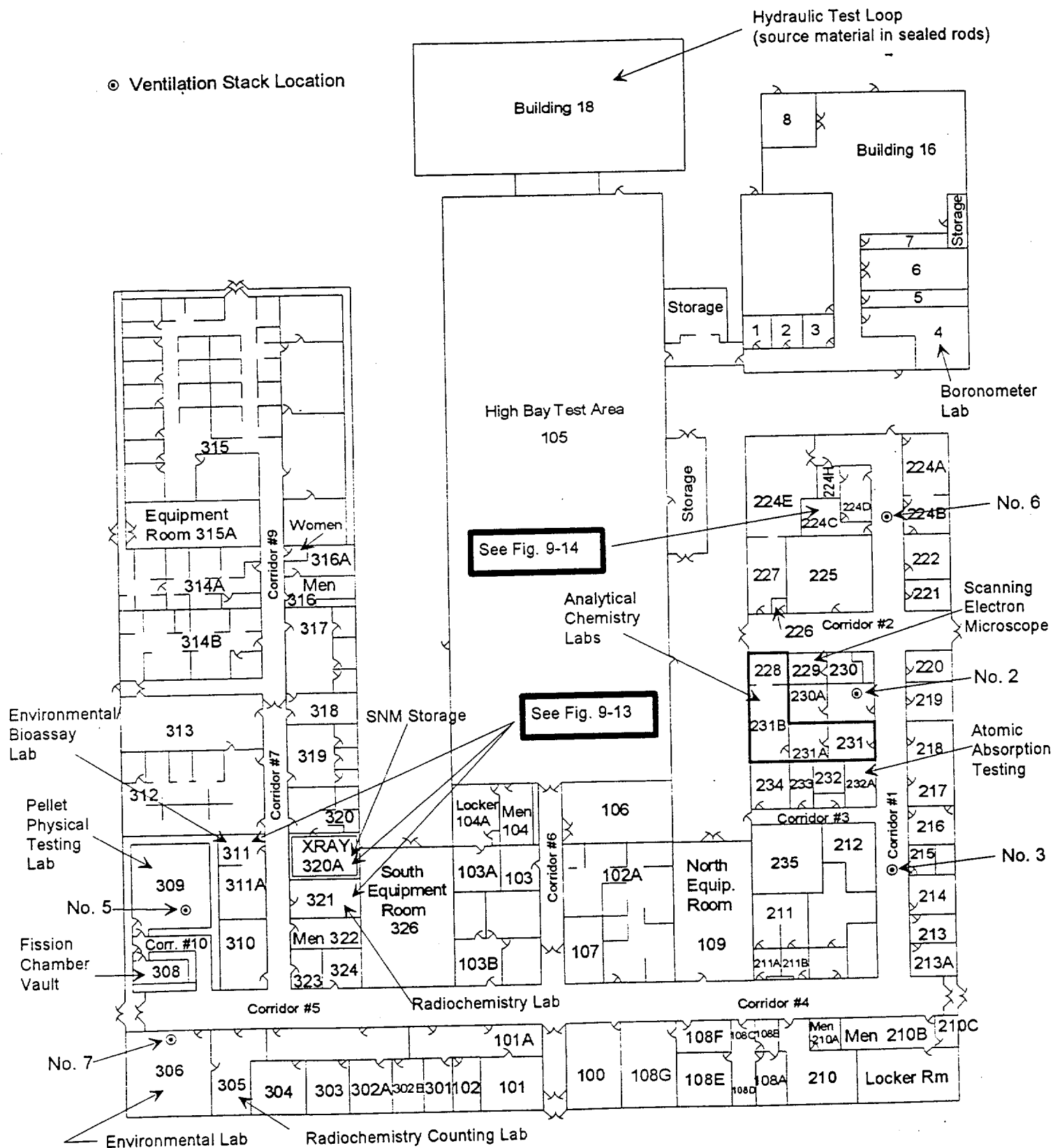


FIGURE 9-11

BUILDING # 2A  
CONTROL ZONES 2, 4A, 4B  
HEPA FILTERED, RECIRCULATING  
VENTILATION SYSTEM

**Figure 9-12**  
**Building 5**



License No. 06-00217-06

Page: 37  
Date: 5/18/95

Figure 9-13  
Building 5 Air Exhaust and Sampling Systems  
Ventilation System No. 5

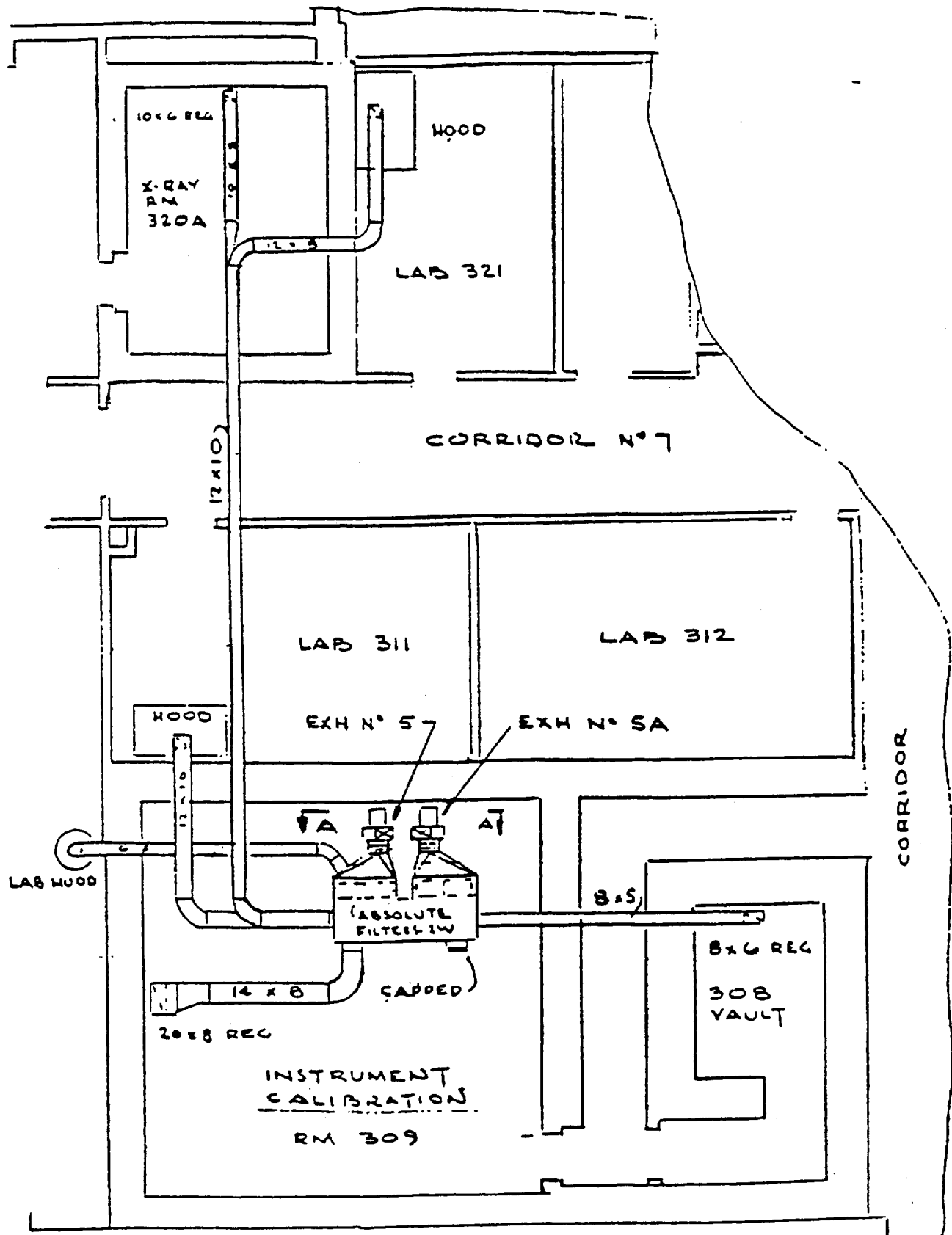
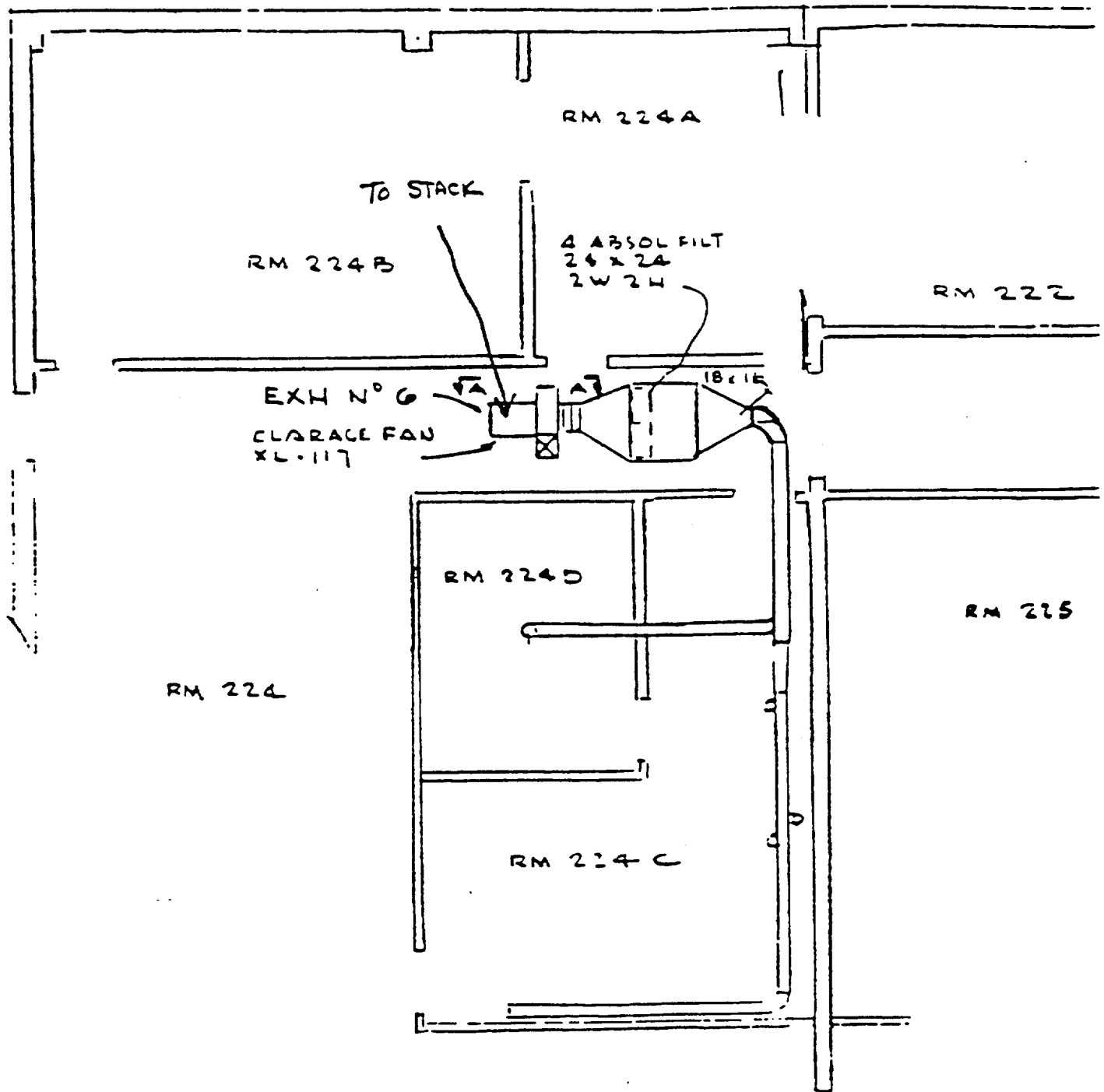


Figure 9-14  
Building 5 Air Exhaust and Sampling Systems  
Ventilation System No. 6



**Figure 9-15**  
**Building 6 Liquid Waste System**

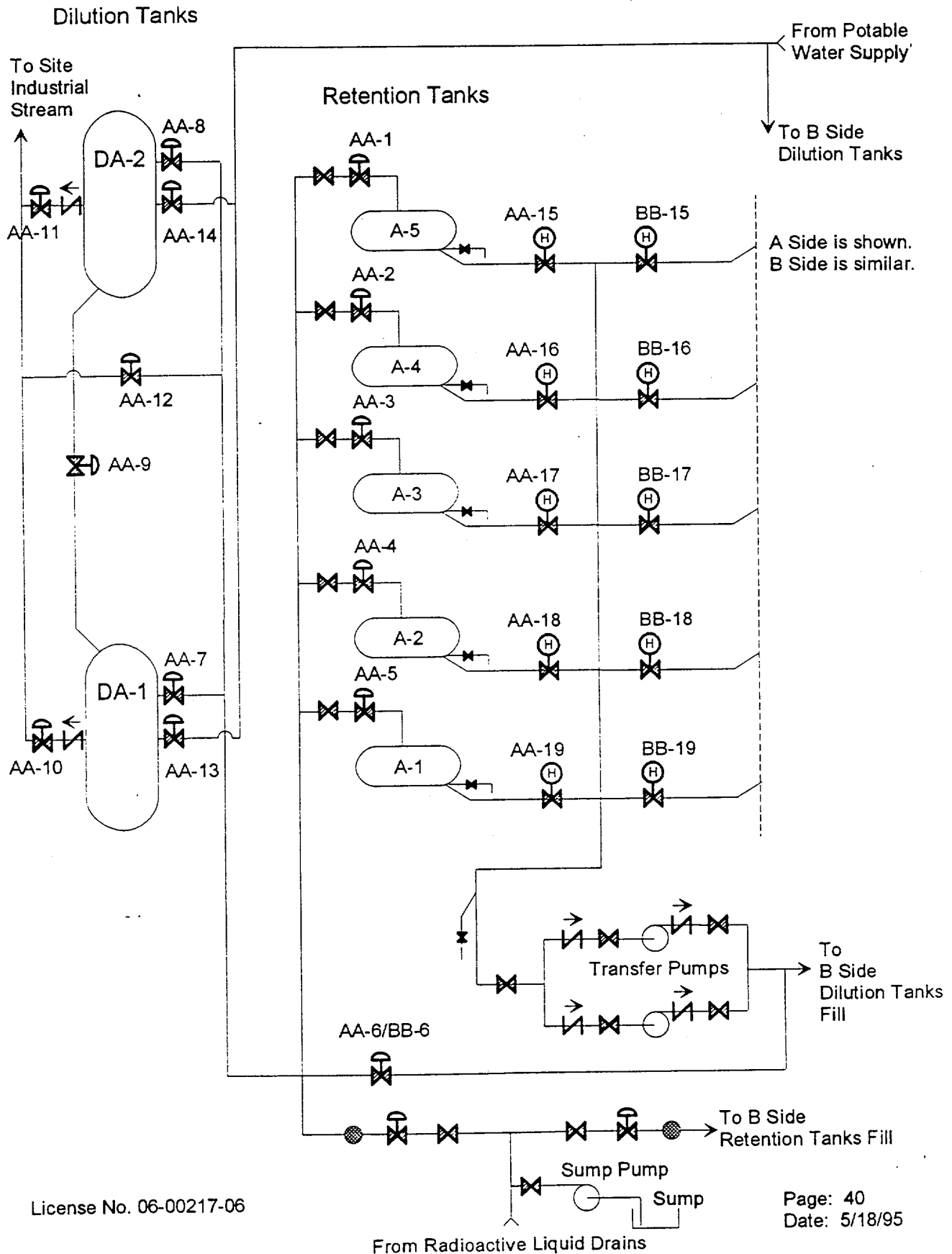
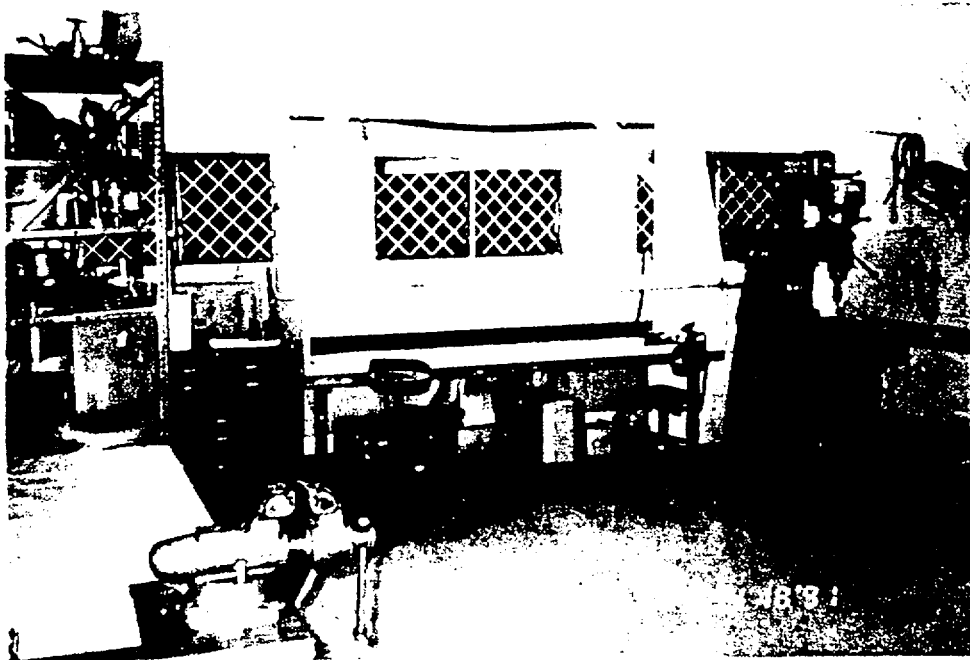


Figure 9-16  
Typical Control Zones Utilized for Work with Unclad Radioactive Materials





**Figure 9-17**  
**Radiation Survey, Counting and Sampling Equipment**

<u>Manufacturer</u>	<u>Model</u>	<u>Type</u>	<u>Range</u>	<u>Quantity</u>
Eberline	RM-14	β Frisker	0 - 50K CPM	13
Ludlum	177	β Frisker	0 - 500K CPM	1
Eberline	RM-20	β Frisker (gas flow)	0 - 500K CPM	2
Eberline	E-520	Dose Rate	0 - 2 R/hr	3
Ludlum	14C	Dose Rate	0 - 2 R/hr	2
Eberline	6112B	Dose Rate	0 - 1000 R/hr	1
Eberline	RO-2	Dose Rate	0 - 5 R/hr	6
Eberline	MS-3	β Scaler	0 - 999,999 CPM	4
Eberline	MS-2	β Scaler	0 - 999,999 CPM	1
Eberline	PNR-4	Dose Rate	0 - 5 R/hr	1
Ludlum	125	μR Meter	0 - 3,000 μR/hr	1
Ludlum	19	μR Meter	0 - 5,000 μR/hr	1
Canberra	2404	β Scaler	0 - 999,999 DPM	1
Eberline	PCM1B	β Personal Frisker	N/A	1
Victoreen	OB-430	Personal Air Sampler	N/A	40
NMC	AM-2B	Continuous Air Monitor	10 - 1M CPM	2
NMC	AM-3D	Continuous Air Monitor	50 - 50K CPM	2
Dosimeter Corp.	862	Pocket Ion Chamber	0 - 200 mr	50
Dosimeter Corp.	611	Pocket Ion Chamber	0 - 1 R	10

Note: Each of the above instruments/systems will be calibrated on a quarterly basis, or more frequently if the required by the technical manual or procedure.

**Figure 9-18**  
**Example: Typical Calibration Procedure**

The following procedure, RPS CAL-03, "Calibration Procedure for Eberline Model RO-2 Ion Chamber" (8 pages), provides, for information, an example of calibration procedures used by Combustion Engineering.

CALIBRATION PROCEDURE FOR  
EBERLINE MODEL RO-2 ION CHAMBER

PREPARED BY

*Eustis Davis*

APPROVED BY

*DM Dene*

## 1.0 Introduction

The Eberline Model RO-2 is a portable air ion chamber used to detect Beta, Gamma and x-ray radiation.

## 2.0 References

- 2.1 Eberline Technical Manual for Ion Chamber Model RO-2.
- 2.2 American National Standards Institute ANSI N323-1978.
- 2.3 Radiological Protection Instruction RPI-22: General Safety Precautions for the use of the Shepherd Calibrator.
- 2.4 Radiological Health Handbook.
- 2.5 NRC By-Product License 06-00217-06 as amended.
- 2.6 Eberline Tec Notice 7-6-90

## 3.0 Equipment Requirement

- 3.1 NBS traceable Cs<sup>137</sup> encapsulated source with sufficient activity to produce a field of 4000 mr/hr.
- 3.2 NBS traceable depleted uranium slab.

## 4.0 Instructions

### 4.1 Primary Calibration and Performance Test Frequency

- 4.1.1 Eberline Model R02 shall be calibrated on intervals not to exceed three (3) months or after any repair or maintenance has been performed on the unit. Note: This does not include battery change out.
- 4.1.2 Periodic Performance Test. To assure proper operation of the instrument between calibrations, the instrument shall be tested with the check source during operation and prior to each intermittent use.

Reference readings shall be obtained on each instrument when exposed to a check source in a constant and reproducible manner at the time of, or promptly after, primary calibration. If at any time the instrument response to the check source differs from the reference reading by more than  $\pm 20$  percent, the instrument shall be returned to the calibration facility for repair or recalibration, as required.

4.2 Precalibration. The following conditions shall be established prior to exposing the instrument to a source for adjustment and calibration:

- (1) The instrument should be free of significant radioactive contamination.
- (2) The meter shall be adjusted to zero or the point specified by the manufacturer using the adjustment or adjustments provided.
- (3) The batteries or power shall comply with the instrument manufacturer's specification.
- (4) The instrument shall be turned on and allowed to warm up for the time period specified by the manufacturer - 5 minutes for these instruments.
- (5) Geotropism shall be known for orientation of the instrument in the three mutually perpendicular planes, and this effect shall be taken into account during calibration and performance testing.

#### 4.3 Primary Calibration

##### 4.3.1 Gamma Source Calibration

- 4.3.1.1 Determine the distances from the Cs<sup>137</sup> source to produce a reading of 1/4, 1/2 and 3/4 scale for each range.
- 4.3.1.2 For the 0-5 mr/hr scale place the center line of the detector ( effective center of the detector is marked by case indentations) in a Gamma field corresponding to mid scale (2.5 mr/hr). Adjust the calibration control for the 0-5 mr/hr range until the meter reading agrees with the radiation field strength ( $\pm 10\%$ ). Record this information on the Certificate of Calibration (attachment 1).
- 4.3.1.3 Repeat 4.3.1.2 for 0-50 mr/hr, 0-500 mr/hr and 0-5000 mr/hr ranges.
- 4.3.1.4 Perform a calibration check by placing the instrument in radiation fields corresponding to 1/4 and 3/4 scale for each range. The instrument reading must be within 10% of the actual radiation field for every point checked. Record this information on the Certificate of Calibration.

##### 4.3.2 Beta Source Calibration

4.3.2.1 After completion of the Gamma Source Calibration move the instruments to a low background radiation area ( $<1.0$  mr/hr). Insure that the Beta Shield on the bottom of the instrument is closed. Place the vertical centerline of the detector squarely over and in contact with the depleted Uranium slab. Take a contact Gamma dose rate of the Uranium slab and record on the Certificate of Calibration. Open the Beta shield, take a contact Beta Gamma dose rate. Subtract the gamma dose rate from the Beta Gamma dose rate, this gives the uncorrected Beta dose rate. Record this information on the Certificate of Calibration.

4.3.2.2 Calculate the Beta correction factor by dividing the actual Beta dose rate obtained from the source activity certification sheet, ( Note: The RO2 with the Beta slide open has two layers of mylar .001" each, between the source and the detection chamber. Combined the two mylar layers produce an absorber thickness of  $7 \text{ mg/cm}^2$  ) by the uncorrected Beta dose rate from 4.3.2.1. Record the Beta correction on the Certificate of calibration and on the instrument calibration sticker.

#### 4.4 Swing Arm Inspection

- 4.4.1 Remove the instrument from its case, cycle the function switch and check for smooth operation of the cam/switch mechanism.
- 4.4.2 Check the alignment of the collar and the switch shaft. The alignment holes in the collar should be offset approximately  $18^\circ$  from the flat side of the shaft.
- 4.4.3 Cycle the function selector switch thru each position, observe the movement of the magnet for each switch position. Verify that the magnet position is as shown on Attachment 3.
- 4.4.4 If the swing arm and selector switch operate properly, note this in the comments section of the calibration sheet. If adjustments are required a calibration check must be made at mid scale for each range and noted on the calibration sheet.

#### 4.5 Calibration Records

- 4.5.1 Calibration Certificate - Maintenance/Repair Log. A record shall be maintained of all calibration, maintenance, repair, and modification data for each instrument. The record shall be dated and shall identify the individual performing the work. These records shall be filed in the appropriate instrument file.

Attachment 1 - Calibration Certificate

Attachment 2 - Maintenance/Repair Log

4.5.2 Calibration Labels

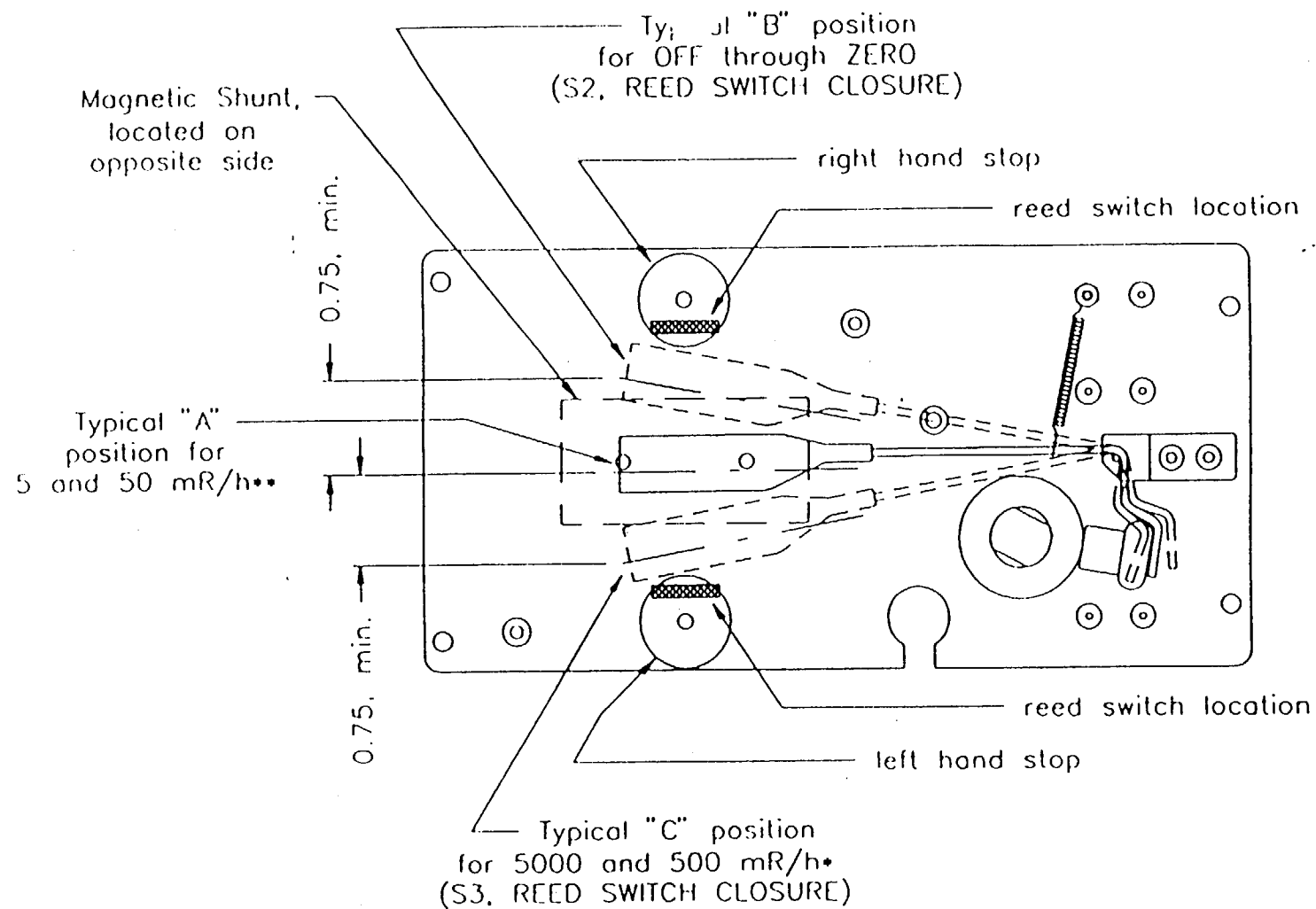
- 4.5.2.1 Each instrument shall be labeled with the following information:
- (1) Date of most recent calibration
  - (2) Initials or other specific identifying mark of calibrator.
  - (3) Instrument response to an identified check source ( to be provided either by calibrator or user).
  - (4) Date that primary calibration is again required.
  - (5) Beta correction factor.

4.6 Receipt Of Out Of Calibration Instruments

If any instrument received for calibration that does not meet the acceptance criteria of Sections 4.2 or 4.3; the RSO or Manager, RPS shall then review all surveys where that instrument was used since its last successful performance test and determine if actual conditions under survey are represented correctly. If not, the RSO or Manager, RPS shall investigate the occurrence and provide correctional actions.

5.0 Quality Assurance

- 5.1 Annually, an audit of instrument records and procedures shall be performed by the Manager, RPS; RSO or Quality Assurance .



Pictorial D  
Typical Swing Arm Positions:  
not to scale

- \*for RO-2. (5 and 50 R/h for RO-2A)
- \*\*for RO-2. (50 and 500 mR/h for RO-2A)



CERTIFICATE OF CALIBRATION

Instrument Type \_\_\_\_\_  
Manufacturer \_\_\_\_\_  
Range \_\_\_\_\_  
Accuracy \_\_\_\_\_  
Mfg. Serial No. \_\_\_\_\_  
C-3 ID No. \_\_\_\_\_  
Calibration Date \_\_\_\_\_  
Calibration Due Date \_\_\_\_\_  
Calibration Document \_\_\_\_\_  
Procedure \_\_\_\_\_  
Rev. \_\_\_\_\_  
Manufacturer's Specifications \_\_\_\_\_

Test Equipment Used to Perform Calibration

Test Equipment Serial or ID No. \_\_\_\_\_  
Test Equipment \_\_\_\_\_  
Serial or ID No. \_\_\_\_\_

Test Equipment Serial or ID No. \_\_\_\_\_  
Test Equipment \_\_\_\_\_  
Serial or ID No. \_\_\_\_\_

INSTRUMENT CALIBRATION INFORMATION

Instrument Range \_\_\_\_\_  
Calibration Standard Value \_\_\_\_\_  
Instrument Response Before Calib. \_\_\_\_\_  
After Calib. \_\_\_\_\_  
Correct \_\_\_\_\_

1				
2				
3				
4				
5				
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7				
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20				

CALIBRATION HAS BEEN PERFORMED UTILIZING MEASUREMENT DEVICES WHICH HAVE KNOWN RELATIONSHIPS TO NBS STANDARDS WHERE SUCH STANDARDS EXIST. WHERE SUCH STANDARDS DO NOT EXIST, AN APPROVED PROCEDURE WRITTEN IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS HAS BEEN USED AND THE STANDARDS DOCUMENTED.

REMARKS

ACCEPTED \_\_\_\_\_  
REJECTED \_\_\_\_\_

CALIBRATED BY \_\_\_\_\_

ORGANIZATION \_\_\_\_\_

MFG: \_\_\_\_\_ MODEL \_\_\_\_\_ SERIAL NO. \_\_\_\_\_ RAD: \_\_\_\_\_

DATE \_\_\_\_\_ DESCRIPTION: \_\_\_\_\_

PERFORMED BY \_\_\_\_\_

DATE \_\_\_\_\_ DESCRIPTION: \_\_\_\_\_

PERFORMED BY \_\_\_\_\_

DATE \_\_\_\_\_ DESCRIPTION: \_\_\_\_\_

PERFORMED BY \_\_\_\_\_

DATE \_\_\_\_\_ DESCRIPTION: \_\_\_\_\_

PERFORMED BY \_\_\_\_\_

DATE \_\_\_\_\_ DESCRIPTION: \_\_\_\_\_

PERFORMED BY \_\_\_\_\_

DATE \_\_\_\_\_ DESCRIPTION: \_\_\_\_\_

PERFORMED BY \_\_\_\_\_

## 10 Radiation Safety Program

### 10.1 Previous Licenses

This renewal application of License Number 06-00217-06 requests continuation of the use of radioactive materials. This license was most recently renewed via Amendment No. 36, dated July 12, 1990, under Docket Number 030-03754 (CE application dated December 14, 1989). This renewal application includes amendments through No. 40, dated August 17, 1994.

Source material and special nuclear material laboratory activities included in this license application are transferred from License No. SNM-1067 (Docket No. 70-1100).

### 10.2 Administrative Procedures

In addition to any other requirements or procedures imposed by regulation or license, specific Radiological Protection Instructions (RPIs) are prepared, approved, issued and maintained. The set of RPIs comprise what is often referred to as a "Radiation Safety Manual". The RPIs are used to inform staff of safety criteria and good health physics practices, NRC regulations and license commitments. The following provides a description of the RPIs.

#### RPI Format

In order to maintain consistency and clarity of RPIs, the following is required for all RPIs generated. These formats and associated contents facilitate control and auditability of the overall radiation protection program to assure compliance with license conditions and that ALARA exposures are achieved:

<u>Section</u>	<u>Contents</u>
I. PURPOSE	Statement as to why the RPI is issued.
II. SCOPE	Who or what is being affected by the RPI.
III. REFERENCES	Documents that are directly or indirectly utilized as a basis for the RPI.
IV. DEFINITIONS	Definitions of items or terms (including acronyms) that affect the understanding of the RPI.
V. INSTRUCTION	Specific step-by-step instructions to accomplish the stated purpose of the RPI.

- |                        |  |
|------------------------|--|
| VI. RECORDS            | Documents (including electronic media if appropriate) and their associated retention, protection and disposal methods associated with the implementation of the RPI. |
| VII. QUALITY ASSURANCE | The description of the method that assures the RPI is functioning according to its intended purpose.   |
| VIII. APPENDICES       | Forms, illustrations, tables, and/or examples associated with the RPI.   |

#### RPI Approval

RPIs are prepared and approved as outlined below:

1. A preparer is assigned by the Radiation Safety Officer (RSO) or his designee.
2. The author (preparer) drafts the RPI using the RPI format described above.
3. The author submits for review and comment the "DRAFT" RPI to the RSO and Lead Senior Health Physics Technician(s) who the RSO may designate.
4. The author receives comments and resolves them via RPI changes or through resolution with the commentor and/or RSO.
5. The final RPI is approved as denoted by signature of the RSO.
6. For revisions, the entire RPI is revised (i.e., in lieu of pages changes).
7. Approved RPIs are issued and copy control is maintained via a controlled copy holders listing; controlled copy holders acknowledge receipt by signature.

### Listing of RPIs

The following provides a listing of current RPIs, as an example of the procedures maintained (this listing may change as needed):

<u>RPI No.</u>	<u>Title</u>
1	Personnel Monitoring
2	Skin and Extremity Monitoring
3	Handling, Packaging and Shipping of Dry Activated Waste (DAW)
4	Radiation Work Permits
5	Vent System Flow Testing
6	Calibration Frequency and Operational Checks of RPS Instruments
7	Restricted Area Boundary Monitoring
8	Visitor Access to Health Physics Restricted Areas
9	Monitoring for Radiation and Contamination
10	Receipt and Storage of Processed Radioactive Waste
11	Hot Particle Surveillance
12	General Safety Precautions for Use of the Shepherd Calibrator
13	Transportation of Radioactive Material
14	Emergency Instructions
15	Radiation Worker Training Program

#### 10.2.1 Control of Procurement and Use

Procurement of radioactive materials is controlled by the Manager, Radiological Protection Services or the RSO through a controlled purchasing agent system.

#### 10.2.2 Safety Evaluations of Proposed Uses/Users

See Section 10.5 for a description of the methods used for safety evaluations of uses and users.

### 10.2.3 Emergency Procedures

The RPIs contain instructions in the event of minor or major spills, injuries or fire. Procedures for emergencies involving areas where radioactive materials are located include the prompt notification of the health physics staff. Provisions for notification include call lists including site phone, beeper phone and home phone numbers. Postings of notifications in the event of an emergency are provided in key areas.

### 10.2.4 Operating and Handling Procedures

While laboratory operating and handling procedures are maintained, the vast majority refer to Radiation Work Permits (RWP) for radiation safety instructions. Some specific projects, on a case by case basis, also include radiation safety instructions in the operating procedure. As discussed in Section 10.5, RWPs include instructions to ensure adequate external and internal exposure controls including contamination controls, waste disposal practices, personnel and area monitoring criteria, use of protective clothing and equipment, and prohibitions of specific unsafe practices, etc.

### 10.2.5 Other Procedures

As mentioned in Section 10.2 above, the Radiological Protection Instructions (RPI) are used to guide, control and ensure consistency in the implementation of the radiation protection program. Section 7.2 and Figure 7.2-1 contain commitments that pertinent elements of the radiation safety program (e.g., procedures, etc.) are reviewed by the Radiation Safety Committee.

## 10.3 **Licensed Material Inventory and Accountability**

Inventory control and accountability is accomplished by keeping track of receipts and outgoing shipments of material in logs. Running totals are maintained to ensure that possession limits are not exceeded.

A physical inventory of sources and/or devices possessed under the license is performed every six (6) months. Records of inventories are maintained for a minimum of 5 years from the date of the inventory.

## 10.4 Audits and Appraisals

Section 7.2 and Figure 7.2-2 contain commitments for the annual Radiation Safety Committee audit of the radiation safety program. -

### 10.4.1 Management and Radiation Safety Committee

The Chairman of the Radiation Safety Committee is the management representative; as such he is responsible to keep upper management informed of the compliance status of the radiation safety program. The RSO communicates as needed with the Chairman of the RSC regarding compliance status. Provisions of NRC regulations and of the license which affect the radiation safety program are reflected in the Radiological Protection Instructions.

The Radiation Safety Committee is fully aware of the operations and activities of the radiation safety office through frequent meetings. Provisions for RSC oversight are discussed in Section 7.2 and Figure 7.2-2.

### 10.4.2 Radiation Safety Officer and Staff

The RSO and RSOS audits activities to verify compliance with the terms and conditions of the NRC license, including RWPs and good health physics practices. Routine unannounced inspections are performed under the RWP system. Inspections include:

- a. Review of inventory and survey records.
- b. Evaluation of worker training through discussion and observation of work practices.
- c. Performance of independent surveys of work areas.
- d. Evaluation of compliance with RWP and RPI (Safety Manual) requirements.
- e. Provision for performance-based instruction to radiation workers.

Audits/inspections of radiation workers are performed on a routine basis. All work with licensed material is performed under RWP.

## **10.5 Safety Evaluations of Proposed Users and Uses**

Users are evaluated by means of the radiation worker training program. Most uses are evaluated by means of the Radiation Work Permit system. Special uses may be evaluated via special safety evaluations on a case-by-case basis.

Radiation Work Permits (RWP) specify the allowable exposure of workers, the radiological environment which can be expected, physical protection requirements for the workers, special instructions, and restrictions and termination provisions for the RWP. RWPs are prepared and approved via an RWP Procedure. Figure 10.5-1 provides, for information, the current RWP procedure (may be changed without prior NRC notification).

The radiation worker training program applies to all workers whose job requires on site exposure to radiation or radioactive materials associated with the broad scope license. The program includes requirements for initial training and annual refresher training. Provisions are included for examination to determine the need for formal training for selected experienced individuals; formal training may be waived upon successful completion of such examination. The radiation worker training program is established by procedure. Figure 10.5-2 provides, for information, the current training procedure (may be changed without prior NRC notification).



**Figure 10.5-1**  
**Radiation Work Permit Procedure**

The following 13 pages provide for information a current copy of the Radiological Protection Instruction, RPI-4, "Radiation Work Permits".

COMBUSTION ENGINEERING, INC.

RADIOLOGICAL PROTECTION INSTRUCTION

RPI-4

RADIATION WORK PERMITS

PREPARED BY: Robert B. Clark DATE: 10/18/94  
(PRINTED NAME)

SIGNATURE : Robert B. Clark

APPROVED BY: STEPHEN M. Sorenson DATE: 10/18/94  
(PRINTED NAME)

SIGNATURE : Stephen M. Sorenson

## I. PURPOSE

THE PURPOSE OF THIS RADIOLOGICAL PROTECTION INSTRUCTION HEREAFTER RPI, IS TO PROVIDE THE METHOD AND PROCEDURE FOR IMPLEMENTATION OF THE RADIATION WORK PERMIT (RWP) SYSTEM FOR WORK WITH RADIOACTIVE MATERIALS UNDER NRC MATERIALS LICENSE NO. 06-00217-06 AS AMENDED.

## II. SCOPE

THE SCOPE OF THIS INSTRUCTION IS FOR ANY WORK WITH RADIOACTIVE MATERIALS USED UNDER NRC MATERIALS LICENSE 06-00217-06 AS AMENDED. CERTAIN OPERATIONS MAY BE CONDUCTED WITHOUT THE USE OF AN RWP, BUT MUST BE SPECIFICALLY APPROVED BY THE RADIOLOGICAL SAFETY COMMITTEE OR MANAGER, RADIOLOGICAL PROTECTION SERVICES.

## III. REFERENCES

- A. NRC MATERIALS LICENSE 06-00217-06 (AS AMENDED)
- B. RPI-1 "PERSONNEL MONITORING"
- C. RPI-2 "SKIN AND EXTREMITY MONITORING"
- D. RPI-9 "MONITORING FOR RADIATION AND CONTAMINATION"
- E. 10 CFR PART 20 "STANDARDS FOR PROTECTION AGAINST RADIATION"
- F. RPI- "RADIATION WORKERS TRAINING PROGRAM"

## IV. DEFINITIONS

- A. DDE (DEEP DOSE EQUIVALENT) - EXTERNAL WHOLE BODY EXPOSURE; THE DOSE EQUIVALENT (AS DEFINED IN 10CFR20 20.1003) AT A TISSUE DEPTH OF 1CM (1000 mg/cm2).
- B. SDE,WB(SHALLOW DOSE EQUIVALENT, WHOLE BODY) - EXTERNAL EXPOSURE TO THE SKIN OF THE WHOLE BODY (AS DEFINED IN 10CFR20 20.1003) AT A DEPTH OF .007CM (7 mg/cm2).
- C. SDE,ME(SHALLOW DOSE EQUIVALENT, EXTREMITY) - EXTERNAL EXPOSURE TO ANY EXTREMITY (AS DEFINED IN 10CFR20 20.1003) AT A TISSUE DEPTH OF .007CM (7 mg/cm2).
- D. LDE(LENS OF THE EYE DOSE EQUIVALENT) - EXTERNAL EXPOSURE TO THE LENS OF THE EYE (AS DEFINED IN 10CFR20 -20.1003) AT A TISSUE DEPTH OF 0.3 cm (300 mg/cm2).
- E. RWP(RADIATION WORK PERMIT) - THE DOCUMENTATION WHICH SETS RADIOLOGICAL AND OTHER WORK CONDITION WHICH MUST BE ADHERED TO FOR WORK WITH RADIOACTIVE MATERIALS.

V. INSTRUCTIONS

A. INITIATING AN RWP

1. THE JOB COORDINATOR SHALL COMPLETE A RADIATION PROTECTION SERVICES WORK REQUEST (APPENDIX F). PLEASE REMEMBER TO CHECK THE CHARGE NUMBER TO ASCERTAIN THAT IT IS OPEN AND CORRECT!
2. RADIOLOGICAL PROTECTION SERVICES WILL THEN COMPLETE THE RWP AS SHOWN BELOW AND THE APPENDICES A, B, C, D, & E.
3. EACH OF THE BLOCKS ON THE RWP (NUMBERED ON APPENDIX A) ARE EXPLAINED AS FOLLOWS:
  - a. "REQUESTOR" - 1
    - THE ENGINEER OR TASK MANAGER WHO FILLED OUT THE WORK REQUEST (APPENDIX F).
  - b. "DATE START" - 2
    - THE DATE THE ENGINEER OR TASK MANAGER WISHES THE WORK TO BEGIN (REQUEST START DATE- APPENDIX F).
  - c. "DATE EXPIRE" - 3
    - RWP'S ARE ROUTINELY IN EFFECT FOR A SEVEN (7) DAY PERIOD OR ANY PART THEREOF; BEGINNING ON SUNDAY AND ENDING ON THE FOLLOWING SATURDAY. CERTAIN RWP'S MAY BE EXTENDED FOR LONGER PERIODS WITH THE PERMISSION OF THE MANAGER, RPS, RSO OR THEIR DESIGNEE.
  - d. "RWP NO." - 4
    - RWP NUMBERS MAKE EACH PERMIT UNIQUE. THIS ALLOWS FOR TRACKING OF JOBS, CONTAMINATION, EXPOSURES, AND ALARA. THE RWP LOG (APPENDIX C) IS USED TO TRACK RWP'S AND THEIR NUMBER. THE LOG IS USED TO NOTE WHETHER AN RWP IS ACTIVE OR TERMINATED AND PROVIDES FOR UNIQUE SEQUENTIAL TRACKING NUMBERS.

RWP,S USE THE FOLLOWING FORMAT

XX-Z-ABC

WHERE:

XX IS THE CURRENT YEAR

Z IS THE BUILDING NUMBER

ABC IS THE SEQUENTIAL NUMBER STARTING WITH 001 EACH YEAR

- e. "WORK AREA" - 5  
THE LOCATION WHERE THE WORK IS TO BE PERFORMED (CONTROL ZONE, LABORATORY OR TEMPORARY WORK AREA)
- f. "JOB DESCRIPTION" - 6  
A BRIEF DESCRIPTION OF THE WORK TO BE PERFORMED (TAKEN FROM "WORK DESCRIPTION/PERSONNEL ARE ON APPENDIX F)
- g. "AUTHORIZED PERSONNEL" - 7  
THE PERSONNEL CHOSEN BY THE ENGINEER OR TASK MANAGER TO PERFORM THE WORK REQUESTED (FROM "WORK DESCRIPTION/PERSONNEL SECTION OF APPENDIX F). RPS STAFF SHALL VERIFY THAT EACH INDIVIDUAL LISTED ON AN RWP HAS THE APPROPRIATE TRAINING PRIOR TO LISTING A PERSON AS AN "AUTHORIZED PERSONNEL". (SEE BLOCK # 8)
- h. "T"-TRAINING - 8  
HP INITIALS THIS BLOCK TO INDICATE THAT EACH PERSON LISTED AS AN "AUTHORIZED PERSONNEL" HAS CURRENT AND APPROPRIATE TRAINING FOR THE PROPOSED WORK.
- i. "INITIAL" - 9  
EACH "AUTHORIZED PERSONNEL" SHALL INITIAL IN BLOCK 9 PRIOR TO BEGINNING WORK ON ANY RWP, TO INDICATE THAT THE PERSON HAS READ, UNDERSTANDS, AND WILL COMPLY WITH THE CONDITIONS OF THE RWP.
- j. "ALLOWABLE WEEKLY EXPOSURE" - 10  
PERSONNEL ARE TYPICALLY LIMITED TO 100 mREM PER WEEK. THIS LIMIT MAY BE INCREASED (SEE REFERENCE B ) BASED UPON THE INDIVIDUAL'S CURRENT EXPOSURE AND/OR JOB REQUIREMENTS.
- THE 100 MREM PER WEEK LIMIT IS A WEEKLY LIMIT REGARDLESS OF THE NUMBER OF RWPS ON WHICH A PERSON IS AUTHORIZED.
- k. "ALLOWABLE DAILY EXPOSURE" - 11  
100 mREM MINUS ANY PREVIOUS EXPOSURE DURING THE WEEK. THIS FIGURE IS CALCULATED FROM THE DAILY DOSIMETER LOG SHEET (APPENDIX E). THIS LOGSHEET IS REQUIRED TO BE UPDATED DAILY
- l. "HP/DATE" - 12  
TO BE INITIALED AND DATED FOR EACH DAY AN RWP IS TO BE USED, PRIOR TO THE START OF EACH WORK DAY.

m. "RADIATION AND CONTAMINATION LEVELS" - 13,14,15, & 16

RADIATION AND CONTAMINATION LEVELS ARE PROVIDED ON THE RWP TO INFORM PERSONNEL OF THE TYPICAL RADIOLOGICAL ENVIRONMENT WHICH WILL BE ENCOUNTERED DURING THEIR WORK. THE LEVELS ARE BASED UPON RESULTS OF INSTRUMENT AND SMEAR SURVEYS OF AREAS AND ITEMS ASSOCIATED WITH THE WORK. REFERENCE D PROVIDES GUIDELINES FOR DOSE RATE AND CONTAMINATION LEVELS, RESTRICTIONS ASSOCIATED WITH RWPS, AND REQUIRED ACTIONS.

n. "REQUIREMENTS" - 17

REQUIREMENTS SPECIFY THE USE OF PHYSICAL PROTECTION (e.g PROTECTIVE CLOTHING, BOOTIES, GLOVES, ETC.) AND RADIOLOGICAL CONTROLS MEASUREMENT DEVICES SUCH AS BREATHING ZONE(BZ) AIR SAMPLERS, TLDS AND PICS.

o. "SPECIAL INSTRUCTIONS" - 18

SPECIAL INSTRUCTIONS ARE USED WHEN ADDITIONAL CONTROLS ARE NECESSARY. EXAMPLES WOULD BE UNUSUAL SKIN AND/OR EXTREMITY EXPOSURES OR JOBS REQUIRING SPECIAL VENTILATION SET-UPS.

p. "APPROVED BY" - 19

THE RWP MUST BE APPROVED , AS A MINIMUM, BY A SENIOR HEALTH PHYSICS TECHNICIAN, PRIOR TO ISSUANCE. THIS APPLIES TO RWPS LASTING 7 DAYS OR LESS. RWPS WITH A DURATION OF GREATER THAN 7 DAYS, REQUIRES THE APPROVAL MANAGER, RPS. OR RSO.

q. "TERMINATED BY" - 20

-SEE SECTION - V.C

B. IMPLEMENTING AN RWP

1. PRIOR TO STARTING THE WORK STATED ON THE RWP, AUTHORIZED PERSONNEL, LISTED ON THE RWP, MUST READ AND INITIAL THE RWP(BLOCK 9), SIGNIFYING THAT THE INDIVIDUAL HAS READ AND UNDERSTANDS ALL REQUIREMENTS. **ANY INDIVIDUAL, FAILING TO DO SO, MAY BE RESTRICTED FROM ANY OR ALL RWP WORK, UNTIL THE MATTER IS RESOLVED.**

2. THE ORIGINAL OF THE RWP, AS WELL AS ANY ASSOCIATED SURVEYS, SHALL BE POSTED NEAR THE WORK AREA. A COPY OF THE RWP IS PLACED IN THE "ACTIVE RWP FILE" IN THE HP OFFICE.
3. PRIOR TO THE START OF EACH DAYS WORK , THE HEALTH PHYSICS TECHNICIAN SHALL UPDATE THE DAILY ALLOWABLE EXPOSURE (BLOCKS 11), FOR ALL PERSONNEL LISTED ON THE RWP. THE TECHNICIAN SHALL DATE AND INITIAL THE PROPER COLUMN FOR THE DAILY EXPOSURE (BLOCK 12).
4. ALL AUTHORIZED PERSONNEL, PRIOR TO ENTRY INTO AND ON DEPARTURE FROM A CONTROL ZONE OR WORK AREA, SHALL MAKE THE PROPER ENTRIES ON THE CONTROL ZONE ENTRY LOG SHEET (APPENDIX D). THIS ALLOWS THE RPS STAFF TO TRACK INDIVIDUAL EXPOSURES TO RADIATION AND AIRBORNE CONTAMINATION ON A JOB SPECIFIC BASIS (ALARA PRINCIPLE).
5. AT THE END OF EACH WORKING DAY, PERSONNEL AUTHORIZED BY THE RWP SHALL UPDATE THE WEEKLY DOSIMETER LOG SHEET (APPENDIX E) IN THE SPACE FOR THE APPROPRIATE DAY. THE NET INCREASE ON THE POCKET DOSIMETERS (PICS) ARE RECORDED ON A DAILY BASIS. THIS SHEET IS USED TO UPDATE THE DAILY ALLOWABLE EXPOSURE ON THE RWP.

C. TERMINATING AN RWP

1. TO TERMINATE AN RWP, IT MUST BE SIGNED AND DATED BY A SENIOR HP TECHNICIAN IN THE TERMINATED BY (BLOCK 20) SECTION. THE TERMINATION DATE IS ENTERED ON THE RWP LOG, AND THE RWP COPY IS REMOVED FROM THE ACTIVE FILE. THE ORIGINAL AND THE COPY (YELLOW), CONTINUATION SHEETS AND RELATED SURVEYS SHALL THEN BE PLACED IN THE "TERMINATED RWP" FILE.

D. RWP RESTRICTIONS

1. ONLY WORKERS, AUTHORIZED BY THE RADIOLOGICAL SAFETY COMMITTEE OR DESIGNEES SHALL BE ALLOWED AS "AUTHORIZED PERSONNEL" ON AN RWP. THESE PERSONNEL ARE "AUTHORIZED" PROVIDED THEY MEET THE REQUIREMENTS CONCERNING TRAINING AND DOSIMETRY.
2. NO INDIVIDUAL WILL BE ALLOWED TO WORK ON AN RWP, IF, THE INDIVIDUAL'S BZ AIR SAMPLE PRELIMINARY RESULTS, BASED UPON CO-60 IS GREATER THAN FOUR (4) DAC-HRS WITHIN A SEVEN (7) CONSECUTIVE DAY PERIOD WITHOUT APPROVAL OF THE MANAGER, RPS.

3. ANY DAILY BZ RESULT GREATER THAN ONE (1) DAC-HR, - BASED UPON CO-60, WILL BE INVESTIGATED AS DIRECTED BY THE MANAGER, RPS OR HIS DESIGNEE, TO DETERMINE THE REASON(S) FOR THE ELEVATED RESULTS.

CONCURRENTLY, THE INDIVIDUAL WHO WORE THE BZ, WILL NOT BE ALLOWED TO RETURN TO WORK ON THE RWP, OR ANY OTHER RWP INVOLVING LOOSE CONTAMINATION, WITHOUT THE APPROVAL OF THE MANAGER, RPS. OR HIS DESIGNEE.



## RADIATION WORK PERMIT

Initiator (1)	Date Start (2)	Date Expire (3)	R.W.P. No. (4)							
Work Area (5)		Job Description (6)								
R.W.P. MUST BE INITIATED BY ALL AUTHORIZED PERSONNEL PRIOR TO STARTING WORK.										
Authorized Personnel	T	Initial	Allowable Weekly Exposure	HP	HP	HP	HP	HP	HP	HP
				Date	Date	Date	Date	Date	Date	Date
(7)		(8)	(9)	(10)		(11)				
Radiation Levels				Mrem/hr		Contamination Levels		DPM/100 cm <sup>2</sup>		
Contact - (13)						Equipment - (15)		Beta Alpha		
- (14)						General Area - (16)				
Requirements										
<input type="checkbox"/> TLD - Whole Body <input type="checkbox"/> Dosimeter <input type="checkbox"/> B-Z Air Sampler <input type="checkbox"/> Lab Coat <input type="checkbox"/> Beta/Safety Glasses <input type="checkbox"/> Ventilation in operation			<input type="checkbox"/> Full PC's (17) <input type="checkbox"/> Cloth/Plastic Booties <input type="checkbox"/> Cloth Hood <input type="checkbox"/> Rubbers <input type="checkbox"/> Plastic Gloves <input type="checkbox"/> No cutting, drilling, grinding without HP approval			<input type="checkbox"/> Rubber Gloves <input type="checkbox"/> Cotton Gloves <input type="checkbox"/> Plastic Suit <input type="checkbox"/> Finger Ring - TLD <input type="checkbox"/> Handling Estimate <input type="checkbox"/> Approved Procedure <input type="checkbox"/> Other (specify below)				
Special Instructions:										
(18)										
Approved By: (19)				Date Terminated By: (20)				Date		

Work Area

RWP No.

[illegible]

RPI-4  
REV. 01

APPENDIX C  
RWP RECORD LOG

[illegible]

A. DIX D

## CONTROL ZONE ENTRY LOGSHEET

CONTROL ZONE NO. \_\_\_\_\_

DATE\_

[illegible]

APPENDIX E  
DAILY DOSIMETER LOGSHEET

[illegible]

FOR THE WEEK OF \_\_\_\_\_

RPI-4  
REV. 01

PAGE 12 OF 13  
10/18/94

# RADIATION PROTECTION SERVICES

## WORK REQUEST

DATE: \_\_\_\_\_

TIME: \_\_\_\_\_

WORK DESCRIPTION/PERSONNEL: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

REQUESTED BY: \_\_\_\_\_  
(PRINT NAME)

REQUEST START DATE: \_\_\_\_\_

OPERATION CHARGE NUMBER: \_\_\_\_\_ TASK: \_\_\_\_\_

CHECK ONE AND INITIAL:    ☐ MOBILIZATION \_\_\_\_\_  
                                 ☐ DEMOBILIZATION \_\_\_\_\_  
                                 ☐ EQUIP. MAINT. \_\_\_\_\_  
                                 (1799963)

## APPROVALS

REQUESTOR SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

RAD PROTECTION SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

**Figure 10.5-2**  
**Radiation Worker Training Procedure**

The following 7 pages provide for information a current copy of the Radiological Protection Instruction, RPI-15, "Radiation Worker Training Programs".

COMBUSTION ENGINEERING, INC.

RADIOLOGICAL PROTECTION INSTRUCTION

RPI-15

RADIATION WORKER TRAINING PROGRAMS

PREPARED BY: WILLIAM PAGEL DATE: 2/27/95  
(PRINTED NAME)

SIGNATURE : William Pagel

APPROVED BY: STEPHEN M. SORRASEN DATE: 2/27/95  
(PRINTED NAME)

SIGNATURE : SM Sorrasen



## I. PURPOSE

THE PURPOSE OF THIS INSTRUCTION IS TO SPECIFY THE TRAINING REQUIREMENTS AND FREQUENCY OF RETRAINING FOR VARIOUS LEVELS OF RADIATION WORKERS CONTROLLED BY NRC MATERIALS LICENSE NO. 06-00217-06 (AS AMENDED). THIS INSTRUCTION PROVIDES A DESCRIPTION OF EACH COURSE AND ITS GENERAL REQUIREMENTS. THE TRAINING COURSES THEMSELVES, ARE SEPARATE DOCUMENTS AS REFERENCED BELOW.

## II. SCOPE

THE SCOPE OF THIS INSTRUCTION ENCOMPASSES ANY PERSON THAT IS REQUIRED TO WORK IN HEALTH PHYSICS RESTRICTED AREAS, RADIATION AREAS, CONTAMINATED AREAS AND/OR WITH RADIOACTIVE MATERIAL.

## III. REFERENCES

- A. INPO 87-004 "GUIDELINES FOR GENERAL EMPLOYEE TRAINING"
- B. NRC MATERIALS LICENSE NO. 06-00217-06 (AS AMENDED)
- C. NRC REGULATORY GUIDES 8.13, 8.27, & 8.29
- D. 10 CFR PARTS 19 & 20
- E. DDH-88-129 "INITIAL RADIATION WORKER TRAINING COURSE"
- F. RPS - 10 "RADIATION WORKER RETRAINING PROGRAM"
- G. RPS-07 "CATEGORY I RADIATION WORKER TRAINING COURSE"
- H. RPS-08 "RADIATION WORKER CHALLENGE TRAINING COURSE"
- I. RPI-8 "VISITOR ACCESS TO HEALTH PHYSICS RESTRICTED AREAS"
- J. ACAD 93-009 "GUIDELINES FOR GENERAL EMPLOYEE TRAINING"

## IV. DEFINITIONS - ALL DEFINITIONS IN THIS INSTRUCTION ARE AS STATED IN THE ABOVE REFERENCED DOCUMENTS.

## V. INSTRUCTION

ANY PERSON REQUIRED TO ENTER A RESTRICTED AREA, BE EXPOSED TO IONIZING RADIATION, AND/OR WORK WITH RADIOACTIVE MATERIAL IS REQUIRED TO HAVE APPROPRIATE TRAINING COMMENSURATE WITH THE HAZARD(S) TO WHICH, THE INDIVIDUAL MAY BE EXPOSED. THE FOLLOWING DESCRIPTIONS OF THE VARIOUS TRAINING PROGRAMS ARE PRESENTED FOR GUIDANCE TO MEET THE VARIOUS REQUIREMENTS UNDER NRC MATERIALS LICENSE NO. 06-00217-06 AND FEDERAL REGULATIONS.

1

**A. INITIAL RADIATION WORKER TRAINING COURSE - DDH-88-129 (TO BE GIVEN ONLY AFTER REVISION UPGRADE TO NEW PART 20 REQUIREMENTS)**

THIS COURSE IS DESIGNED TO MEET THE REQUIREMENTS OF INPO 87004 FOR CATEGORY II RADIATION WORKERS. THE COURSE CONSISTS OF 20 HOURS OF CLASSROOM INSTRUCTION, 4 HOURS OF PRACTICAL FACTORS TRAINING, AND A 60 QUESTION (50 MULTIPLE CHOICE AND 10 ESSAY) EXAMINATION WITH A MINIMUM PASSING SCORE OF 80%.

PERSONS QUALIFIED UNDER THIS PROGRAM, HAVE UNESCORTED ACCESS TO RESTRICTED, RADIATION, AND CONTAMINATION AREAS. THEY ARE ALSO QUALIFIED TO WORK WITH RADIOACTIVE MATERIAL UNDER THE CONTROLS OF A RADIATION WORK PERMIT (RWP).

THIS TRAINING IS VALID FOR ONE (1) YEAR FROM THE LAST DAY OF THE MONTH IN WHICH THE TRAINING IS SUCCESSFULLY COMPLETED.

**B. RADIATION WORKER RETRAINING PROGRAM - RPS-10**

THIS COURSE COVERS THE SAME OBJECTIVES AND SUBJECTS AS THE INITIAL RADIATION WORKER TRAINING COURSE, BUT IS DESIGNED TO EMPHASIZE CHANGES IN REGULATORY AND SITE SPECIFIC PROCEDURES.

THE PREREQUISITES FOR PARTICIPATION IN THE REFRESHER COURSE ARE:

1. COMPLETION OF THE INITIAL RADIATION WORKER TRAINING COURSE WITHIN THE PRIOR 24 MONTHS.

OR

2. COMPLETION OF THE RADIATION WORKER RETRAINING PROGRAM (RPS-10) COURSE WITHIN THE PRIOR 24 MONTHS.

OR

3. COMPLETION OF AN INPO RADIATION WORKER II COURSE WITHIN THE PRIOR 12 MONTHS (DOCUMENTATION MUST BE PROVIDED).

THE COURSE INCLUDES APPROXIMATELY 4 HOURS OF CLASSROOM INSTRUCTION, A 60 QUESTION (50-MULTIPLE CHOICE & 10 ESSAY) EXAMINATION. A PASSING GRADE FOR THE EXAMINATION IS 80%. ALSO, PRACTICAL EXERCISES ASSOCIATED WITH PROCEDURAL CHANGES MAY BE REQUIRED.

NOTE

ADDITIONAL PRACTICAL FACTORS TRAINING MAY BE REQUIRED FOR INDIVIDUALS WHO, INFREQUENTLY WORK IN THE RESTRICTED AREAS, AT THE INSTRUCTOR'S DISCRETION.

THE REFRESHER COURSE WILL REQUALIFY AN INDIVIDUAL FOR ONE (1) YEAR <TRAINING WILL EXPIRE ONE (1) YEAR FROM THE LAST DAY OF THE MONTH IN WHICH THE TRAINING WAS COMPLETED>. THE ANNUAL REFRESHER TRAINING MAY BE REPEATED AS OFTEN AS NECESSARY, TO MAINTAIN QUALIFICATION.

C. RADIATION WORKER CHALLENGE TRAINING COURSE - RPS - 08

THE CHALLENGE COURSE IS DESIGNED TO PROVIDE A METHOD FOR TRAINING INDIVIDUALS, WHO HAVE HAD PREVIOUS TRAINING AND EXPERIENCE, IN WORKING WITH RADIOACTIVE MATERIAL.

THE PREREQUISITES FOR PARTICIPATION IN THE CHALLENGE COURSE ARE:

1. SUCCESSFUL COMPLETION OF THE "INITIAL RADIATION WORKER TRAINING COURSE -DDH-88-129" WITHIN THE PRIOR 24 MONTHS.

OR

2. SUCCESSFUL COMPLETION OF THE "ANNUAL RADIATION WORKER RETRAINING PROGRAM (RPS-10)" WITHIN THE PRIOR 24 MONTHS.

OR

3. DOCUMENTED, SUCCESSFUL COMPLETION, OF AN "INPO 87-004/ ACAD 93-009 GENERAL EMPLOYEE TRAINING, LEVEL II COURSE", WITHIN THE PRIOR 12 MONTHS.

THE COURSE CONSISTS OF 1 - 2 HOURS LECTURE ON SITE SPECIFIC TOPICS, PRACTICAL FACTORS EXERCISES, AND A 60 (50 MULTIPLE CHOICE AND 10 ESSAY) QUESTION EXAMINATION. THE MINIMUM PASSING GRADE FOR THE EXAMINATION IS 80%.

SUCCESSFUL COMPLETION OF THE CHALLENGE COURSE ALLOWS AN INDIVIDUAL TO WORK WITH RADIOACTIVE MATERIAL, UNDER THE CONTROL OF AN APPROVE RADIATION WORK PERMIT (RWP). ALSO, IT ALLOWS AN INDIVIDUAL UNESCORTED ACCESS TO RESTRICTED, RADIATION, AND CONTAMINATION AREAS, BUT NOT HIGH RADIATION AREAS.

THE CHALLENGE COURSE MAY ONLY BE TAKEN ONCE, PRIOR TO TAKING AN ANNUAL REFRESHER COURSE, TO QUALIFY, FOR ACCESS AND WORK WITH RADIOACTIVE MATERIAL. (THE MANAGER, RADIOLOGICAL PROTECTION SERVICES, AND/OR RSO MAY WAIVE THIS REQUIREMENT , ON AN INDIVIDUAL BASIS AT HIS DISCRETION).

**NOTE**

THE COMPLETION OF THE CHALLENGE COURSE DOES NOT MEET THE REQUIREMENTS FOR ANNUAL RETRAINING. INDIVIDUALS WHO DO NOT ATTEND THE ANNUAL REFRESHER COURSE WITHIN 12 MONTHS FROM THE TIME OF COMPLETING A CHALLENGE COURSE, MAY BE REQUIRED TO ATTEND THE "INITIAL RADIATION WORKER TRAINING COURSE DDH-88-129".

**D. CATEGORY I RADIATION WORKER TRAINING COURSE RPS-07**

THE CATEGORY I RADIATION WORKER TRAINING COURSE IS DESIGNED TO PROVIDE TRAINING TO INDIVIDUALS SO THAT THEY MAY HAVE UNESCORTED ACCESS TO RESTRICTED AREAS AND WORK WITH RADIOACTIVE MATERIAL WITH AN APPROVED RADIATION WORK PERMIT UNDER THE SUPERVISION OF A CATEGORY II TRAINED RADIATION WORKER.

THE COURSE CONSISTS OF 4 HOURS OF CLASSROOM INSTRUCTION, 1 - 2 HOURS OF PRACTICAL FACTORS TRAINING, AND A 50 QUESTION, MULTIPLE CHOICE EXAMINATION. THE MINIMUM PASSING GRADE ON THE EXAMINATION IS 80%.

AN INDIVIDUAL SUCCESSFULLY COMPLETING THIS COURSE, SHALL BE CONSIDER TRAINED FOR ONE (1) YEAR FROM THE LAST DAY OF THE MONTH, IN WHICH, THE TRAINING WAS COMPLETED.

**E. REGULATORY GUIDE 8.13 TRAINING**

IN ADDITION TO OTHER TRAINING REQUIREMENTS, ALL FEMALE RADIATION WORKERS, MUST READ AND REVIEW NRC REGULATORY GUIDE 8.13 "INSTRUCTION CONCERNING PRENATAL RADIATION EXPOSURE", PRIOR TO ENTERING ANY RESTRICTED AREA. A STATEMENT THAT THIS REQUIREMENT HAS BEEN MET, SHALL BE PLACED AND KEPT IN THE INDIVIDUAL'S TRAINING RECORD.

#### F. TRAINING CLASS SCHEDULING

TRAINING CLASSES SHALL BE HELD AS DETERMINED BY THE HEALTH PHYSICS DEPARTMENT ON AN AS NEEDED BASIS, SUBJECT TO INSTRUCTOR AVAILABILITY. INDIVIDUALS WHOSE TRAINING WILL EXPIRE WITHIN 60 DAYS WILL BE NOTIFIED, BY MEMO, OF THE NEXT TRAINING CLASS TO BE SCHEDULED. THIS LIST WILL BE PUBLISHED BY THE HEALTH PHYSICS DEPARTMENT ON OR AROUND THE 15TH OF EACH MONTH FOR THE CURRENT MONTH AND THE FOLLOWING 2 MONTHS.

#### G. CLASS INSTRUCTORS

INDIVIDUALS TEACHING RADIATION WORKER TRAINING COURSES SHALL BE ASSIGNED BY THE MANAGER, RADIOLOGICAL PROTECTION SERVICES OR THE RADIATION SAFETY OFFICER. THE INDIVIDUAL ASSIGNED TO TEACH, SHALL BE, AT A MINIMUM, A SENIOR HEALTH PHYSICS TECHNICIAN. AN AUDIT OF THE INSTRUCTOR'S INITIAL CLASS SHALL BE PERFORMED BY THE RSO OR HIS DESIGNEE. A RECORD OF THE AUDIT SHALL BE MAINTAINED IN THE INSTRUCTOR'S TRAINING FILE.

#### H. VISITOR TRAINING

VISITORS MAY BE ALLOWED ESCORTED ACCESS TO RESTRICTED AREAS IN ACCORDANCE WITH RPI-8 "VISITOR ACCESS TO HEALTH PHYSICS RESTRICTED AREAS".

### VI. RECORDS

THE FOLLOWING RECORDS SHALL BE MAINTAINED IN INDIVIDUAL TRAINING FILES AND/OR THE RADIATION EXPOSURE CONTROL DATA BASE SYSTEM (REC).

- A. ALL COMPLETED AND REVIEWED EXAMINATIONS
- B. ALL PRACTICAL FACTORS EXERCISE SHEET
- C. REGULATORY GUIDE 8.13 TRAINING RECORDS
- D. CLASS SCHEDULES AND ATTENDANCE RECORDS
- E. A DATABASE LISTING REPORT OF ALL TRAINED PERSONNEL

#### NOTE

THE RADIOLOGICAL PROTECTION SERVICES STAFF HAS ACCESS TO THE TRAINING STATUS OF ALL INDIVIDUALS REQUESTING ACCESS TO THE RESTRICTED VIA A SLAVE COMPUTER TERMINAL IN THE HP LAB.

ALL TRAINING RECORDS SHALL BE MAINTAINED INDEFINITELY OR UNTIL DISPOSAL IS AUTHORIZED BY COMPETENT AUTHORITY.

VII. QUALITY ASSURANCE

AN ANNUAL REVIEW AND AUDIT OF COURSE MATERIALS, RECORDS AND OTHER ACTIVITIES, DEEMED NECESSARY BY THE RADIOLOGICAL SAFETY COMMITTEE SHALL BE CONDUCTED AS DIRECTED BY THE COMMITTEE.

VIII. APPENDICES

THERE ARE NO APPENDICES FOR THIS INSTRUCTION.

## 10.6 Exposure Control and Monitoring

Exposure control and monitoring for licensed activities not involving source material or special nuclear material (SM/SNM) is described in Sections 10.6A.1 and 10.6A.2. That for SM/SNM activities is given in Sections 10.6B.1 and 10.6B.2.

### 10.6A.1 External - Non-SM/SNM Activities

Radiological surveys are conducted on a routine basis, both in and adjacent to restricted areas. Figures 10.6-1 and 10.6-2 specify routine survey locations, type and frequency. Figure 10.6-3 provides action levels and administrative controls for both restricted and unrestricted areas. Radiation and contamination surveys are performed only by qualified health physics personnel (qualification as determined by the RSC, the RSO, the Manager, Radiological Protection Services or the their designee).

HEPA ventilation filtration systems are DOP tested in accordance with ANSI N510-1980 following HEPA filter replacement.

Personnel monitoring devices (e.g., TLD's; extremity badges) are used as specified in Figure 10.6-3. TLD's are processed at least quarterly. Extremity badges are processed as required by RWP.

Personnel dosimetry is generally processed in-house at Combustion Engineering using an NVLAP accredited Panasonic TLD System in accordance with 10 CFR 20.1501 (please see Figure 10.6-4). Neutron monitoring is accomplished through the use of NVLAP accredited vendor badges for personnel requiring such monitoring. In the event that either the in-house system is disabled or Combustion Engineering is no longer eligible for accreditation, arrangements are available for dosimetry processing elsewhere according to regulations.

### 10.6A.2 Internal - Non-SM/SNM Activities

Whole body counts (i.e., in vivo bioassays) are performed for mixed fission and corrosion products twice per calendar year. Personnel selected for whole body counts are those who have worked on a radiation work permit since their last count.

Personnel intake of radioactive materials is monitored through the use of personal lapel breathing zone air samples whenever work with loose contamination exceeds 10,000 DPM/100 cm<sup>2</sup>. The sample filters are counted, and if a calculated intake is determined to be greater than four (4) DAC-hrs, the filter is sent for gamma spectroscopy to identify the nuclides involved. Further, the affected individual may be sent for a whole body count. Also, the work is reviewed and the individual may be restricted from work requiring breathing zone sampling for seven (7) days following the intake.

Should an individual be suspected of receiving an intake of greater than forty (40) DAC-hrs, the work will be stopped and a complete evaluation and root cause analysis will be performed. Additionally, the individual will be given a whole body count and will not be allowed to work with radioactive material until the Radiation Safety Committee is satisfied that appropriate corrective actions to prevent recurrence have been taken.

#### 10.6B.1 External - SM/SNM Activities

Exposure to radiation shall be monitored for individuals likely to receive, in one year from sources external to the body, in excess of 10% of the occupational dose limits of 10 CFR 20. The personnel monitoring device will be a thermoluminescent dosimeter (TLD). TLDs shall be processed for dose reading on at least a quarterly basis by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited dosimetry processor. The action level for investigation and possible work restrictions shall be 1 rem for deep dose equivalent (DDE) on an annual basis.

#### 10.6B.2 Internal - SM/SNM Activities

The intake of radioactive material shall be monitored for individuals likely to receive in excess of 10% of the applicable Annual Limit on Intake (ALI). Soluble uranium intake shall be limited to less than 10 milligrams per week per individual. Work activity restrictions shall be imposed when an individual reaches 50% of the applicable limit; i.e., 0.5 ALI (1,000 DAC-hours) and 5 milligrams per week for soluble uranium. A diagnostic study to evaluate intakes shall be started at these action levels.

The primary method of calculating Committed Effective Dose Equivalent is by using personal lapel air sampling results. Personal lapel monitors shall be counted on a daily basis when in use for this purpose.



If a respiratory protection program is utilized or personnel are likely to receive greater than 10% ALI such that monitoring is required, then a bioassay program shall be maintained for confirmation and evaluation of intakes. If a bioassay program is required, then bioassay assessments of intakes shall be performed on an annual basis, or, for personnel exposed to soluble uranium, bioassay assessment shall be on a monthly basis. Bioassay assessment may also be used to perform the diagnostic study at the action levels above.

#### 10.6B.3 Contamination Surveys

Contamination surveys are performed on a routine basis to monitor radioactive contamination. Routine contamination surveys are performed at a minimum of once per week in loose surface contaminated areas of the Laboratory where work involving unclad radioactive materials may be in progress. Direct beta/gamma surveys are also performed on a monthly basis in such areas. Surveys in step-off pad areas in use are performed on a daily basis. Surveys conducted in support of work performed under a radiation work permit may be used to meet the survey requirement.

The following are action levels for contamination control:

<u>Area</u>	<u>Action Level*</u>
Contamination Control Area	5,000
Clean Areas	50
Step-Off Pad Areas (in use)	10

\*  $\text{dpm alpha} / 100 \text{ cm}^2$  as determined by smear survey

Clean up action is started within 24 hours when removable surface contamination exceeds the action level limits specified above.

#### 10.6B.4 Materials and Equipment Released for Unrestricted Use

Release of equipment and materials from restricted areas to clean areas on-site or unrestricted areas shall be in accordance with the NRC's "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated April 1993.

**Figure 10.6-1  
Building 2 Complex  
(Nuclear Service Buildings)  
Survey Requirements**

Item	Survey Location	Frequency	Contamination Survey	Radiation Survey
1	Control Zone Buffer Zones	Daily <sup>1,2</sup>	X	
2	Building 2 Office Spaces	Weekly	X	
3	Building 2 Restricted Areas	Weekly	X	X
4	Building 2 Lower Mezzanine	Weekly <sup>1</sup>	X	X
5	Building 2A Restricted Areas	Weekly	X	X
6	Control Zone 1	Weekly <sup>1,3</sup>	X	X
7	Control Zone 2	Weekly <sup>1,3</sup>	X	X
8	Control Zone 3	Weekly <sup>1,3</sup>	X	X
9	Control Zone 4	Weekly <sup>1,3</sup>	X	X
10	Control Zone 5	Weekly <sup>1,3</sup>	X	X
11	Building 1 Restricted Areas	Weekly	X	X
12	Building 1 High Radiation & LLRW Storage	Monthly	X	X
13	Building 1A Radiation Storage	Monthly	X	X
14	Building 1A Multi-Purpose Area	Weekly <sup>1,3</sup>	X	X
15	Trailer Storage Area	Monthly		X
16	Yard Storage Area	Monthly		X
17	Waste Pad	Monthly		X
18	Vault	Monthly	X	X

<sup>1</sup> When in use; monthly when not in use.

<sup>2</sup> No map required. Health physics personnel perform the required surveys and acceptability of survey results is acknowledged on the weekly report.

<sup>3</sup> Prior to a new RWP being issued for change of work scope when radiological conditions could materially change.

**Figure 10.6-2**  
**Building 5**  
**(Non-SM/SNM Nuclear Laboratories)**  
**Survey Requirements**

Item	Survey Location	Frequency	Contamination Survey	Radiation Survey
1	Laboratory Buffer Zones	Daily <sup>1,2</sup>	X	
2	Building 5 General Area	Weekly	X	X <sup>3</sup>
3	Warm Metallography Lab - Room 224C	Weekly <sup>1</sup>	X	X
4	Radiochemistry Labs - Rooms 305 & 306	Weekly <sup>1</sup>	X	X
5	Radiochemistry Lab - Room 321	Weekly <sup>1</sup>	X	X
6	Boronometer Test Area - Building 16	Weekly <sup>1</sup>	X	X

<sup>1</sup> When in use; monthly when not in use.

<sup>2</sup> No map required. Health physics personnel perform the required surveys and acceptability of survey results is acknowledged on the weekly report.

<sup>3</sup> Monthly; survey to be performed adjacent to areas where work with radioactive materials is being performed.

**Figure 10.6-3**  
**Action Levels and Administrative Controls**

Action Level	Administrative Control
<b>1. Radiation Surveys - General</b>	
a) 0.1 mr/hr - Contact (100 DPM/100 cm <sup>2</sup> fixed contamination by RM-14 or equivalent)	Unconditional Release of Equipment (and requirements of 3a) of this table.
b) 2.0 mr/hr - area	Dosimetry required.
c) 2.0 mr/hr - area	Posted as a "RADIATION AREA".
d) 100 mr/hr - area	Posted as a "HIGH RADIATION AREA" and locked, guarded and/or alarmed.
<b>2. Radiation Surveys - for RWP Controls</b>	
a) Greater than 14 mr/hr Beta @ 18"	Dose estimate required for skin exposure.
b) Greater than 50 mr/hr Gamma @ contact.	Handling estimate required for extremity exposure.
c) Greater than 500 mr/hr Gamma @ contact.	Dose estimate required for skin exposure and additional RWP approvals.
d) Greater than 1,000 mr/hr Gamma @ contact.	Handling estimate, extra extremity dosimetry and additional RWP controls required.

---

3. Contamination Surveys

- |   |   |
|---|---|
| a) 200 DPM/100 cm <sup>2</sup> Beta/Gamma<br>10 DPM/100 cm <sup>2</sup> Alpha | Limits for controlled area and for unrestricted release. Above these limits, area controlled as contaminated area.    |
| b) 1,000 DPM/100 cm <sup>2</sup> Beta/Gamma on items/equipment                | BZ's required only if grinding, cutting or drilling performed on equipment or items.                                  |
| c) 10,000 DPM/100 cm <sup>2</sup> Beta/Gamma on items/equipment               | BZ's required when working on items or equipment; no grinding, cutting or drilling unless approved by Health Physics. |
| d) 10,000 DPM/100 cm <sup>2</sup> Beta/Gamma in General Area <sup>1</sup>     | Area cleanup required within 24 hours.  |
| e) 11,100 DPM (0.005 microcuries) on sealed sources                           | Source must be removed from use and Manager, Radiation Protection Services or RSO notified immediately.               |

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<sup>1</sup> Action levels are based on smear averages, not individual smears.

NOTE: Limits for unconditional release may be increased to 1,000 DPM/100 cm<sup>2</sup> beta/gamma upon written approval by RSO or Manager, Radiation Protection Services. However, a reasonable effort must be made to decontaminate items to less than 200 DPM/100 cm<sup>2</sup> beta/gamma.

NOTE: If any smear reveals the presence of more than 100,000 DPM/100 cm<sup>2</sup> beta/gamma removable contamination, that smear will be counted for alpha. If the alpha contamination is greater than 1% of the beta/gamma count, the BZ's used in that work area shall be counted for alpha.

Figure 10.6-4  
NVLAP Accreditation  
Personnel Dosimetry Processing

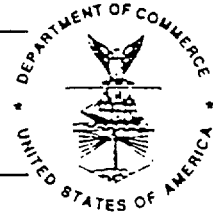
National Institute  
of Standards and Technology



National Voluntary  
Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990  
ISO/IEC GUIDE 58:1993  
ISO 9002:1994

## Scope of Accreditation



Page 1 of 1

IONIZING RADIATION DOSIMETRY

NVLAP LAB CODE 0563

COMBUSTION ENGINEERING, INC.  
1000 Prospect Hill Road, P.O. Box 500  
Windsor, CT 06095-0500  
Stephen M. Sorensen Phone: 203-285-5285

This facility has been evaluated and deemed competent to process the radiation dosimeter listed below through employing a Panasonic automatic reader model UD710A.

This facility is accredited to process the following dosimeter by virtue of actual demonstration of compliance with ANSI-N13.11-1983 through testing.

Panasonic TLD model UD802-AS2 in a Panasonic UD874-AT holder for ANSI-N13.11 categories II, III, IV, V, VI, VII.

October 1, 1995

*Effective until*

A handwritten signature in dark ink, appearing to read "Albert R. Phalen".

*For the National Institute of Standards and Technology*

License No. 06-00217-06

Page: 59  
Date: 5/18/95

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## **10.7 Environmental Monitoring**

Environmental monitoring is accomplished by the Windsor Site Environmental Monitoring Program. This program examines uranium content, alpha radioactivity and beta radioactivity in surface and well waters, river sediment, soil, vegetation, and atmospheric fallout. Additionally, pH, fluoride, and nitrate levels are determined in well water, surface water and river sediment. A gamma spectrum is performed on selected river sediment, soil, vegetation and atmospheric fallout samples. Fourteen (14) on-site routine sampling stations have been established at designated points for collection of quarterly atmospheric fallout samples. Semi-annually, soil and vegetation samples are also collected at these fourteen (14) on-site locations, and four (4) additional locations off-site.

## **10.8 ALARA Program**

Combustion Engineering is committed to keep occupational radiation exposures As Low As Reasonably Achievable (ALARA). The ALARA Program is described in RPS-01, given for information in Figure 10.8-1.

**Figure 10.8-1  
ALARA Program**

The following 4 pages provide for information a current copy of the Radiological Protection Standard, RPS-01, "A.L.A.R.A. Program for Materials License No. 06-00217-06".



COMBUSTION ENGINEERING, INC.

RADIOLOGICAL PROTECTION STANDARD

RPS-01

A.L.A.R.A. PROGRAM FOR MATERIALS LICENSE

NO. 06-00217-06

PREPARED BY: William A. PAGEL DATE: 4/11/95  
(PRINTED NAME)

SIGNATURE : William A. Pagel

APPROVED BY: STEPHEN M. SORENSON DATE: 4/11/95  
(PRINTED NAME)

SIGNATURE : SM Sorenson

A.L.A.R.A. POLICY STATEMENT

"THE MANAGEMENT OF COMBUSTION ENGINEERING, INC. IS COMMITTED TO KEEPING OCCUPATIONAL RADIATION EXPOSURES AS LOW AS REASONABLY ACHIEVABLE (A.L.A.R.A.) WITH REGARD TO OPERATIONS CONDUCTED UNDER U.S.N.R.C. MATERIALS LICENSE NO. 06-00217-06 AS RENEWED OR AMENDED. THE FOLLOWING PROGRAM IS ADOPTED AS THE METHOD TO ACHIEVE THIS COMMITMENT."

D.A. CIRELLI, DIRECTOR  
FIELD SERVICES  
FACILITIES, FINANCE, AND  
ADMINISTRATION

*D.A. Cirelli* 4/13/95  
(DATE)

I. MANAGEMENT AUDIT

A. "MANAGEMENT SHALL PERFORM AN ANNUAL AUDIT, THROUGH THE RADIOLOGICAL SAFETY COMMITTEE, TO DETERMINE HOW EXPOSURES MIGHT BE LOWERED."

B. AS A MINIMUM, THE FOLLOWING AREAS SHALL BE REVIEWED AND EVALUATED FOR A.L.A.R.A.:

1. ANNUAL EXPOSURE REPORT
2. WEEKLY DOSIMETER LOG SHEETS
3. RADIATION WORK PERMITS
4. RADIATION AND CONTAMINATION SURVEYS
5. WHOLE BODY COUNT RESULTS
6. BREATHING ZONE SAMPLE RESULTS

II. A. "MANAGEMENT SHALL ENSURE THAT THERE IS A WELL SUPERVISED RADIATION PROTECTION CAPABILITY, WITH WELL DEFINED RESPONSIBILITIES."

B. THIS IS ACCOMPLISHED BY THE FOLLOWING:

1. A FORMAL ORGANIZATION CHART (UPDATED AS NECESSARY)
2. FORMAL JOB DESCRIPTIONS FOR THE POSITIONS IDENTIFIED IN THE ORGANIZATION.
3. PERIODIC PROFESSIONAL TRAINING OR RETRAINING OF THE RADIATION PROTECTION STAFF.

III. RADIATION WORKER TRAINING

A. "MANAGEMENT SHALL ENSURE THAT RADIATION WORKERS AND OTHER SITE PERSONNEL RECEIVE APPROPRIATE AND SUFFICIENT TRAINING."

B. THIS IS ACCOMPLISHED BY THE FOLLOWING METHODOLOGY:

1. RADIOLOGICAL PROTECTION INSTRUCTION - RPI-15 "RADIATION WORKER TRAINING PROGRAMS" FORMALLY SPECIFIES VARIOUS TRAINING REQUIREMENTS AND PROCEDURES FOR PERSONNEL WHO WORK WITH AND/OR IN THE VICINITY OF RADIOACTIVE MATERIAL.
2. RADIOLOGICAL PROTECTION INSTRUCTION - RPI-4 "RADIATION WORK PERMITS" SPECIFIES THE TRAINING REQUIRED TO WORK WITH A RADIATION WORK PERMIT (RWP).
3. RADIOLOGICAL PROTECTION INSTRUCTION - RPI-1 "PERSONNEL MONITORING" SPECIFIES RADIATION MONITORING AND TRAINING REQUIREMENTS FOR ANY PERSONNEL ENTERING A HEALTH PHYSICS RESTRICTED AREA.

IV. RADIATION SAFETY OFFICER (RSO) AUTHORITY

- A. THE RADIATION SAFETY OFFICER (RSO) OR HIS/HER DESIGNEE SHALL HAVE THE AUTHORITY TO ENFORCE SAFE OPERATIONS AND HAS THE AUTHORITY TO HALT WORK THAT HE/SHE DEEMS NOT IN ACCORDANCE WITH THIS PROGRAM.

V. MODIFICATIONS TO OPERATING PROCEDURES

- A. MODIFICATIONS TO OPERATING PROCEDURES SHOULD BE MADE WHERE THEY WILL SUBSTANTIALLY REDUCE EXPOSURES AT A REASONABLE COST.

- B. THIS IS ACCOMPLISHED BY THE FOLLOWING:

1. RADIOLOGICAL PROTECTION INSTRUCTION - RPI-1 "PERSONNEL MONITORING"
  - (a) ADMINISTRATIVELY AND OPERATIONALLY LIMITS WHOLE BODY AND LENS OF THE EYE EXPOSURE.
2. RADIOLOGICAL PROTECTION INSTRUCTION - RPI-2 "SKIN AND EXTREMITY MONITORING"
  - (a) ADMINISTRATIVELY AND OPERATIONALLY LIMITS SKIN AND EXTREMITY EXPOSURE.
3. RADIOLOGICAL PROTECTION INSTRUCTION - RPI-4 "RADIATION WORK PERMITS"
  - (a) ADMINISTRATIVELY AND OPERATIONALLY PROVIDES FOR REVIEWS OF RADIOLOGICAL CONDITIONS, OPERATIONS, AND PERSONNEL EXPOSURE ON AN ONGOING BASIS.
4. RADIOLOGICAL PROTECTION INSTRUCTION - RPI-8 "VISITOR ACCESS TO HEALTH PHYSICS RESTRICTED AREAS"
  - (a) ADMINISTRATIVELY AND OPERATIONALLY RESTRICTS "VISITORS" TO SPECIFIC AREAS WITHIN THE HEALTH PHYSICS RESTRICTED AREA.
5. RADIOLOGICAL PROTECTION INSTRUCTION - RPI-9 "MONITORING FOR RADIATION AND CONTAMINATION"
  - (a) ADMINISTRATIVELY AND OPERATIONALLY SPECIFIES CONTROLS AND ACTION LEVELS FOR RADIATION AND CONTAMINATION LEVELS IN THE WORKPLACE.

ANY OPERATION THAT FALLS OUTSIDE THE SCOPE OF THE ABOVE MENTIONED INSTRUCTIONS, SHALL BE REVIEWED BY THE RSO AND/OR RADIOLOGICAL SAFETY COMMITTEE

## **11 Waste Management**

### **11.1 Non-SM/SNM Wastes**

Solid radioactive waste is packaged and shipped in accordance with applicable regulations to a licensed Radioactive Waste Reduction Facility for treatment by compaction, shredding, decontamination for unrestricted release, or incineration. Combustion Engineering, Inc., currently has an agreement with Scientific Ecology Group, Inc., of Oak Ridge, Tennessee, for waste processing and ultimate disposal. Scientific Ecology Group, Inc., is licensed by the State of Tennessee under License Number R-73008-E94. Combustion Engineering, Inc., reserves the right to utilize alternate waste brokers without prior notification of the NRC.

Combustion Engineering may receive back its own processed waste for extended interim storage. For Non-SM/SNM wastes, Figure 11-1 addresses the information requested in NRC Information Notice IN 90-09 for interim storage of low level radioactive waste.

Liquid radioactive wastes (with the exception of potentially contaminated SM or SNM liquid wastes, as discussed in Chapter 9 above with respect to Building 6) produced by operations at the Windsor site are evaporated in fume hoods which exhaust to HEPA filtered and monitored stacks. The remaining materials are then handled as solid waste.

### **11.2 SM/SNM Wastes**

For SM/SNM wastes, CE (J. F. Conant) letters to NRC (M. Tokar) dated December 23, 1992 (ML-92-057), June 3, 1993 (ML-93-020), and August 20, 1993 (ML-93-032) provide the information requested in NRC Information Notice IN 90-09.

Low Level Radioactive Waste (LLRW) storage shall be in Building 6, in locked C-vans or trailers, and in other buildings or enclosures on site. LLRW in storage will be checked annually for integrity and exterior contamination.

**Figure 11-1**  
**Receipt and Interim Storage of Low Level Radioactive Waste**

Following 11 pages provide for information a current copy of the Radiological Protection Instruction, RPI-10, "Receipt and Interim Storage of Low Level Radioactive Waste".

COMBUSTION ENGINEERING, INC.

RADIOLOGICAL PROTECTION INSTRUCTION

RPI-10

RECEIPT AND INTERIM STORAGE OF LOW LEVEL RADIOACTIVE WASTE

PREPARED BY: William PAGEL DATE: 3/30/95  
(PRINTED NAME)

SIGNATURE : William A. Pagel

APPROVED BY: STEPHEN M. BREENSEN DATE: 3/30/95  
(PRINTED NAME)

SIGNATURE : Stephen M. Breensen

## I. PURPOSE

THE PURPOSE OF THIS INSTRUCTION IS TO PROVIDE THE MINIMUM REQUIREMENTS ASSOCIATED WITH RECEIPT AND INTERIM STORAGE OF PROCESSED LOW LEVEL RADIOACTIVE WASTE (LLRW) GENERATED BY OPERATIONS, UNDER NRC MATERIALS LICENSE 06-00217-06 (AS AMENDED).

## II. SCOPE

THE SCOPE OF THIS INSTRUCTION INCLUDES ONLY LLRW GENERATED BY OPERATIONS ON THE WINDSOR, CT SITE OF COMBUSTION ENGINEERING, INC. UNDER NRC MATERIALS LICENSE 06-00217-06.

## III. REFERENCES

1. NRC MATERIALS LICENSE 06-00217-06 (AS AMENDED)
2. RPI-9 "MONITORING FOR RADIATION AND CONTAMINATION"
3. RPI-4 "RADIATION WORK PERMITS"
4. RPI-11 "HOT PARTICLE SURVEILLANCE"
5. RPI-13 "TRANSPORTATION OF RADIOACTIVE MATERIAL"
6. RPI-15 RADIATION WORKER TRAINING PROGRAMS"
7. 10CFR20 "STANDARDS FOR PROTECTION AGAINST RADIATION"
8. USNRC INFORMATION NOTICE 90-09 "EXTENDED INTERIM STORAGE OF LOW-LEVEL RADIOACTIVE WASTE BY FUEL CYCLE AND MATERIALS LICENSEES"
9. RPI-14 "EMERGENCY INSTRUCTIONS"

## IV. DEFINITIONS

1. AS STATED IN THE ABOVE REFERENCES

## V. INSTRUCTION

1. ALL LLRW GENERATED BY OPERATIONS, COVERED BY NRC MATERIALS LICENSE, ON THE WINDSOR, CT SITE OF COMBUSTION ENGINEERING, INC. -SHALL BE SENT TO A WASTE PROCESSOR AFTER SORTING.
2. THE LLRW SHALL BE PACKAGED AND TRANSPORTED TO THE PROCESSOR, IN ACCORDANCE WITH RPI-13 "TRANSPORTATION OF RADIOACTIVE MATERIALS" AND ANY SPECIAL CONDITIONS REQUIRED BY THE PROCESSOR.
3. AFTER THE LLRW HAS BEEN PROCESSED, IT WILL BE PACKAGED AND SHIPPED BACK TO COMBUSTION ENGINEERING, INC.



4. THE PROCESSED, REPACKAGED LLRW SHALL BE RECEIPT SURVEYED IN ACCORDANCE WITH RPI-13 "TRANSPORTATION OF RADIOACTIVE MATERIALS", RPI-4 "RADIATION WORK PERMITS", RPI-11 "HOT PARTICLE SURVEILLANCE", AND RPI-15 "RADIATION WORKER TRAINING PROGRAMS".
5. THE PACKAGES (GENERALLY S.E.G. METAL BOXES MODEL - 44ft3 TYPE A OR CONTAINERS DESIGNATED AS B-25's) SHALL BE THEN PLACED IN THE VAULT IN BUILDING #1.
6. A MONTHLY SURVEY AND INSPECTION OF THE STORED CONTAINERS WILL BE PERFORMED TO ASSURE CONTAINER INTEGRITY AND RADIATION AND CONTAMINATION LEVELS IN THE STORAGE AREA.
7. A PHYSICAL DESCRIPTION OF THE STORAGE AREA IS PROVIDED AS APPENDIX A.

#### VI. RECORDS

THE FOLLOWING RECORDS ARE TO BE MAINTAINED ON FILE UNTIL FINAL LICENSE TERMINATION OR UNTIL DISPOSAL IS AUTHORIZED BY COMPETENT AUTHORITY.

1. ALL OUTGOING AND INCOMING SHIPPING PAPER WORK AS REQUIRED BY RPI-13 "TRANSPORTATION OF RADIOACTIVE MATERIALS"
2. RADIATION AND CONTAMINATION SURVEYS & CONTAINER INSPECTIONS AS REQUIRED BY RPI-9 "MONITORING FOR RADIATION AND CONTAMINATION"
3. RADIATION WORK PERMITS AS REQUIRED BY RPI-4 "RADIATION WORK PERMITS"

#### VII. QUALITY ASSURANCE

THE RECORDS AND OPERATIONS ASSOCIATED WITH THIS INSTRUCTION SHALL BE AUDITED, AS DIRECTED BY THE RADIATION SAFETY COMMITTEE, ON AN ANNUAL BASIS.

#### VIII. APPENDICES

- A. "INFORMATION NEEDED TO AUTHORIZE EXTENDED INTERIM STORAGE OF LOW-LEVEL RADIOACTIVE WASTE."

PLEASE NOTE WE ALREADY HAVE AN AMENDMENT APPROVED TO OUR LICENSE (NO. 40) THAT ALLOWS RECEIPT BACK OF OUR OWN LLW FROM OUR PROCESSOR(S). THIS APPENDIX IS TO INCORPORATE THAT AMENDMENT AND PROVIDE ADDITIONAL INFORMATION TO THE COMMISSION

APPENDIX A  
INFORMATION NEEDED TO AUTHORIZE EXTENDED  
INTERIM STORAGE OF LOW-LEVEL RADIOACTIVE WASTE

1. IDENTIFICATION OF WASTE TO BE STORED

a. SPECIFY ANY POSSESSION LIMIT INCREASES NEEDED FOR EXTENDED INTERIM STORAGE OF LLW.

1. NONE REQUIRED

b. IDENTIFY THE ESTIMATED MAXIMUM AMOUNT OF LLW TO BE STORED, BOTH IN TERMS OF VOLUME AND ACTIVITY, BY RADIONUCLIDE

1. THE ESTIMATED MAXIMUM VOLUME OF LLW TO BE STORED IS: 800 ft<sup>3</sup>

2. THE ESTIMATED MAXIMUM ACTIVITY OF LLW TO BE STORED IS: 20 Ci

3. THE ESTIMATED MAXIMUM ACTIVITY OF LLW BY RADIONUCLIDE IS:

a.) CO-60 (@95.70%) = 19.140 Ci

b.) CO-58 (@ 1.25%) = 0.250 Ci

c.) MN-54 (@ 1.05%) = 0.210 Ci

d.) SB-125 (@ 1.00%) = 0.200 Ci

e.) CS-137 (@ 0.75%) = 0.150 Ci

f.) CO-57 (@ 0.25%) = 0.049 Ci

g.) OTHER TRACE = 0.001 Ci

c. CHARACTERIZE THE WASTE TO BE STORED

(1) VOLUME OF WASTE BY CLASS:

- CLASS A, 800ft<sup>3</sup>

(2) PHYSICAL FORM OF WASTE:

- SOLID

(3) WASTE PROCESSING:

- NONE ON SITE

(4) ADDITIONAL NON-RADIOLOGICAL PROPERTIES OF LLW

- NONE

d. DESCRIBE THE AMOUNT AND TYPE OF LLW CURRENTLY BEING STORED OR PROCESSED.

1. TWO SEALAND CONTAINERS OF CLASS A DRY ACTIVATED BURNABLE LLW CURRENTLY BEING PROCESSES AT S.E.G. 2,580 ft<sup>3</sup> BEFORE INCINERATION AND COMPACTION.

e. IDENTIFY ANY ADDITIONAL PERMITS OR APPROVALS NECESSARY FOR STORAGE AND THE STATUS OF EACH REQUIRED APPROVAL.

1. CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION APPROVAL TO STORE ONE (1) 55 GALLON DRUM OF FREON CONTAMINATED RADIOACTIVE FILTERS. APPROVAL GRANTED UNTIL DECEMBER 31, 1996. (PAPERWORK ON FILE).

2. PLANS FOR FINAL DISPOSAL

- a. SPECIFY WHEN DISPOSAL CAPACITY WILL NO LONGER BE AVAILABLE TO YOU AND ONSITE STORAGE WILL BEGIN.

1. DISPOSAL CAPACITY WAS NO LONGER AVAILABLE TO US SINCE 01 JUL 94 HOWEVER, DUE TO THE ECONOMICS OF TRANSPORTATION AND MINIMIZING AMOUNTS GENERATED WE DO NOT EXPECT TO RECEIVE WASTE BACK, FOR STORAGE, FOR AT LEAST TWO (2) YEARS.

3. THE FOLLOWING IS A PHYSICAL DESCRIPTION OF THE LOW-LEVEL RADIOACTIVE WASTE STORAGE AREA AT THE COMBUSTION ENGINEERING, INC. BUILDING #2 COMPLEX AREA AT 1000 PROSPECT HILL ROAD, WINDSOR, CT 06095-0500, IN ACCORDANCE WITH NRC INFORMATION NOTICE 90-09 "EXTENDED INTERIM STORAGE OF LOW-LEVEL RADIOACTIVE WASTE BY FUEL CYCLE AND MATERIALS LICENSEES".

- a. IDENTIFY THE LOCATION AND PROVIDE A DIAGRAM OF THE LLW STORAGE AREA WHICH DEMONSTRATES WHERE PACKAGES WILL BE STORED AND HOW PACKAGES WILL BE ACCESSIBLE FOR INSPECTION PURPOSES. INCLUDE THE LOCATION OF WASTE PROCESSING EQUIPMENT (IF APPLICABLE), AIR SAMPLING STATIONS, FILTERS, AND ANY SOURCES OF FLAMMABLE OR EXPLOSIVE MATERIAL.

1. PLEASE SEE DIAGRAMS OF THE BUILDING #2 COMPLEX AND THE BUILDING #1 DETAIL(PAGES AND OF THIS APPENDIX) SHOWING THE HIGH DENSITY, CONCRETE VAULT, IN WHICH, THE RECEIPTED LLW WILL BE STORED. THERE IS NO PROCESSING EQUIPMENT, AIR SAMPLING STATION, SOURCES OF FLAMMABLE OR EXPLOSIVE MATERIAL IN OR NEAR THE AREA. THE ONLY THING THIS VAULT WILL BE USED FOR IS LLW STORAGE, IN APPROVED PACKAGES.

- b. SPECIFY THE MAXIMUM VOLUME OF LLW THAT CAN BE STORED IN THE PROPOSED WASTE STORAGE AREA AND RELATE THIS TO THE ANNUAL VOLUME OF WASTE GENERATED.

1. THE MAXIMUM VOLUME THE STORAGE AREA CAN HOLD, WHILE STILL BEING INSPECTABLE IS: 800 ft<sup>3</sup>. THIS RELATES TO AN AVERAGE PROCESSED VOLUME GENERATED OF 100 ft<sup>3</sup> PER YEAR.

- c. SPECIFY THE TYPE OF BUILDING/STRUCTURE IN WHICH THE WASTE WILL BE STORED AND DEMONSTRATE THAT THE WASTE WILL BE PROTECTED FROM WEATHER, AT ALL TIMES.

1. THE WASTE WILL BE STORED IN A HIGH DENSITY, CONCRETE VAULT WITH A HEAVY (BANK TYPE) COMBINATION LOCKED, DOOR. THE VAULT IS LOCATED INSIDE BUILDING #1 ACROSS FROM OUR HIGH RADIATION STORAGE AREA AND IS WELL PROTECTED FROM ANY WEATHER EVENT. THE ONLY TIME ANY WASTE PACKAGE WILL BE ALLOWED TO BE MOVE FROM THE VAULT, IS IF THE CONTAINER INTEGRITY IS QUESTIONED OR WHEN WASTE IS TO BE SHIPPED TO A LOW LEVEL WASTE SITE.

- d. DESCRIBE THE MEASURES TO CONTROL ACCESS TO THE LLW WASTE STORAGE AREA AND THEREBY ENSURE SECURITY OF THE WASTE.
  - 1. THE WASTE IS STORED IN A VAULT WITH A COMBINATION LOCK ON A "BANK TYPE" DOOR. THE RADIOLOGICAL PROTECTION STAFF HAS THE COMBINATION ONLY. IF FOR SOME REASON THE COMBINATION WAS COMPROMISED, A NEW COMBINATION WOULD BE PUT IN PLACE. THE AREA IS ALSO INSIDE BUILDING #1 TO WHICH THE RPS STAFF HAS CONTROL OF THE KEYS.
- e. DESCRIBE THE VENTILATION SYSTEM AND HOW IT WILL ASSURE ADEQUATE VENTILATION FOR THE STORAGE AREA.
  - 1. THERE IS NO SPECIAL VENTILATION REQUIRED FOR THIS AREA AS IT WILL BE MAINTAINED AT AMBIENT BUILDING TEMPERATURES AND HUMIDITY THROUGH THE HVAC SYSTEM AND INGRESS AND EGRESS FOR INSPECTIONS AND SURVEYS.
- f. DESCRIBE THE FIRE PROTECTION AND SUPPRESSION SYSTEM TO MINIMIZE THE LIKELIHOOD AND EXTENT OF FIRE.
  - 1. THERE IS NO NEED FOR A FIRE SUPPRESSION OR PROTECTION SYSTEM IN THIS AREA BECAUSE ALL MATERIAL WILL BE STORED IN METAL PACKAGES AND THE MATERIAL WILL NOT SUPPORT COMBUSTION. ADDITIONALLY, NO COMBUSTIBLES WILL BE STORED IN THE AREA.
- g. DESCRIBE HOW THE ADVERSE EFFECTS OF EXTREMES OF TEMPERATURE AND HUMIDITY ON WASTE AND WASTE CONTAINERS WILL BE AVOIDED.
  - 1. (SEE E.1 ABOVE)
- h. DESCRIBE VULNERABILITY TO OTHER HAZARDS SUCH AS TORNADO, HURRICANE, FLOOD, INDUSTRIAL ACCIDENT, ETC.
  - 1. SINCE THE VAULT IS OF HIGH DENSITY CONCRETE AND INSIDE ANOTHER STRUCTURALLY SOUND BUILDING AND IS A SINGLE, CONTROLLED USE, AREA, THE LIKELIHOOD OF ANY OF THESE HAZARD AFFECTING THE WASTE IS EXTREMELY REMOTE.

#### 4. PACKAGING AND CONTAINER INTEGRITY

- a. DESCRIBE THE PACKAGES OR CONTAINERS TO BE USED FOR STORAGE OF LLW, ANY HAZARDS THE WASTE MAY POSE TO THEIR INTEGRITY, AND THE PROJECTED STORAGE LIFE OF THE PACKAGES OR CONTAINERS.
  1. THE PACKAGES TO BE USED FOR STORAGE ARE S.E.G. METAL BOXES DESIGNATED MODEL 44 ft3-TYPE A, CONTAINER PRODUCTS CORP. METAL BOXES DESIGNATED MODEL B-25 OR EQUIVALENT.
  2. THERE ARE NO HAZARDS ASSOCIATED WITH THE WASTE FORM WHICH MAY POSE AN INTEGRITY PROBLEM.
  3. THE PROJECTED STORAGE LIFE OF THE PACKAGES OR CONTAINERS IS GREATER THAN 15 YEARS.
- b. DESCRIBE YOUR PROGRAM FOR PERIODIC INSPECTION OF LLW PACKAGES TO ENSURE THEY RETAIN THEIR INTEGRITY AND CONTAINMENT OF LLW.
  1. SINCE THE METAL BOXES WILL BE STACKED ON PALLETS OR 2 x 4's, THE INSPECTION AND SURVEY PROCESS WILL BE ON A MONTHLY BASIS SIMILAR TO OUR HIGH RADIATION STORAGE AND MIXED WASTE STORAGE AREA. (SEE PAGES 10 & 11 OF THIS SECTION FOR SAMPLE CHECKLIST AND SURVEY FORM.
- c. DESCRIBE YOUR PROGRAM AND EQUIPMENT (IF APPLICABLE) FOR REMOTE HANDLING AND/OR REPACKAGING DAMAGED OR LEAKING WASTE CONTAINERS.
  1. SINCE ALL THE WASTE IN THE STORAGE AREA IS IN SOLID FORM, IT IS NOT EXPECTED THAT ANY PACKAGE WILL LEAK. HOWEVER, IF A PACKAGE IS DAMAGED, IT WILL BE PLACED IN AN APPROVED OVERPACK BY THE RPS STAFF. THERE IS NO NEED FOR REMOTE HANDLING EQUIPMENT.

#### 5. RADIATION PROTECTION

- a. DESCRIBE YOUR PROGRAM FOR SAFE PLACEMENT AND INSPECTION OF WASTE IN STORAGE AND MAINTAINING OCCUPATIONAL EXPOSURES AS LOW AS REASONABLY ACHIEVABLE (ALARA).
  1. THIS AREA WILL BE POSTED IN ACCORDANCE WITH OUR LICENSE CONDITIONS, AS WILL RADIATION AND CONTAMINATION SURVEYS ALONG WITH PROGRAMMATIC INSPECTIONS AS STATED ABOVE. THERE WILL BE NO ADDITIONAL, SPECIAL REQUIREMENTS, THAT AREN'T ALREADY BEING PERFORMED IN OTHER RESTRICTED AREAS IN THE FACILITY.
- b. DESCRIBE PROJECTED EXPOSURE RATES, NEEDS FOR SHIELDING (IF ANY) AND ANY CHANGES IN PERSONNEL MONITORING WHICH WILL BE REQUIRED AS RESULT OF WASTE STORAGE.
  1. PROJECTED EXPOSURE RATES ARE <25 Mr/ HR @ 30 cm. NO ADDITIONAL SHIELDING OR CHANGES IN PERSONNEL MONITORING ARE ANTICIPATED.

- c. DESCRIBE YOUR PROCEDURES FOR RESPONDING TO EMERGENCIES, INCLUDING NOTIFICATION OF AND COORDINATION WITH LOCAL FIRE, POLICE, AND MEDICAL DEPARTMENTS.
    - 1. THESE EMERGENCY PROCEDURES ARE DESCRIBED IN RPI-14 "EMERGENCY INSTRUCTIONS" AND THE WINDSOR SITE EMERGENCY PLAN.
  - d. DESCRIBE YOUR SYSTEM FOR MAINTAINING ACCURATE RECORDS OF WASTE IN STORAGE (INCLUDING ANY WASTE RECEIPTS OR TRANSFERS FROM OR TO OTHER LICENSEES) TO ASSURE ACCOUNTABILITY.
    - 1. RPI-13 "TRANSPORTATION OF RADIOACTIVE MATERIAL" IS THE PROCEDURE THAT PRODUCES THESE RECORDS TO ENSURE ACCOUNTABILITY. (THE PROCEDURE IS USED AS A STARTING POINT FOR SOURCE ACCOUNTABILITY).
6. TRAINING
- a. DESCRIBE YOUR TRAINING PROGRAM FOR TRAINING PERSONNEL IN PROCEDURES FOR PACKAGING, HANDLING, PLACEMENT, INSPECTION, SURVEYING AND EMERGENCY RESPONSE FOR LLW STORAGE.
    - 1. ALL LLW PACKAGING, HANDLING, PLACEMENT, INSPECTION, SURVEYING, AND EMERGENCY RESPONSE WILL BE DONE BY THE RPS STAFF AND TRAINED HAZMAT EMPLOYEES, UNDER THE CONTROLS ESTABLISHED BY RADIATION WORK PERMIT (RWP).
7. FINANCIAL ASSURANCE
- a. REVIEW THE RELEVANT SECTIONS OF PARTS 30, 40 AND 70 REGARDING FINANCIAL ASSURANCE FOR DECOMMISSIONING.
    - 1. THE DECOMMISSION FUNDING PLAN SUBMITTED AS PART OF THIS LICENSE RENEWAL APPLICATION ADDRESSES THIS ASPECT OF FINANCIAL ASSURANCE.
8. EMERGENCY PREPAREDNESS
- a. REVIEW THE RELEVANT SECTIONS OF PARTS 30, 40 AND 70 REGARDING EMERGENCY PREPAREDNESS.
    - 1. NOT REQUIRED FOR THE POSSESSION LIMITS REQUESTED.

LLW EXTENDED INTERIM

STORAGE AREA INSPECTION REPORT

ONE COPY OF THE INSPECTION REPORT WILL BE FILED WITH THE WEEKLY REPORT AS A MONTHLY SURVEY AND ONE COPY WILL BE RETAINED BY THE MANAGER/RSO, RADIOLOGICAL PROTECTION SERVICES FOR THE "D & D" FILE.

THE STORAGE AREA INSPECTOR WILL, ON A MONTHLY BASIS, VISUALLY INSPECT EACH CONTAINER IN THE AREA AND PERFORM THE APPROPRIATE RADIATION AND CONTAMINATION SURVEYS IN ACCORDANCE WITH THE SCHEDULE IN RPI-9 "MONITORING FOR RADIATION AND CONTAMINATION."

SPECIFIC ITEM	COMMENT/PROBLEM	INITIAL
1. CONTAINER PLACEMENT & STACKING		
2. CONTAINER SEALS		
3. CONTAINER LABELING		
4. PALLETS/ 2 x 4's		
5. CONTAINER CONDITION		
6. RADIATION SURVEY		
7. CONTAMINATION SURVEY		
8. HOUSEKEEPING		
9. WARNING/POSTING SIGNS		

REMEDIAL ACTIONS TAKEN:

INSPECTOR NAME (PRINT)

(DATE)

SIGNATURE



ABB - CE RADIOLOGICAL SURVEY  
OUTAGE SERVICES DIVISION

Technician:	Date:	Location: <b>BLDG 1</b>
Instrument Used:	Cal Due Date:	

LLW EXTENDED INTERIM STORAGE

Smear Results dom/100cm <sup>2</sup> B <sup>1a</sup>	
1	
2	
3	
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KEY: □ = mr/Hr ND = non detectable

**RADIOLOGICAL SURVEY SUMMARY**

Contamination		Dose Rate	Instrument Checks	
	Bv / α	mr/hr		
General			Battery Check	
Max			Source Check	

Comments \_\_\_\_\_

The following Sections 12 through 13 are given in the NRC Form 313, and reiterated below.

## 12 License Fees

Based upon the possession limits requested and in consideration of the fee categories specified in 10 CFR 170, Combustion Engineering provides the following license fees for this application:

<u>10 CFR 170 Fee Category</u>	<u>Amount</u>
1.D. Special Nuclear Material (< 10 CFR 150.11 critical mass) - Renewal	\$ 430
2.C. Source Material - Renewal	\$ 1,400
3.L. Byproduct material (broad scope, research and development) - Renewal	\$ 2,200
3.N. Services for other licensees - Renewal	\$ 2,100
3.P. Other byproduct material - Renewal	<u>\$ 680</u>
Total	\$ 6,810

## 13 Certification

The accompanying application is signed by S. M. Sorensen, who is authorized to sign official documents of the company (e.g., documents related to licensing).

Combustion Engineering, Inc.  
1000 Prospect Hill Road  
Windsor, CT 06095-0500

Decommissioning  
Funding Plan

License No. 06-00217-06  
Docket No. 030-03754

# DECOMMISSIONING FUNDING PLAN

## TABLE OF CONTENTS

1.0	INTRODUCTION .....	3
2.0	SCOPE .....	3
3.0	FACILITY DESCRIPTION .....	3
3.1	Building 1 .....	3
3.2	Building 1A .....	4
3.3	Buildings 2/2A .....	4
3.4	Buildings 3/3A .....	4
3.5	Building 5 .....	5
3.6	Building 6 .....	5
3.7	Building 16 .....	5
3.8	Building 18 .....	5
4.0	DECOMMISSIONING CRITERIA .....	6
4.1	Residual Contamination Criteria .....	6
4.2	Salvage .....	6
4.3	Low Level Waste .....	6
4.4	Estimation Methodology .....	6
4.5	Duration of Decommissioning .....	7
4.6	Decontamination Methodology .....	7
5.0	DECOMMISSIONING COST ESTIMATES .....	11
6.0	FINANCIAL ASSURANCE METHOD .....	35
7.0	REFERENCES .....	36
	ATTACHMENT I - RIDER TO INCREASE SURETY BOND .....	37

## 1.0 INTRODUCTION

This Decommissioning Funding Plan (DFP) is pursuant to 10 CFR 70.25 and 30.35 and contains the information required by 10 CFR 70.25(e) and 10 CFR 30.35(e). This DFP consists of seven parts: Introduction, Scope, Facility Description, Decommissioning Criteria, Decommissioning Cost Estimates, Financial Assurance Method and References.

## 2.0 SCOPE

This Decommissioning Funding Plan is for the Combustion Engineering, Inc. (CE), Type A Broad Scope License No. 06-00217-06 for facilities located at 1000 Prospect Hill Road, Windsor, Connecticut. This Plan includes Buildings 1, 1A, 2, 2A, 3, 3A, 5, 6, 16 and 18.

## 3.0 FACILITY DESCRIPTION

### 3.1 Building 1

The total area of Building 1, including floors, ceilings, and walls is approximately 26,934 square feet. The building is used for three basic purposes with regard to radioactive materials:

- a. High Radiation Storage - The northeast corner of the building contains a room which measures approximately 20' 6" x 37' 6" x 15'. The area is used to store contained materials with dose rates of approximately 100 mr/hr or greater. The area is surveyed on a monthly basis for loose surface contamination and radiation dose rates. The loose surface contamination levels in the area are below 200 dpm/100 cm<sup>2</sup> (beta/gamma) and less than 10 dpm/100cm<sup>2</sup> (alpha).
- b. Interim Extended Radioactive Waste Storage - A vault in the north west corner of the building is used to store radioactive waste awaiting disposal.
- c. Control Zone #5 - The east section of Building 1 contains a work zone with a HEPA filtered exhaust system. The room measures approximately 18' x 20' 6" x 15'. Prior to conducting any radioactive material work in the room under this license, false walls, floors, and a ceiling were installed. The loose surface contamination levels in the area are below 3000 dpm/100 cm<sup>2</sup>, average (beta/gamma).

The remainder of Building 1 is used as a staging area for receiving and shipping of radioactive material. Routine surveys of the remainder of Building 1 indicate loose surface contamination below 200 dpm/100 cm<sup>2</sup> (beta/gamma), and 10 dpm/100 cm<sup>2</sup> (alpha).

### **3.2 Building 1A**

The total area of Building 1A, including floors, ceilings, and walls is approximately 21,162 square feet. Building 1A is used primarily as a storage area for packaged radioactive materials. Routine surveys of Building 1A indicate loose surface contamination levels below 200 dpm/100 cm<sup>2</sup> (beta/gamma), and 10 dpm/100 cm<sup>2</sup> (alpha).

### **3.3 Buildings 2/2A**

The total area of Buildings 2/2A, including floors, ceilings, and walls is approximately 102,950 square feet. Building 2 is a two story structure with the second floor devoted entirely to office space. A shielded health physics counting room is located on the south west corner of the first floor.

A high density concrete vault is located in the center of Building 2. The area is used for the calibration of instruments and Thermoluminescent Dosimeters (TLD) using sealed sources. The single entrance to this vault has a combination door lock controlled by Radiation Protection Services.

The northeast corner of Building 2 is comprised of a concrete walled area, identified as Cell 2, and an interconnecting wing to Building 2A. Cell 2, both the ground level and subterranean level, and Building 2A have been established as part of a single restricted area. The subterranean level of Cell 2 is used primarily for decontamination and repair of reactor inspection equipment.

The areas at ground level of Cell 2, plus Building 2A, are used to refurbish, inspect, develop and store reactor servicing equipment and to train personnel in the use of the material. Control zones are established to handle unclad radioactive material. The control zones are of modular construction erected to accommodate the equipment and personnel. Each control zone is serviced by a negative pressure air system designed to move air from the control zone and discharge back into the building after it has been filtered by two banks of HEPA filters.

### **3.4 Buildings 3/3A**

Activities in this building include x-ray diffraction measurement of sealed specimens of radioactive material. Routine surveys of this building indicate that the building is not contaminated with radioactive material controlled under this license.

### **3.5 Building 5**

Building 5 contains approximately 60,000 square feet of floor space. The main bay and each of the three wings of the structure contain office space which occupies a total of 27,000 square feet of the facility. The balance of the building is used for mechanical testing and research/development. Work in the laboratory areas is roughly evenly divided among activities that require the handling of radioactive materials and those that involve non-radioactive materials. Each area that uses radioactive materials - the radiochemistry laboratory, metalography laboratory, mechanical testing laboratories, Boronometer test area (in the adjoining Building 16) - is established and maintained as a separate restricted area.

### **3.6 Building 6**

Liquid effluents from SNM Laboratory activities in Building 5 drain to any one of ten 2,000 gallon retention tanks, located in Building 6. Four 10,000 gallon dilution tanks in Building 6 are used for diluting liquid effluents to within regulatory limits prior to discharge.

### **3.7 Building 16**

The Boronometer test area is in Building 16. Sealed special nuclear material sources are used in this area. Routine surveys of this building indicate that the building is not contaminated.

### **3.8 Building 18**

This building contains a scale reactor hydraulic test loop. Occasionally, simulated fuel rods containing source material are used in this test loop. The rods are maintained sealed, and are also stored in this building. Routine surveys of this building indicate that the building is not contaminated.

## **4.0 DECOMMISSIONING CRITERIA**

This Decommissioning Funding Plan is for the Type A Broad Scope license for CE's facilities at 1000 Prospect Hill Road, Windsor, CT, License No. 06-00217-06, Docket No. 030-03754.

### **4.1 Residual Contamination Criteria**

Cost estimates were based on the assumption that facilities and equipment would be released for unrestricted use when residual contamination met the criteria established in Regulatory Guide 1.86, Reference (1), as shown in Table 4.1, which is consistent with "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Material", Reference (2). Estimates are further based on the assumption that soils will be free released according to NRC Branch Technical Position: "Disposal or On-Site Storage of Residual Thorium or Uranium", Reference (3).

### **4.2 Salvage**

The salvage value of any material or equipment was not included in this DFP. Likewise, the costs associated with moving equipment to the Hematite Missouri Fuel Manufacturing Plant or CE's Southeast Nuclear Service Center prior to decommissioning are beyond the scope of this plan.

### **4.3 Low Level Waste**

This plan assumes that a Low Level Waste (LLW) burial site will be available to bury material and equipment that does not meet free release criteria. Also included in the cost estimate is the projected burial cost and surcharges, totaling an average of \$400/ft<sup>3</sup>, for LLW to be buried and the cost for containers (B-25) and transportation.

### **4.4 Estimation Methodology**

In generating the cost estimates provided in the following sections, facility buildings were broken down into separate areas or rooms. The volume and/or dimensions of equipment, structures, and materials within those areas and rooms were physically measured. These measurements were used to estimate the volume of low level waste that can be expected from decommissioning. The same measurements were used to estimate the duration of dismantling and decontamination operations that will be required to complete decommissioning. The estimates take into account waste reduction operations that will be undertaken during decommissioning.

For the purposes of these estimates, it has been assumed that loose surface contamination on floors, walls, ceilings, and other surfaces will be removed and that fixed contamination in the floors will be scabbled off or otherwise removed.



Provisions have been made to include sufficient contingency funds in the cost estimates. Further revisions and refinements to the plan that may better define the cost estimates may also result in reduction of associated contingency funding.

Estimates provided in this Plan are shown in 1995 dollars. A summary of the cost estimates is given in Table 4.2. The details of the costs estimates are given in the tables of Section 5.0.

#### **4.5 Duration of Decommissioning**

Cost estimates are based on the assumption that the majority of the decontamination and decommissioning activities will be completed within two years of commencing.

#### **4.6 Decontamination Methodology**

Cost estimates are also based on the assumption that decontamination tasks will be completed using methodologies drawn from the following listing:

- 1) **Hand Wiping:** It is anticipated that the majority of the contaminated equipment and materials will be cleaned using hand wiping. This will involve manually cleaning equipment, structure, and/or material surfaces using rags, maslin, paper and/or abrasive pads and a cleaning solution such as Alconox or similar. Decontamination solutions will be carefully selected to ensure that mixed waste is not generated. This method has been selected because it is a simple and effective method for routine decontamination tasks and personnel are easily trained to safely use this technique. Rags, etc., used in these operations may be laundered and reused.
- 2) **Hydrolasing:** This methodology is an available option for removal of widespread areas of loose surface contamination. This method will only be utilized in an enclosed area that is set up specifically for hydrolasing. Specific allowances will be made for the recapture and recycling of contaminated water.
- 3) **CO<sub>2</sub> Cleaning:** This technology is an available option for surface cleaning by means of tiny, solidified pellets of CO<sub>2</sub>. The gaseous CO<sub>2</sub> is then collected by a suction line and passes through a HEPA filter. Advantages to this process include its effectiveness at cleaning intricate surfaces, its lack of physical surface damage, and its lack of secondary radioactive waste generation.

- 4) **Strippable Paint:** This material, commonly used in nuclear power plants, may have some applicability in two areas. First, it may be used to provide a removable, protective coating over decontaminated areas remaining in the vicinity of ongoing decontamination work. Second, it may be utilized to perform actual decontamination tasks on large smooth surfaces such as metal sheets or similar. If used, it is intended that, following its removal, the paint may be incinerated in an approved facility, thus reducing radioactive waste burial volumes.
- 5) **Abrasive Media Cleaning:** This process utilizes either sponge-like material, sand, or grit accelerated by high pressure air to effect controlled decontamination of contaminated surfaces. These media have the advantage of being reusable, to a degree. When exhausted, the sponge material may be incinerated in an approved facility, resulting in relatively small volumes of low level waste. The sand and/or grit will be disposed of as low level radioactive waste if it exceeds the criteria listed in Reference (3).
- 6) **Material Surface Removal:** In cases where hand wiping or other surface cleaning methods are insufficient to remove contaminants present, removal of material surfaces may be required. For tools, equipment, and other metal objects, grinders may be utilized to remove contaminants that would otherwise be considered fixed contamination. This will avoid the necessity of disposing of large inventories of materials as radioactive waste. For contaminated structural materials such as concrete floors and walls, scabblers and scarifiers may be utilized to remove contaminated surface from those materials. To the extent practical, engineering controls will be used to reduce aerosols that can result from scabbling and/or scarifying operations. Scabbling has been proven successful in a number of areas and buildings during recent decontamination projects.

**Table 4.1**  
**Acceptable Surface Contamination Levels**

NUCLIDE <sup>a</sup>	AVERAGE <sup>b,c</sup>	MAXIMUM <sup>b,d</sup>	REMOVABLE <sup>b,e</sup>
U-nat, U-235, U-238, and associated decay products	5,000 dpm $\alpha/100\text{cm}^2$	15,000 dpm $\alpha/100\text{cm}^2$	1,000 dpm $\alpha/100$ $\text{cm}^2$
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100cm <sup>2</sup>	300 dpm/100cm <sup>2</sup>	20 dpm/100cm <sup>2</sup>
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100cm <sup>2</sup>	3000 dpm/100cm <sup>2</sup>	200 dpm/100cm <sup>2</sup>
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5000 dpm $\beta\gamma/100\text{cm}^2$	15,000 dpm $\beta\gamma/100\text{cm}^2$	1000 dpm $\beta\gamma/100\text{cm}^2$

- <sup>a</sup> Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.
- <sup>b</sup> As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- <sup>c</sup> Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.
- <sup>d</sup> The maximum contamination level applies to an area of not more than 100 cm<sup>2</sup>.
- <sup>e</sup> The amount of removable radioactive material per 100 cm<sup>2</sup> of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

**Table 4.2**  
**Summary of DFP Cost Estimates**

Description	Table Herein	Table of Appendix F, Reg. Guide 3.66	Cost Estimate Summary
Unit Cost for Workers	Table 5.1	Table 2	(included)
Planning and Preparation	Table 5.2	Table 1	\$257,638.63
Cost for Surveying Non-Contaminated Areas	Table 5.3	Table 3	\$607,254.12
Cost for Decon/Dismantle of Radiological Areas	Table 5.4	Table 3	\$534,058.21
Equipment and Supplies	Table 5.5	Table 4	(included)
Packaging, Shipping, and Disposal of Radioactive Waste	Table 5.6	Table 5, 6, and 7	\$592,500.00
Restoration	Table 5.7	Table 8	(included)
Final Radiation Survey	Table 5.8	Table 9	(included)
Stabilization	Table 5.9	Table 10	(not applicable)
Total			\$1,991,450.90

**SECTION 5.0  
DECOMMISSIONING  
COST ESTIMATES**

**Table 5.1**  
**Unit Cost for Workers**  
 (Table 2 of Appendix F, Reg. Guide 3.66)

<u>Classification</u>	<u>\$/Hour</u>
Project Manger	\$50.90
Decontamination Technicians	
Supervisor	\$37.41
Senior	\$24.16
Junior	\$21.97
Health Physics Technicians	
Supervisor	\$41.70
Senior	\$31.90
Junior	\$24.85
Health Physicist	\$50.90
Engineer	\$55.55
Clerical	\$10.96
Labor	\$22.00
Craft	\$35.00

Note: Wage rates are from cognizant services companies and include overhead expenses.

**Table 5.2**  
**Planning and Preparation**  
 (Table 1 of Appendix F, Reg. Guide 3.66)

1. Preparation of Documentation for Regulatory Agencies

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	300	\$50.90	\$15,270.00
Project Manager	80	\$50.90	\$4,072.00
Clerical	200	\$10.96	\$2,192.00
Total			\$21,534.00

2. Submission of Decommissioning Plan to NRC when required by 10 CFR 30/70

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	1000	\$50.90	\$50,900.00
Project Manager	200	\$50.90	\$10,180.00
Clerical	400	\$10.96	\$4,384.00
Total			\$65,464.00

3. Development of Work Plans

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	500	\$50.90	\$25,450.00
Project Manager	125	\$50.90	\$6,362.50
Clerical	200	\$10.96	\$2,192.00
Total			\$34,004.50

**Table 5.2 (Cont.)**  
**Planning and Preparation**  
 (Table 1 of Appendix F, Reg. Guide 3.66)

4. Procurement of Special Equipment

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	100	\$50.90	\$5,090.00
Project Manager	100	\$50.90	\$5,090.00
Clerical	40	\$10.96	\$438.40
		Total	\$10,618.40

5. Staff Training

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	40	\$50.90	\$2,036.00
Project Manager	0	\$50.90	\$0.00
Clerical	100	\$10.96	\$1,096.00
H.P. Supervisor	500	\$41.70	\$20,850.00
		Total	\$23,982.00

6. Characterization of Radiological Condition of Facility

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	100	\$50.90	\$5,090.00
Project Manager	100	\$50.90	\$5,090.00
Clerical	100	\$10.96	\$1,096.00
H.P. Supervisor	200	\$41.70	\$8,340.00
		Total	\$19,616.00



**Table 5.2 (Cont.)**  
**Planning and Preparation**  
 (Table 1 of Appendix F, Reg. Guide 3.66)

7. Other

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	200	\$50.90	\$10,180.00
Project Manager	200	\$50.90	\$10,180.00
Clerical	200	\$10.96	\$2,192.00
H.P. Supervisor	200	\$41.70	\$8,340.00
		Total	\$30,892.00

Subtotal		\$206,110.90
CONTINGENCY OF 25%		0.25
Total		\$257,638.63

**Table 5.3**  
**Cost for Surveying Non-contaminated Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

1. Cost for surveying non-contaminated areas

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Bldg 1	26,934 <sup>a</sup> (w,f,c)	599	\$24.85	\$14,885.15
Misc <sup>b</sup> (e,p,v)	3120	150	\$24.85	\$3,727.50
Bldg 1A	21,162 <sup>a</sup> (w,f,c)	424	\$24.85	\$10,536.40
Misc <sup>b</sup> (e,p,v)	2988	106	\$24.85	\$2,634.10
Bldg 2/2A	96,950 <sup>a</sup> (w,f,c)	1835	\$24.85	\$45,599.75
Misc <sup>b</sup> (e,p,v)	6540	500	\$24.85	\$12,425.00
Bldg 3/3A (x-ray lab)	3060 <sup>a</sup> (w,f,c)	115	\$24.85	\$2,857.75
Misc <sup>b</sup> (e,p,v)	500	40	\$24.85	\$994.00
Bldg 5	172,792 <sup>a</sup> (w,f,c)	3110	\$24.85	\$77,283.50
Misc <sup>b</sup> (e,p,v)	8000	864	\$24.85	\$21,470.40
Bldg 16 (boronometer lab)	2160 <sup>a</sup> (w,f,c)	90	\$24.85	\$2,236.50
Misc <sup>b</sup> (e,p,v)	320	20	\$24.85	\$497.00
Bldg 18	13,480 <sup>a</sup> (w,f,c)	155	\$24.85	\$3,851.75
Misc <sup>b</sup> (e,p,v)	550	30	\$24.85	\$745.50

2. Cost for reviewing non-contaminated areas survey data.

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
(1, 1A, 2, 2A, 3, 3A, 5, 6, 16, 18)	-----	400	\$50.90	\$20,360.00

<sup>a</sup> (w,f,c) indicates walls, floor, and ceiling

<sup>b</sup> (e,p,v) indicates electrical, piping, and ventilation

**Table 5.3 (Cont.)**  
**Cost for Surveying Non-contaminated Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

3. Cost of gridding non-contaminated areas.

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
(1, 1A, 2, 2A, 3, 3A, 5, 6, 16, 18)	337,908 <sup>a</sup> (w,f,c)	5885	\$22.00	\$129,470.00

4. Cost of Instrumentation support and supplies.

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
(1, 1A, 2, 2A, 3, 3A, 5, 6, 16, 18)	----	400	\$31.90	\$12,760.00
Supplies	----	-----	-----	\$10,000.00

5. Cost for collecting and analyzing volumetric samples

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
(1, 1A, 2, 2A, 3, 3A, 5, 6, 16, 18)	-----	400	\$50.90	\$20,360.00
Grid layout	101590	2257	\$22.00	\$49,654.00
Collecting	----	300	\$24.85	\$7,455.00
Analyses (600 @ \$60 each)	----	----	----	\$36,000.00

Subtotal	\$485,803.30
CONTINGENCY OF 25%	0.25
Total	\$607,254.12

<sup>a</sup> (w,f,c) indicates walls, floor, and ceiling

<sup>b</sup> (e,p,v) indicates electrical, piping, and ventilation

**Table 5.4**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 1 (Control zone 5)				
- Decon/Dismantle <sup>(a)</sup> equipment	1848	100	\$21.97	\$2,197.00
- Ventilation (Removal)	40 (ft)	40	\$35.00	\$1,400.00
- Supplies	-----	-----	-----	\$2,000.00
- Survey/H.P. Coverage	1848	100	\$24.85	\$2,485.00
- H.P. Support	1848	10	\$50.90	\$509.00
- Craft	-----	20	\$35.00	\$700.00
Building 2 (Control Zone 1)				
- Decon/Dismantle <sup>(a)</sup> equipment	4800	240	\$21.97	\$5,272.80
- Ventilation (Removal)	200 (ft)	40	\$35.00	\$1,400.00
- Supplies	-----	-----	-----	\$2,500.00
- Survey/H.P. Coverage	4800	240	\$24.85	\$5,964.00
- H.P. Support	4800	30	\$50.90	\$1,527.00
- Craft	-----	40	\$35.00	\$1,400.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 2 (Control zone 2)				
- Decon/Dismantle <sup>(a)</sup> equipment	1152	85	\$21.97	\$1,867.45
- Ventilation (Removal)	100 (ft)	40	\$35.00	\$1,400.00
- Supplies	-----	-----	-----	\$3,000.00
- Survey/H.P. Coverage	1152	85	\$24.85	\$2,112.25
- H.P. Support	1152	10	\$50.90	\$509.00
- Craft	-----	40	\$35.00	\$1,400.00
Building 2 (Control Zone 3)				
- Decon/Dismantle <sup>(a)</sup> equipment	780	46	\$21.97	\$1,010.62
- Ventilation (Removal)	20 (ft)	30	\$35.00	\$1,050.00
- Supplies	-----	-----	-----	\$2,000.00
- Survey/H.P. Coverage	780	46	\$24.85	\$1,143.10
- H.P. Support	780	10	\$50.90	\$509.00
- Craft	-----	20	\$35.00	\$700.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 2 (Control zone 4A)				
- Decon/Dismantle <sup>(a)</sup> equipment	1640	120	\$21.97	\$2,636.40
- Ventilation (Removal)	20 (ft)	30	\$35.00	\$1,050.00
- Supplies	----	----	----	\$3,000.00
- Survey/H.P. Coverage	1640	120	\$24.85	\$2,982.00
- H.P. Support	1640	20	\$50.90	\$1,018.00
- Craft	----	40	\$35.00	\$1,400.00
Building 2 (Control Zone 4B)				
- Decon/Dismantle <sup>(a)</sup> equipment	2056	115	\$21.97	\$2,526.55
- Ventilation (Removal)	20 (ft)	40	\$35.00	\$1,400.00
- Supplies	----	----	----	\$5,000.00
- Survey/H.P. Coverage	2056	115	\$24.85	\$2,857.75
- H.P. Support	2056	20	\$50.90	\$1,018.00
- Craft	----	50	\$35.00	\$1,750.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 106)				
- Decon/Dismantle <sup>(a)</sup> equipment	2148	120	\$21.97	\$2,636.40
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	-----	-----	-----	\$2,000.00
- Survey/H.P. Coverage	2148	120	\$24.85	\$2,982.00
- H.P. Support	1848	10	\$50.90	\$509.00
- Craft	-----	15	\$35.00	\$525.00
Building 5 (Room 218)				
- Decon/Dismantle <sup>(a)</sup> equipment	1,292	75	\$21.97	\$1,647.75
- Ventilation (Removal)	100 (ft)	40	\$35.00	\$1,400.00
- Supplies	-----	-----	-----	\$1,500.00
- Survey/H.P. Coverage	1,292	75	\$24.85	\$1,863.75
- H.P. Support	1,292	15	\$50.90	\$763.50
- Craft	-----	20	\$35.00	\$700.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 221)				
- Decon/Dismantle <sup>(a)</sup> equipment	1080	60	\$21.97	\$1,318.20
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	----	----	----	\$3,000.00
- Survey/H.P. Coverage	1080	60	\$24.85	\$1,491.00
- H.P. Support	1848	10	\$50.90	\$509.00
- Craft	----	40	\$35.00	\$1,400.00
Building 5 (Room 224A)				
- Decon/Dismantle <sup>(a)</sup> equipment	2176	120	\$21.97	\$2,636.40
- Ventilation (Removal)	75 (ft)	30	\$35.00	\$1,050.00
- Supplies	----	----	----	\$2,500.00
- Survey/H.P. Coverage	2176	120	\$24.85	\$2,982.00
- H.P. Support	1848	20	\$50.90	\$1,018.00
- Craft	----	10	\$35.00	\$350.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.



**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 224; C, D, G, H)				
- Decon/Dismantle <sup>(a)</sup> equipment	3088	180	\$21.97	\$3,954.60
- Ventilation (Removal)	100 (ft)	40	\$35.00	\$1,400.00
- Supplies	----	----	----	\$5,000.00
- Survey/H.P. Coverage	3088	180	\$24.85	\$4,473.00
- H.P. Support	1848	20	\$50.90	\$1,018.00
- Craft	----	50	\$35.00	\$1,750.00
Building 5 (Room 225)				
- Decon/Dismantle <sup>(a)</sup> equipment	3240	180	\$21.97	\$3,954.60
- Ventilation	0 (ft)	0	\$35.00	\$0.00
- Supplies	----	----	----	\$4,000.00
- Survey/H.P. Coverage	3240	180	\$24.85	\$4,473.00
- H.P. Support	3240	10	\$50.90	\$509.00
- Craft	----	20	\$35.00	\$700.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 228)				
- Decon/Dismantle <sup>(a)</sup> equipment	4540	200	\$21.97	\$4,394.00
- Ventilation (Removal)	140 (ft)	40	\$35.00	\$1,400.00
- Supplies	-----	-----	-----	\$5,000.00
- Survey/H.P. Coverage	4540	200	\$24.85	\$4,970.00
- H.P. Support	4540	20	\$50.90	\$1,018.00
- Craft	-----	50	\$35.00	\$1,750.00
Building 5 (Room 231)				
- Decon/Dismantle <sup>(a)</sup> equipment	1020	55	\$21.97	\$1,208.35
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	-----	-----	-----	\$1,000.00
- Survey/H.P. Coverage	1020	55	\$24.85	\$1,366.75
- H.P. Support	1020	10	\$50.90	\$509.00
- Craft	-----	10	\$35.00	\$350.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 231A)				
- Decon/Dismantle <sup>(a)</sup> equipment	980	40	\$21.97	\$878.80
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	----	----	----	\$1,250.00
- Survey/H.P. Coverage	980	40	\$24.85	\$994.00
- H.P. Support	980	10	\$50.90	\$509.00
- Craft	----	10	\$35.00	\$350.00
Building 5 (Room 232)				
- Decon/Dismantle <sup>(a)</sup> equipment	1120	50	\$21.97	\$1,098.50
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	----	----	----	\$2,000.00
- Survey/H.P. Coverage	1120	50	\$24.85	\$1,242.50
- H.P. Support	1120	10	\$50.90	\$509.00
- Craft	----	10	\$35.00	\$350.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 232A and B)				
- Decon/Dismantle <sup>(a)</sup> equipment	9768	320	\$21.97	\$7,030.40
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	-----	-----	-----	\$5,000.00
- Survey/H.P. Coverage	9768	320	\$24.85	\$7,952.00
- H.P. Support	9768	40	\$50.90	\$2,036.00
- Craft	-----	40	\$35.00	\$1,400.00
Building 5 (Room 305)				
- Decon/Dismantle <sup>(a)</sup> equipment	1548	85	\$21.97	\$1,867.45
- Ventilation (Removal)	120 (ft)	40	\$35.00	\$1,400.00
- Supplies	-----	-----	-----	\$2,000.00
- Survey/H.P. Coverage	1548	85	\$24.85	\$2,112.25
- H.P. Support	1548	10	\$50.90	\$509.00
- Craft	-----	50	\$35.00	\$1,750.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 308)				
- Decon/Dismantle <sup>(a)</sup> equipment	740	40	\$21.97	\$878.80
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	----	----	----	\$2,000.00
- Survey/H.P. Coverage	740	40	\$24.85	\$994.00
- H.P. Support	740	10	\$50.90	\$509.00
- Craft	----	10	\$35.00	\$350.00
Building 5 (Room 309)				
- Decon/Dismantle <sup>(a)</sup> equipment	4240	320	\$21.97	\$7,030.40
- Ventilation (Removal)	259 (ft)	80	\$35.00	\$2,800.00
- Supplies	----	----	----	\$11,000.00
- Survey/H.P. Coverage	4240	320	\$24.85	\$7,952.00
- H.P. Support	4240	45	\$50.90	\$2,290.50
- Craft	----	110	\$35.00	\$3,850.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 6 (Retention/Dilution Tanks)				
- Decon/Dismantle <sup>(a)</sup> equipment	----	300	\$21.97	\$6,591.00
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	----	----	----	\$7,000.00
- Survey/H.P. Coverage	----	300	\$24.85	\$7,455.00
- H.P. Support	----	40	\$50.90	\$2,036.00
- Craft	----	360	\$35.00	\$12,600.00
Buildings (1, 1A, 2, 2A, 5, 6,) (Underground Piping)				
- Decon/Dismantle	----	575	\$21.97	\$12,632.75
- Supplies/equipment	----	----	----	\$100,000.00
- Survey/H.P. Coverage	----	300	\$24.85	\$7,455.00
- H.P. Support	----	120	\$50.90	\$6,108.00
- Craft	----	680	\$35.00	\$23,800.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

Subtotal		\$427,246.57
CONTINGENCY OF 25%		<u>0.25</u>
Total		\$534,058.21

**Table 5.5**  
**Equipment and Supplies**  
(Table 4 of Appendix F, Reg. Guide 3.66)

Cost of equipment and supplies have been included in Table 5.3 "Cost for Surveying Non-contaminated Areas" and 5.4 "Cost for Decon/Dismantle of Radiological Areas" of this DFP. The types, quantity, and cost will depend on the work performed. Within the DFP, a total of \$181,750.00 has been included to cover the cost of equipment and supplies (e.g., smears, rags, HEPA units, strippable paint, soil removal/rigging equipment, etc.).

**Table 5.6**  
**Packaging, Shipping and Disposal of Radioactive Wastes**  
 (Table 5, 6, and 7 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Waste Type<sup>(a)</sup></u>	<u>Volume (ft<sup>3</sup>)</u>	<u>Cost<sup>(b)</sup></u>
1. Disposal of Radioactive Wastes			
Bldg 1 - Control zone 5	Solid	85	\$34,000.00
Bldg 2/2A			
- Control zone 1	Solid	100	\$40,000.00
- Control zone 2	Solid	100	\$40,000.00
- Control zone 3	Solid	25	\$10,000.00
- Control zone 4A	Solid	90	\$36,000.00
- Control zone 4B	Solid	210	\$84,000.00
Bldg 5			
- Room 106	Solid	10	\$4,000.00
- Room 218	Solid	20	\$8,000.00
- Room 221	Solid	10	\$4,000.00
- Room 224A	Solid	5	\$2,000.00
- Room 224 (C,D,G,H)	Solid	90	\$36,000.00
- Room 225	Solid	10	\$4,000.00
- Room 228	Solid	30	\$12,000.00
- Room 231	Solid	30	\$12,000.00
- Room 231A	Solid	5	\$2,000.00

<sup>(a)</sup> Indicates wood, metal, wallboard, concrete, floor tiles, etc.

<sup>(b)</sup> Cost based upon average of \$400/ft<sup>3</sup> of waste.



**Table 5.6 (Cont.)**  
**Packaging, Shipping and Disposal of Radioactive Wastes**  
 (Table 5, 6, and 7 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Waste Type<sup>(a)</sup></u>	<u>Volume (ft<sup>3</sup>)</u>	<u>Cost<sup>(b)</sup></u>
Bldg 5 (Cont.)			
- Room 232	Solid	10	\$4,000.00
- Room 232 A and B	Solid	10	\$4,000.00
- Room 305	Solid	10	\$4,000.00
- Room 308	Solid	30	\$12,000.00
- Room 309	Solid	20	\$8,000.00
- Room 320A	Solid	10	\$4,000.00
- Room 321	Solid	30	\$12,000.00
Bldg 6			
- Tanks (14)	Solid	180	\$72,000.00
Ancillary Areas			
- Piping	Solid	40	\$16,000.00
2. Packaging and Shipping - Bldg (1, 1A, 2, 2A, 5, 6)			
- Containers and Transportation	Solid	----	\$10,000.00

Subtotal	\$474,000.00
CONTINGENCY OF 25%	<u>25</u>
Total	\$592,500.00

<sup>(a)</sup> Indicates wood, metal, wallboard, concrete, floor tiles, etc.

<sup>(b)</sup> Cost based upon average of \$400/ft<sup>3</sup> of waste.

**Table 5.7**  
**Restoration of Contaminated Areas on Facility Ground**  
(Table 8 of Appendix F, Reg. Guide 3.66)

The estimates of the preceding tables include costs for remediating the facilities to release for unrestricted use. Therefore, necessary costs are included and additional costs for restoration are not applicable.

**Table 5.8**  
**Final Radiation Survey**  
(Table 9 of Appendix F, Reg. Guide 3.66)

A total of 10,889 man-hours have been estimated in this DFP for surveying which includes the final radiation survey. Also, 780 man-hours have been included in the estimates for supervision support of the final radiation survey. See Tables 5.3 "Cost for Surveying Non-contaminated Areas" and 5.4 "Cost for Decon/Dismantle of Radiological Areas."

**Table 5.9**  
**Site Stabilization, Long-term Surveillance**  
(Table 10 of Appendix F, Reg. Guide 3.66)

The estimates of the preceding tables include costs for remediating the facilities to release for unrestricted use. Therefore, additional costs for site stabilization or long term surveillance are not applicable.

## **6.0 FINANCIAL ASSURANCE METHOD**

### **A. Standby Trust Agreement**

10 CFR 30.25(e) and 10 CFR 70.25(e) require that a description of the method of assuring funds for decommissioning be contained in each decommissioning funding plan. In Reference (6), CE submitted to the NRC the previous financial assurance for decommissioning associated with License No. 06-00217-06. An executed Standby Trust Agreement was included in that submittal. Combustion Engineering continues to use the surety method permitted by 10 CFR 30.25(f)(2) and 10 CFR 70.25(f)(2); the Standby Trust Agreement of Reference (6) continues to be valid.

### **B. Surety Bond**

The attachment to this Decommissioning Funding Plan provides an appropriately executed rider to the existing surety bond, as submitted to the NRC by Reference (6), to increase its limit from \$750,000 to \$2,000,000.00. This amount is based on and consistent with the cost estimates for decommissioning summarized in Table 4.2 and detailed in Section 5.0 herein.

### **C. Cost Estimate and Funding Adjustments**

The estimated decommissioning costs are based on 1995 dollars. 10 CFR 70.25(e) and 10 CFR 30.35(e) require that decommissioning cost estimates and associated funding levels be adjusted "periodically over the life of the facility." CE will adjust the DFP upon the next license renewal.

## **7.0 REFERENCES**

1. USNRC Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors", June 1974
2. "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Material", USNRC, Division of Industrial and Medical Nuclear Safety, April 1993
3. NRC Branch Technical Position: "Disposal or On-Site Storage of Residual Thorium or Uranium (NRC, 1981, 46FR52061)
4. "Standard Format and Content Guide for Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72", USNRC, NUREG-1336, Rev. 1 (August 1989)
5. "Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72", USNRC, Regulatory Guide 3.66 (Task DG-3002), (June 1990)
6. CE (J. F. Conant) letter to NRC (L. H. Bettenhausen), LD-90-049, dated July 19, 1990, "Financial Assurance for Decommissioning"

**ATTACHMENT I**  
**RIDER TO INCREASE SURETY BOND**



# CHUBB GROUP OF INSURANCE COMPANIES

100 William Street, New York, New York 10038-4568

## FEDERAL INSURANCE COMPANY

RIDER to be attached to and form a part  
of Bond No. 81266980 wherein  
Combustion Engineering, Inc.

is named as Principal, and FEDERAL  
INSURANCE COMPANY, as Surety, in favor of  
U.S. Nuclear Regulatory Commission

in the amount of \$750,000.00  
effective May 24, 1990

-----  
IT IS HEREBY STIPULATED AND AGREED THAT effective May 24, 1995  
said bond is hereby amended as follows:

The bond shall be increased:

From: Seven hundred fifty thousand & 00/100 (\$750,000.00)

To: Two million & 00/100 (\$2,000,000.00 )

and that Combustion Engineering, Inc.  
shall be held and firmly bound and hereby binds itself, its  
successors and assigns, as Principal, and FEDERAL INSURANCE COMPANY  
hereby binds itself, its successors and assigns, as Surety, in  
accordance with the terms, provisions and conditions of said bond  
as so amended.

IN WITNESS WHEREOF, the said Principal and said Surety have  
signed or caused this Rider to be duly signed and their respective  
seals to be hereunto affixed this 12th day of May  
19 95.

Combustion Engineering, Inc.

By: 

Assistant Secretary

FEDERAL INSURANCE COMPANY

By: 

Vincent Moy  
Attorney-in-fact

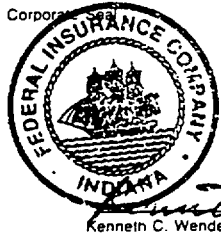


POWER OF ATTORNEY  
**FEDERAL INSURANCE COMPANY**  
ATTN: SURETY DEPARTMENT  
15 Mountain View Road, Warren, NJ 07059  
(908) 580-2000

Know all Men by these Presents, That **FEDERAL INSURANCE COMPANY**, an Indiana Corporation, has constituted and appointed, and does hereby constitute and appoint Vincent Moy, William J. Paterno and Catherine Rosano of New York, New York -----

each its true and lawful Attorney-in-Fact to execute under such designation in its name and to affix its corporate seal to and deliver for and on its behalf as surety thereon or otherwise, bonds or obligations (other than Bail Bonds) given or executed in the course of its business, and any instruments amending or altering the same, and consents to the modification or alteration of any instruments referred to in said bonds or obligations.

In Witness Whereof, the said **FEDERAL INSURANCE COMPANY** has, pursuant to its By-Laws, caused these presents to be signed by its Vice-President and Assistant Secretary and its corporate seal to be hereto affixed this 21st day of June 19 94



Kenneth C. Wendel

Assistant Secretary

**FEDERAL INSURANCE COMPANY**

By

Gerardo G. Mauriz

Gerardo G. Mauriz

Vice-President

STATE OF NEW JERSEY  
County of Somerset

} ss.

On this 21st day of June 19 94, before me personally came Kenneth C. Wendel to me known and by me known to be Assistant Secretary of **FEDERAL INSURANCE COMPANY**, the corporation described in and which executed the foregoing Power of Attorney, and the said Kenneth C. Wendel being by me duly sworn, did depose and say that he is Assistant Secretary of **FEDERAL INSURANCE COMPANY** and knows the corporate seal thereof; that the seal affixed to the foregoing Power of Attorney is such corporate seal and was thereto affixed by authority of the By-Laws of said Company, and that he signed said Power of Attorney as Assistant Secretary of said Company by like authority; and that he is acquainted with Gerardo G. Mauriz and knows him to be the Vice-President of said Company, and that the signature of said Gerardo G. Mauriz subscribed to said Power of Attorney is in the genuine handwriting of said Gerardo G. Mauriz and was thereto subscribed by authority of said By-Laws and in his presence

Notarial Seal



STATE OF NEW JERSEY  
County of Somerset

} ss.

Acknowledged and Sworn to before me  
on the date above written.

Janet A. Scaroni  
Notary Public

CERTIFICATION

**JANET A. SCARONI**  
Notary Public, State of New Jersey  
My Comm. Expires October 2, 1994

I, the undersigned, Assistant Secretary of **FEDERAL INSURANCE COMPANY**, do hereby certify that the following is a true excerpt from the By-Laws of the said Company as adopted by its Board of Directors on June 13, 1974 and most recently amended March 2, 1990 and that this By-Law is in full force and effect.

"ARTICLE XVIII

Section 2. All bonds, undertakings, contracts and other instruments other than as above for and on behalf of the Company which it is authorized by law or its charter to execute, may and shall be executed in the name and on behalf of the Company either by the Chairman or the Vice-Chairman or the President or a Vice-President, jointly with the Secretary or an Assistant Secretary, under their respective designations, except that any one or more officers or attorneys-in-fact designated in any resolution of the Board of Directors or the Executive Committee, or in any power of attorney executed as provided for in Section 3 below, may execute any such bond, undertaking or other obligation as provided in such resolution or power of attorney.

Section 3. All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the Vice-Chairman or the President or a Vice-President or an Assistant Vice-President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, Vice Chairman, President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary and the seal of the Company may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such power of attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached."

I further certify that said **FEDERAL INSURANCE COMPANY** is duly licensed to transact fidelity and surety business in each of the States of the United States of America, District of Columbia, Puerto Rico, and each of the Provinces of Canada with the exception of Prince Edward Island; and is also duly licensed to become sole surety on bonds, undertakings, etc., permitted or required by the law

I, the undersigned Assistant Secretary of **FEDERAL INSURANCE COMPANY**, do hereby certify that the foregoing Power of Attorney is now in full force and effect

Given under my hand and the seal of said Company at Warren, N.J., this 12th day of May 19 95



Steven S. Saper  
Assistant Secretary

STATE OF NEW YORK )  
 )  
COUNTY OF NEW YORK )

On this 12th day of May, 19 95 before me personally came  
Vincent Moy who, being by me duly sworn, did depose and say  
that he/she is an Attorney-In-Fact of the **FEDERAL INSURANCE COMPANY**, and knows the  
corporate seal thereof, that the seal affixed to said annexed instrument is such corporate seal, and  
was thereto affixed by authority of the Power of Attorney of said Company, of which a Certified  
Copy is herto attached, and that he/she signed said Instrument as an Attorney-In-Fact of said  
Company by like authority

Acknowledged and Sworn to before me  
on the date above written

**ANA W. OLIVERAS**  
NOTARY PUBLIC, State of New York  
No. 03-4976178  
Qualified in Bronx County  
Commission Expires Jan. 14, 19 97



## STATEMENT OF ASSETS, LIABILITIES AND SURPLUS TO POLICYHOLDERS

Statutory Basis

DECEMBER 31, 1993

(in thousands of dollars)

ASSETS		LIABILITIES AND SURPLUS TO POLICYHOLDERS	
Cash.....	\$ 5,263	Outstanding Losses and Loss Expenses	\$4,425,194
United States Treasury Bonds.....	217,699	Unearned Premiums.....	990,348
United States Government and Federal Agency Guaranteed Bonds.....	189,859	Provision for Reinsurance.....	51,872
State and Municipal Bonds.....	3,148,953	Loss Portfolio Transfer.....	(140,894)
Other Bonds.....	413,945	Other Liabilities.....	330,812
Stocks.....	326,509		
Short Term Investments.....	713,720	TOTAL LIABILITIES.....	5,657,432
Other Invested Assets.....	168,527		
TOTAL INVESTMENTS.....	5,184,475		
Investments in Affiliates:			
Vigilant Insurance Company.....	317,760	Capital Stock.....	13,957
Great Northern Insurance Company....	111,566	Paid-In Surplus.....	472,986
Pacific Indemnity Company.....	543,089	Unassigned Funds.....	908,292
Bellemead Development Corporation....	412,669	Unrealized Appreciation of Investments..	400,795
CC Canada Holdings Ltd. ....	77,043		
Other Affiliates.....	94,840	SURPLUS TO POLICYHOLDERS.....	1,794,060
Net Premiums Receivable.....	447,232		
Other Assets.....	262,818	TOTAL LIABILITIES AND SURPLUS TO POLICYHOLDERS.....	\$7,451,492
TOTAL ADMITTED ASSETS.....	\$7,451,492		

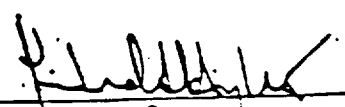
Investments are valued in accordance with requirements of the National Association of Insurance Commissioners.  
Investments valued at \$16,745 are deposited with government authorities as required by law.

State, County &amp; City of New York, - ss:

Richard Hight, Assistant Secretary of the Federal Insurance Company  
being duly sworn, deposes and says that the foregoing Statement of Assets, Liabilities and Surplus to Policyholders of  
said Federal Insurance Company on December 31, 1993 is true and correct and is a true abstract of the Annual  
Statement of said Company as filed with the Secretary of the Treasury of the United States for the 12 months ending  
December 31, 1993.

Subscribed and sworn to before me  
this \_\_\_\_\_ day of \_\_\_\_\_, 1994.

  
Notary Public

  
Assistant Secretary

WILEY L. BROWN  
Notary Public, State of New York  
NO. 31-48223  
Qualified to Notary Public  
Commission Expires December 31, 1994

PRINTED  
IN  
USA

Enclosure (4)  
May 18, 1995

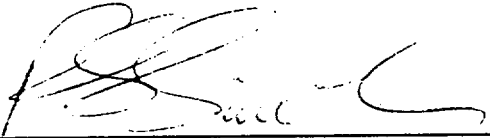
**CERTIFICATION OF FINANCIAL ASSURANCE**

Principal: Combustion Engineering, Inc.  
1000 Prospect Hill Road  
Windsor, Connecticut 06095-0500

NRC License No. 06-00217-06  
Combustion Engineering, Inc.  
1000 Prospect Hill Road  
Windsor, CT 06095-0500

Issued to: U. S. Nuclear Regulatory Commission

This is to certify that Combustion Engineering, Inc. is licensed to possess the types and amounts of material listed in U. S. Nuclear Regulatory Commission License No. 06-00217-06 and that financial assurance in the amount prescribed by 10 CFR Part 30, \$2,000,000, has been obtained for the purpose of decommissioning.

  
\_\_\_\_\_  
R. S. Siudek  
Vice President, Combustion Engineering, Inc.  
President, ABB Combustion Engineering Nuclear Operations

Date: May 18, 1995



030-03754

April 23, 1996  
DDH96004  
Page 1 of 2

License No. 06-00217-06  
Docket No. 030-3754  
Control No. 121790

Mr. Duncan White, Sr. Health Physicist  
US Nuclear Regulatory Commission  
Nuclear Safety Materials Branch 3  
475 Allendale Road  
King of Prussia, PA 19406-1415

Dear Mr. White:

Combustion Engineering, Inc. requests that Materials License 06-00217-06 be amended as follows:

1. Please change our address to:

Combustion Engineering, Inc.  
2000 Day Hill Road  
P.O. Box 500  
Windsor, CT 06095-0500

Licensed materials will continue to be used at the same physical location as before. The town of Windsor has changed the street name necessitating this change. (No fee associated with change).

2. Change Section 9 of our renewal application "**Facilities and Equipment**", **Page 24 - Building 6 - Liquid Waste Processing** to read per the new page 24. We are installing a filtration/evaporator system to upgrade this system. Please see **new pages 24, 24a and 40** for a description and plan.
3. Add **Building No. 17** indicating that byproduct operations, in this building, will be conducted consistent with operations, license conditions, and previous commitments as elsewhere on the site. A description and plan of the proposed facilities, and equipment is included as **new pages 25 & 40a**.

In a simultaneous action, Combustion Engineering has submitted to NRC Headquarters, an amendment request for SNM-1067 to delete references to Windsor Laboratory buildings and operations and Building #17. A copy is enclosed for your information.

ITEM #

167

ABB Combustion Engineering Nuclear Power

B/121

123132

Combustion Engineering Inc  
**OFFICIAL RECORD COPY**  
ML 10

1000 Prospect Hill Road  
Post Office Box 500  
Windsor, Connecticut 06095-0500

Telephone (203) 688-1911  
Fax (203) 285-9512  
Telex 99297 COMBEN WSOR

APR 25 1996

License No. 06-00217-06  
Docket No. 030-03754  
Control No. 121790

4. A revised Decommissioning Funding Plan, (Parts 1, & 2) and Rider to the Surety Bond are enclosed.
5. On page 5 please add a new **Category M** for the Pu-238 sources in the laundry assay unit. On page 6 the Information on Sealed Sources has been updated. Page 7 Purpose of Use of Licensed Material Category M has been added. (Fee for additional material - \$280.00)
6. Please reduce the grams of Uranium 235 in Category K to 325 grams to account for the increase in possession of the Plutonium Sources.
7. The other enclosed pages are editorial or clarifications (please see affected pages list).

A check for \$630.00, in accordance with 10CFR170, is enclosed to cover the cost of this request.

Your action on this request, within thirty (30) days would be deeply appreciated.

If you have any questions or require further information, please contact Mr. Stephen M. Sorensen, Manager, RPS on 860-285-5285, at your convenience.

Very truly yours,  
Combustion Engineering, Inc.



Dese A. Cirelli, Director  
Finance & Facilities Administration  
CENO, Field Services

DDH96004  
Enclosures - as stated

**COMBUSTION ENGINEERING, INC.  
Broad Scope Radioactive Materials  
License Amendment Application  
Supplemental Information Changes**

**LIST OF AFFECTED PAGES**

The pages of Materials License No. 06-00217-06, Docket 030-03754 are changed in accordance with the submitted amendment application dated April 23, 1996. The pages of the Supplemental Information and Decommissioning Funding Plan which are affected are listed below.

**Delete Pages**

<u>Page</u>	<u>Date</u>
1	5/18/95
3	5/18/95
4	5/18/95
5	11/15/95
6	5/18/95
7	5/18/95
21	5/18/95
22	6/27/95
23	5/18/95
24	5/18/95
25	6/27/95
26	5/18/95
40	5/18/95
55	5/18/95

**Add Pages**

<u>Page</u>	<u>Date</u>
1	4/23/96
3	4/23/96
4	4/23/96
5	4/23/96
6	4/23/96
7	4/23/96
21	4/23/96
22	4/23/96
23	4/23/96
24	4/23/96
24a	4/23/96
25	4/23/96
26	4/23/96
40	4/23/96
40a	4/23/96
55	4/23/96

Decommissioning Funding Plan - Replace all pages

4/23/96

COMBUSTION ENGINEERING, INC.  
Broad Scope Radioactive Materials  
License Amendment Application  
Supplemental Information Changes

LIST OF EFFECTIVE PAGES

The pages of Materials License No. 06-00217-06, Docket 030-03754 are changed in accordance with the submitted amendment application dated April 23, 1996. The pages of the Supplemental Information and Decommissioning Funding Plan which are currently effective are listed below.

<u>Pages</u>	<u>Date</u>	<u>Pages</u>	<u>Date</u>
<u>Supplemental Information Title Page</u>		12 through	
1	4/23/96	20	6/27/95
		21	4/23/96
<u>Table of Contents</u>		22	4/23/96
		23	4/23/96
2	4/23/96	24	4/23/96
		24a	4/23/96
		25	4/23/96
<u>Body</u>		26	4/23/96
		27	
3	4/23/96	through	
4	4/23/96	34	5/18/95
5	4/23/96	35	11/15/95
6	4/23/96	36	5/18/95
7	4/23/96	37	5/18/95
8	5/18/95	37a	
9	11/15/95	through	
10	5/18/95	37l	11/15/95
11	11/15/95	38	5/18/95



LIST OF EFFECTIVE PAGES  
(continued)

<u>Pages</u>	<u>Date</u>	<u>Pages</u>	<u>Date</u>
39	5/18/95	58	11/15/95
39a	6/27/95	59	5/18/95
40	4/23/96	59a	11/15/95
40a	4/23/96	60	11/15/95
41	5/18/95	60a	11/15/95
42	6/27/95	60b	11/15/95
43	5/18/95	60c	11/15/95
RPS CAL - 03 (8 pages)	11/15/90	60d	11/15/95
44	5/18/95	60e	11/15/95
45	5/18/95	60f	11/15/95
46	5/18/95	EPA Compliance(2 pages)	3/6/95
47	5/18/95	60g	11/15/95
48	11/15/95	60h	11/15/95
48a	11/15/95	60i	11/15/95
49	5/18/95	60j	11/15/95
50	5/18/95	61	11/15/95
RPI-4 (13 pages)	10/18/94	RPS-01 (4 pages)	10/17/95
51	5/18/95	62	5/18/95
RPI-15 (7 pages)	2/27/95	63	5/18/95
52	5/18/95	RPI-10	3/31/95
53	6/27/95	64	5/18/95
54	11/15/95		
54a	11/15/95		
55			
56	5/18/95		

**Combustion Engineering, Inc.**

2000 Day Hill Road  
Windsor, CT 06095-0500

**Broad Scope Radioactive Materials  
License Amendment Application  
Supplemental Information**

**NRC License No. 06-00217-06**

Docket No. 030-03754

**Broad Scope Radioactive Materials License Renewal Application  
Supplemental Information  
NRC License No. 06-00217-06**

**Introduction**

This document provides supplemental information in support of Combustion Engineering's (CE) License Renewal Application. This information supplements that of the associated completed U.S. Nuclear Regulatory Commission (NRC) Form No. 313, "Application for Materials License". The Section numbers herein correspond to the Item Numbers of that form. This application was completed using the guidance of the NRC's "Standard Review Plan For Applications for Licenses of Broad Scope [Regulatory Guide 10.5, Revision 3] [Applications for Licenses of Broad Scope], dated June 1994.

The following Sections 1 through 4 are given in the completed NRC Form 313, and reiterated below.

**1 License Application**

This is an application for Renewal of License Number 06-00217-06.

**2 Applicant's Name and Mailing Address**

Combustion Engineering, Inc.  
2000 Day Hill Road  
Windsor, CT 06095-0500

**3 Addressees Where Licensed Material Will Be Used or Possessed**

The location of use or possession of material associated with this license is the same address as given in Section 2.

)

#### **4 Person to be Contacted About the Application**

Mr. Stephen M. Sorensen  
Radiation Safety Officer  
Combustion Engineering, Inc.  
2000 Day Hill Road  
Windsor, CT 06095-0500

Telephone: (860) 285-5285  
Facsimile: (860) 285-2540

The following Sections 5 through 11 provide supplemental information in accordance with NRC Form 313.

## **5 Radioactive Material**

The following categories of radioactive material, with corresponding forms and possession limits, are requested:

Byproduct, Source, and/or Special Nuclear Material	Chemical and/or Physical Form	Possession Limit
A. Any byproduct material with Atomic Numbers 1 through 83	A. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, reactor coolant samples, or calibration sources	A. 50 Curies
B. Any byproduct material with Atomic Numbers 84 through 103	B. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or, reactor coolant samples	B. Not to exceed 3 millicuries per nuclide and 30 millicuries total
C. Cesium 137	C. Sealed Sources	C. 215 Curies
D. Americium 241	D. Sealed neutron sources	D. Not to exceed 1 Curie per source and 10 Curies total
E. Americium 241	E. Sealed neutron sources	E. Not to exceed 10 Curies per source and 100 Curies total
F. Neptunium 237	F. Oxide Wires	F. Not to exceed 0.5 millicuries per wire and 5 millicuries total
G. Uranium 233	G. Any	G. 1 gram
H. Uranium 235	H. Any	H. 7 grams
I. Uranium 235	I. Fission chambers (sealed)	I. Not to exceed 1.7 grams per chamber and 13.6 grams total
J. Plutonium	J. Any	J. 1 milligram
K. Uranium 235	K. Any	K. 325 grams, including < 5Kg UF <sub>6</sub>
L. Natural and/or Depleted Uranium	L. Any	L. 10,000 KgU, including < 5Kg UF <sub>6</sub>
M. Plutonium 238	M. Sealed Sources	M. < 1 gram each not to exceed 4 grams total

## Information Concerning Sealed Sources

The following additional information is provided concerning sealed sources:

Sealed Sources	Sealed Source Storage Container or Device
C. Cesium 137 - Listed Below	C. Cesium 137 - Listed Below
1. Technical Operations, Inc. - Model SK1936, S/N S-171 - 2.0 Curies	1. Gamma Densitometer - Model 660
2. International Chemical and Nuclear - Model 375, S/N 771 - 1.19 millicuries	2. Lead Pig - Calibration Source
3. Technical Operations, Inc. - Model FM6, S/N 181, S/N 182 - 30 Curies each	3. Gamma Densitometer - Model 789
4. Measurements, Inc. - Model SK2085, S/N S-274 - 10 Curies	4. Gamma Densitometer - Model 807 #35
5. New England Nuclear - Model NER-401H, S/N CS-160 - 9.75 millicuries	5. Lead Pig - Calibration Source
6. ORNL Model S-136	6. Gamma Densitometer - Model 755
7. ORNL Model S-137	7. Gamma Densitometer - Model RTR-N #221
8. ORNL Model S0169	8. Lead Pig - Calibration Source
D. Americium 241 - Listed Below	D. Americium 241 - Listed Below
1. Monsanto Research Corp. - Model 2723A - 1 Curie	1. DOT 7A Container - Certificate # USA/0043/S
E. Americium 241 - Listed Below	E. Americium 241 - Listed Below
1. Monsanto Research Corp. - Model 2727B - 10 Curies	1. DOT 7A Container - Certificate # USA/0031/S
M. Plutonium 238 - Listed Below	M. Plutonium 238 - Listed Below
1. Monsanto Research Corp. - Model MRC-N-SS-W-Pu8Li-9	1. DOT 7A Container - Container Products Corp. S/N 54367 (Cert. on file)
2. Monsanto Research Corp. - Model MRC-N-SS-W-Pu8Li-11	2. DOT 7A Container - Container Products Corp. S/N 54367 (Cert. on file)
3. Monsanto Research Corp. - Model MRC-N-SS-W-PuLi-12	3. DOT 7A Container - Container Products Corp. S/N 54478 (Cert. on file)
4. Monsanto Research Corp. - Model MRC-N-SS-W-Pu8Li-13	4. DOT 7A Container - Container Products Corp. S/N 54478 (Cert. on file)

## **6 Purpose of Use of Licensed Material**

The following lettered paragraphs correspond to those of the possession limits in Section 5:

- A. through D. Research and development as defined in 10 CFR 30.4; possession incident to maintenance, repair, decontamination, and study of reactor components.
- E. Testing and calibration of boron measuring devices and for distribution to persons holding operating reactor licenses and/or to persons authorized to receive the licensed materials pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- F. through I. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed materials pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- J. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.
- K. through L. Research and development using Special Nuclear Material and Source Material in Buildings 2, 5, 6, 17 & 18.
- M. For storage ONLY until disposal can be arranged, defunct laundry assay unit.

## **7 Management Control and Responsibility**

### **7.1 Senior Management**

Combustion Engineering senior management appreciates the need for strong management controls for an effective radiation safety program for its broad scope license. The Radiation Safety Committee and the Radiation Safety Officer have been delegated sufficient authority, organizational freedom and management prerogative to communicate with and direct personnel of the radiation safety staff and others regarding NRC regulations and license provisions.

Figure 7.1-1 provides an organization chart depicting the organizational relationships of personnel related to radiation safety for this license application.

Figure 7.1-2 provides the signed certification of the Radiation Safety Officer.

#### **7.4 Radiation Safety Office Staff**

The RSO is supported by a staff of health physics (HP) professionals who assist in the maintenance and control of the licensed program. This staff fluctuates according to need; at the time of this application, the staff consists of one Radiation Safety Engineer, one lead senior HP technician, one dosimetry /lead senior HP technician and three junior HP technicians. Other staff is occasionally contracted as conditions warrant.

#### **8 Training for Individuals Working in or Frequenting Restricted Areas**

Combustion Engineering provides initial and refresher training to individuals who will use, or may come in contact with, radioactive material. Section 10.5 of this application describes the training program.

#### **9 Facilities and Equipment**

Combustion Engineering's Windsor site is an approximately 600 acre tract of land located in the town of Windsor, Connecticut. The Farmington River flows along the northern boundary of the site. The land adjacent to the North, East, South and West boundaries of the site consists of heavily wooded sections and open fields which have been cultivated for the production of broad leaf tobacco and other farm products. The land area within five miles of the site is somewhat rural, with rolling farmland interspersed among woodland tracts. In recent years, the area has become a bedroom community suburb of the greater Hartford area, with some light industry. Figure 9-1 shows the buildings and facilities presently located on the CE Windsor site.

Radioactive materials are used primarily in the following buildings: Buildings 1, 1A, 2, 2A, 3, and 5, 6, 16, 17 and 18. Of these, Building 5 contains the Research and Development Laboratories. Buildings 1, 1A, 2, 2A, 5 & 17 are used as part of CE Nuclear Operation's Field Operations' facilities. Source Material (SM) and/or Special Nuclear Material (SNM) is also used for laboratory activities in Buildings 2, 5 and 18. In addition, radioactive (SM and SNM) liquid waste processing is performed in Building 6.

The following descriptions and plans indicate where radioactive materials are normally used and controlled.



## Building 1 - High Radiation Storage and Refurbishment

Figure 9-2 depicts the buildings of the Building 2 Complex (i.e., Buildings 1, 1A, 2 and 2A). Figure 9-3 depicts Building 1. This building is used for three basic purposes:

- A. High Radiation Storage - The northeast corner of the building contains a high density concrete walled cell, as depicted in Figure 9-3. The area is used to store contained materials with dose rates of approximately 100 mr/hr or greater.
- B. Interim Extended Radioactive Waste Storage - The vault shown in the northwest corner of Figure 9-3 may be used to store processed radioactive waste awaiting disposal.
- C. Control Zone #5 - The east section of Building 1 contains a work zone with a single bank HEPA filtered exhaust system. This exhaust system recirculates air back into the building. Figure 9-4 depicts the control zone, and Figure 9-5 depicts the ventilation and sampling system.

### Building 1A - Storage

The northern half of the building is used for materials storage, although temporary radioactive materials work areas may be set up and released after use. Figure 9-6 depicts the northern end of Building 1A.

The southern half of this building is used primarily as an inventory area for packaged radioactive materials. The building layout and ventilation system for this building is shown in Figure 9-7.

A tented controlled area is erected in the southeast corner of the building that is maintained under negative pressure by a portable HEPA filtered fan unit which exhausts back into the building. The tented area is used for visually inspecting containers containing radioactively contaminated equipment. (See Figure 9-7)

### Buildings 2/2A

Buildings 2 and 2A consist of approximately 15,000 square feet of floor space as depicted in Figure 9-8. The southern half of Building 2 is a two story structure with the second floor devoted entirely to office space. A shielded health physics counting room is located on the east side of the first floor.

A high density concrete vault is located in the center of Building 2. The layout of this vault is depicted in Figure 9-9. The purpose of this area is calibration of instruments and thermoluminescent dosimeters (TLD) using sealed sources. The single entrance to this vault is controlled by a combination door lock which is controlled by health physics personnel.

As depicted in the layout of Figure 9-8, the northeast corner of Building 2 is comprised of a concrete walled area, identified as Cell 2, and an interconnecting wing to Building 2A. Cell 2, both the ground level and subterranean level, and Building 2A have been established as part of a single restricted area (see Figure 9-10). The subterranean level of Cell 2 is used primarily for decontamination and repair of reactor inspection equipment.

Airborne radioactive material in the cell is processed through a self-contained HEPA filtered air cleaning system. A portion of the air in the cell is exhausted outside the building via a single bank of HEPA filters. The system is continuously monitored whenever it is in operation. The ventilation system is depicted in Figure 9-11.

The areas at ground level of Cell 2, plus Building 2A, are used to refurbish, inspect, develop and store reactor servicing equipment and to train personnel in the use of the equipment. Controlled zones are established to handle unclad radioactive equipment. The controlled zones are of modular construction erected to accommodate the equipment and personnel. Each controlled zone is serviced by a circulating air system designed to move air from the controlled zone and discharge back into the building after it has been filtered by two banks of HEPA filters. One set of filters is located at the controlled zone; the other set is located just prior to the system discharge. The air between the two banks of filters is sampled through an isokinetic probe and connected to a continuous air monitor which will alarm if radioactive material is detected downstream of the first set of filters (see Figure 9-11).

Mechanical testing (e.g., seismic response or vibration testing) of reactor components is also performed in Building 2. Sealed simulated fuel rods containing SM (e.g., depleted uranium) are occasionally used for such testing and are stored in the building.

### Building 3 - KDL Laboratories

This building consists of approximately 60,000 square feet used for research and development of fossil fuels, boilers, and pollution control equipment. All radioactive materials used in this building will be encapsulated; either in the form of sealed sources as part of densitometer projectors or as materials sealed for x-ray diffraction analysis.

## Building 5 - Research and Development Laboratories

The Research and Development (R&D) Laboratories contain approximately 60,000 square feet of floor space. The main bay and each of the three wings of the structure contain office space which occupies a total of 27,000 square feet of the facility. The balance of the building is used for mechanical testing and research/development. Work in the laboratory areas is evenly divided among activities that require the handling of nonradioactive materials. Each area that uses radioactive materials (such as the Radiochemistry Laboratory, Metallography Laboratory, Mechanical Testing, Laboratories, Boronometer Test Area, etc.) is established and maintained as a separate restricted area.

Air from work areas in which radioactive materials with greater than 5,000 DPM/100 cm<sup>2</sup> loose activity are used is exhausted via stack lines equipped with single banks of HEPA filters (99.97 percent efficient for 0.3 micron particles). Each of the exhaust stacks is equipped with an isokinetic probe and sample collection system. Each exhaust system is tested in accordance with ANSI N510-1980 following HEPA filter replacement. The air and sampling air for each area are shown in Figures 9-13 and 9-14.

Radioactive liquid wastes generated are evaporated in fume hoods which discharge to the sampled exhaust stacks as previously described.

In addition, SM and SNM laboratory activities are performed in Building 5 and the adjoining Building 18. Building 5 contains the Analytical Chemistry Laboratories and Pellet Physical Testing Laboratory. The Analytical Chemistry Laboratories consist of a Uranium Analysis Laboratory, Environmental/Bioassay Laboratory, Radiochemistry Laboratory, Environmental Laboratory, and a Radiochemistry Counting Room. Chemical analysis of uranium fuel and various reactor core materials and components is conducted in the Analytical Chemistry Laboratories. Chemical analyses are performed to determine impurities in fuel pellets, such as analyses for aluminum, calcium, magnesium, chlorides, fluoride, silicon, iron, nickel, hydrogen, moisture and rare earths (e.g., europium, samarium, gadolinium, erbium, etc.). These laboratories also perform analyses which support operational activities such as environmental radiation monitoring, personnel bioassay, radiological protection, and waste water processing. The Pellet Physical Testing Laboratory is used for activities such as pellet resintering tests and immersion density tests.

## Building 6 - Radioactive Liquid Waste Processing

Liquid effluents from Laboratory activities in Building 5 drain to any one of ten 2,000 gallon retention tanks, located in Building 6. A schematic of the Building 6 liquid waste filtration and evaporation system is depicted in Figure 9-15. Liquids may also be discharged to the Site Industrial Stream, which flows into Goodwin Pond Brook, after sampling and dilution, if necessary.

Liquid effluents are discharged in accordance with radionuclide concentration limits of Table 2 of Appendix B to 10CFR20.1001 - 2401. An operational check of the instruments that measure the water level in the dilution tank(s) shall be performed, on a monthly basis whenever the tank(s) are used for this purpose.

Building 6 may also be used to store radioactive waste awaiting shipment (see Chapter 11).

### Building 16 - Boronometer Test Area

A room in Building 16 is used for testing boronometers; sealed sources are used in this area.

### Building 17 - Former Nuclear Fuel Manufacturing

This building is the former Nuclear Fuel Manufacturing facility. Currently, the "Hot Shop" i.e. Bay C is empty of all equipment and fixtures with the exception of FA-3, a HEPA filtered exhaust fan unit. It is planned to introduce byproduct material into this area for similar uses as in Buildings #2 & 2A. Contamination Control Enclosures with appropriate ventilation set-ups will be designed and constructed under the supervision of the Radiation Protection Services Department. A conceptual drawing is Figure 9-15.A, page 40a.

### Building 18 - Test Loop

Building 18 contains a scale model reactor hydraulic test loop. Sealed simulated fuel rods containing source material (e.g., depleted uranium) are used in the test loop and are stored in the building.

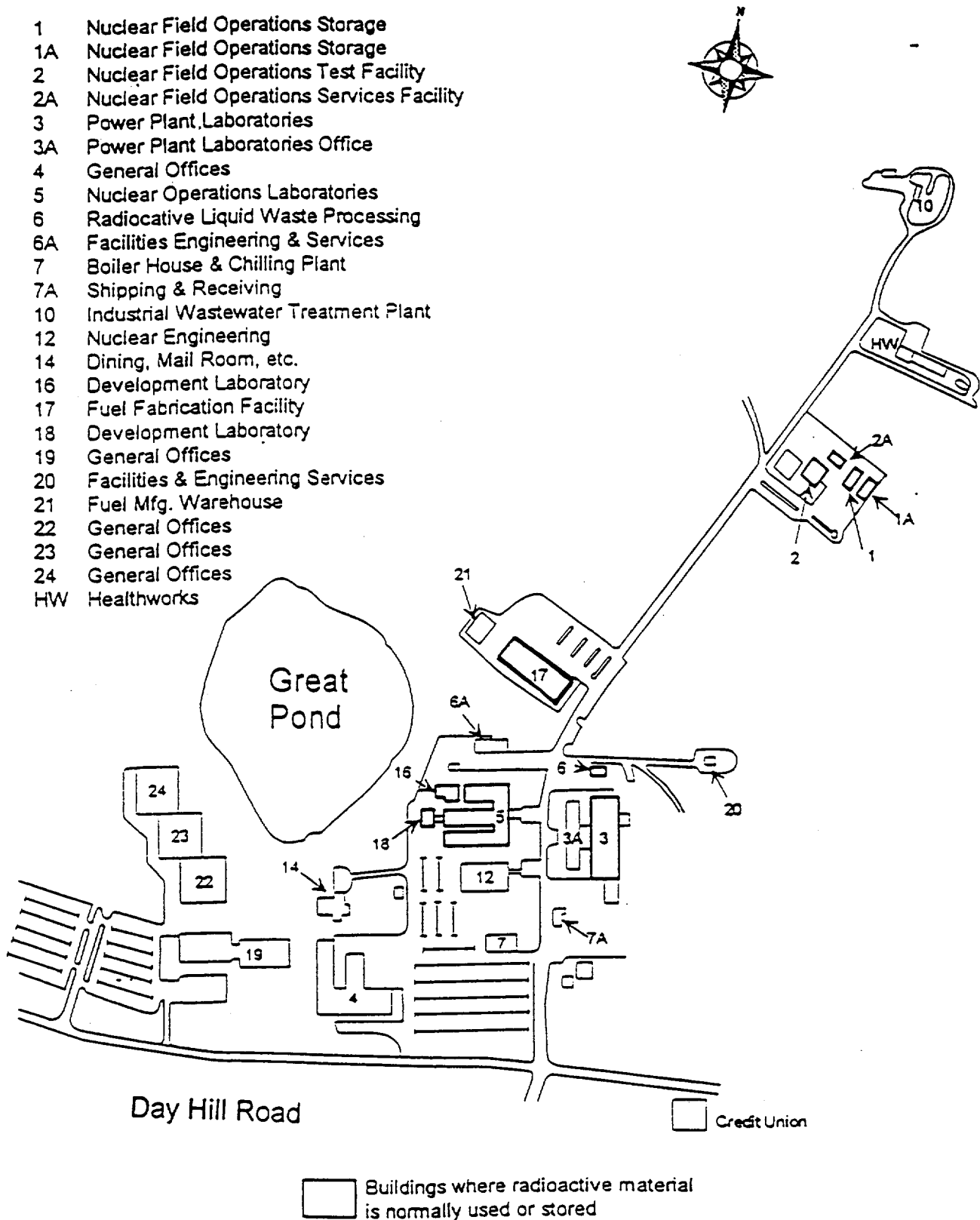
### Facilities and Equipment - General

It is the practice of CE Nuclear Operations that, whenever unclad radioactive materials are used in the various research laboratories, the equipment involved is enclosed where practical, for the protection of personnel and the environment. Generally, laboratory or equipment areas where loose contamination may exceed 10,000 DPM/100 cm<sup>2</sup> are candidates for protective enclosures. These enclosures may be permanent construction, semi-permanent controlled areas, or temporary enclosures (e.g., tents). Typical examples of restricted areas utilizing permanent enclosures or controlled zones may be seen in Figure 9-16.

### Surveys and Counting Equipment

Figure 9-17 is a current listing of radiation survey, counting and sampling equipment used under this license. Calibration procedures are developed and used in accordance with ANSI N323-1980 and manufacturer's technical manuals as required. Equipment additions or deletions from this complement may be made as necessary without prior notification of the NRC, as long as such changes are reviewed and approved by the RSO or his designee. A typical calibration procedure is given in Figure 9-18 as an example for information. A computer generated, calibration frequency list is used to calibrate equipment. This list may differ from the frequency in the procedure until the procedure is officially changed.

Figure 9-1  
Location of Buildings on the Windsor Site



**Figure 9-15**  
**Building 6 Liquid Waste System**

**Figure 9-15**  
**Building 17 Drawing**



**Figure 10.6-1  
Building 2 Complex  
(Nuclear Service Buildings)  
Survey Requirements**

Item	Survey Location	Frequency	Contamination Survey	Radiation Survey
1	Control Zone Buffer Zones	Daily <sup>1,2</sup>	X	
2	Building 2 Office Spaces	Weekly	X	X
3	Building 2 Restricted Areas	Weekly	X	X
4	Building 2 Lower Mezzanine	Weekly <sup>1</sup>	X	X
5	Building 2A Restricted Areas	Weekly	X	X
6	Control Zone 1	Weekly <sup>1,3</sup>	X	X
7	Control Zone 2	Weekly <sup>1,3</sup>	X	X
8	Control Zone 3	Weekly <sup>1,3</sup>	X	X
9	Control Zone 4	Weekly <sup>1,3</sup>	X	X
10	Control Zone 5	Weekly <sup>1,3</sup>	X	X
11	Building 1 Restricted Areas	Weekly	X	X
12	Building 1 High Radiation & LLRW Storage	Monthly	X	X
13	Building 1A Radiation Storage	Monthly	X	X
14	Building 1A Multi-Purpose Area	Weekly <sup>1,3</sup>	X	X
15	Trailer Storage Area	Monthly		X
16	Yard Storage Area	Monthly		X
17	Waste Pad	Monthly		X
18	Vault	Monthly	X	X

<sup>1</sup> When in use; monthly when not in use.

<sup>2</sup> No map required. Health physics personnel perform the required surveys and acceptability of survey results is acknowledged on the weekly report.

<sup>3</sup> Prior to a new RWP being issued for change of work scope when radiological conditions could materially change.

**Combustion Engineering, Inc.**  
2000 Day Hill Road  
Windsor, CT 06095-0500

**Decommissioning  
Funding Plan**

Part 1

Buildings 1,1A,2,2A,3/3A,5,6,16 & 18

**License No. 06-00217-06**  
**Docket No. 030-03754**

# DECOMMISSIONING FUNDING PLAN

## TABLE OF CONTENTS

1.0	INTRODUCTION .....	3
2.0	SCOPE .....	3
3.0	FACILITY DESCRIPTION.....	3
3.1	Building 1 .....	3
3.2	Building 1A.....	4
3.3	Buildings 2/2A.....	4
3.4	Buildings 3/3A.....	4
3.5	Building 5 .....	5
3.6	Building 6 .....	5
3.7	Building 16.....	5
3.8	Building 18 .....	5
4.0	DECOMMISSIONING CRITERIA.....	6
4.1	Residual Contamination Criteria .....	6
4.2	Salvage .....	6
4.3	Low Level Waste.....	6
4.4	Estimation Methodology .....	6
4.5	Duration of Decommissioning .....	7
4.6	Decontamination Methodology.....	7
5.0	DECOMMISSIONING COST ESTIMATES .....	11
6.0	FINANCIAL ASSURANCE METHOD.....	35
7.0	REFERENCES .....	36

## **1.0 INTRODUCTION**

This Decommissioning Funding Plan (DFP) is pursuant to 10 CFR 70.25 and 30.35 and contains the information required by 10 CFR 70.25(e) and 10 CFR 30.35(e). This DFP consists of seven parts: Introduction, Scope, Facility Description, Decommissioning Criteria, Decommissioning Cost Estimates, Financial Assurance Method and References.

## **2.0 SCOPE**

This Decommissioning Funding Plan is for the Combustion Engineering, Inc. (CE), Type A Broad Scope License No. 06-00217-06 for facilities located at 2000 Day Hill Road, Windsor, Connecticut. This Plan includes Buildings 1, 1A, 2, 2A, 3, 3A, 5, 6, 16, and 18.

## **3.0 FACILITY DESCRIPTION**

### **3.1 Building 1**

The total area of Building 1, including floors, ceilings, and walls is approximately 26,934 square feet. The building is used for three basic purposes with regard to radioactive materials:

- a. High Radiation Storage - The northeast corner of the building contains a room which measures approximately 20' 6" x 37' 6" x 15'. The area is used to store contained materials with dose rates of approximately 100 mr/hr or greater. The area is surveyed on a monthly basis for loose surface contamination and radiation dose rates. The loose surface contamination levels in the area are below 200 dpm/100 cm<sup>2</sup> (beta/gamma) and less than 10 dpm/100cm<sup>2</sup> (alpha).
- b. Interim Extended Radioactive Waste Storage - A vault in the north west corner of the building is intended to be used for the interim storage of Radioactive Waste in the event of denial of access to disposal facilities
- c. Control Zone #5 - The east section of Building 1 contains a work zone with a HEPA filtered exhaust system. The room measures approximately 18' x 20' 6" x 15'. Prior to conducting any radioactive material work in the room under this license, false walls, floors, and a ceiling were installed. The loose surface contamination levels in the area are below 3000 dpm/100 cm<sup>2</sup>, average (beta/gamma).

The remainder of Building 1 is used as a staging area for receiving and shipping of radioactive material. Routine surveys of the remainder of Building 1 indicate loose surface contamination below 200 dpm/100 cm<sup>2</sup> (beta/gamma), and 10 dpm/100 cm<sup>2</sup> (alpha).

### **3.2 Building 1A**

The total area of Building 1A, including floors, ceilings, and walls is approximately 21,162 square feet. Building 1A is used primarily as a storage area for packaged radioactive materials. Routine surveys of Building 1A indicate loose surface contamination levels below 200 dpm/100 cm<sup>2</sup> (beta/gamma), and 10 dpm/100 cm<sup>2</sup> (alpha).

### **3.3 Buildings 2/2A**

The total area of Buildings 2/2A, including floors, ceilings, and walls is approximately 102,950 square feet. Building 2 is a two story structure with the second floor devoted entirely to office space. A shielded health physics counting room is located on the south west corner of the first floor.

A high density concrete vault is located in the center of Building 2. The area is used for the calibration of instruments and Thermoluminescent Dosimeters (TLD) using sealed sources. The single entrance to this vault has a combination door lock controlled by Radiation Protection Services.

The northeast corner of Building 2 is comprised of a concrete walled area, identified as Cell 2, and an interconnecting wing to Building 2A. Cell 2, both the ground level and subterranean level, and Building 2A have been established as part of a single restricted area. The subterranean level of Cell 2 is used primarily for decontamination and repair of reactor inspection equipment.

The areas at ground level of Cell 2, plus Building 2A, are used to refurbish, inspect, develop and store reactor servicing equipment and to train personnel in the use of the material. Control zones are established to handle unclad radioactive material. The control zones are of modular construction erected to accommodate the equipment and personnel. Each control zone is serviced by a negative pressure air system designed to move air from the control zone and discharge back into the building after it has been filtered by two banks of HEPA filters.

### **3.4 Buildings 3/3A**

Activities in this building include x-ray diffraction measurement of sealed specimens of radioactive material. Routine surveys of this building indicate that the building is not contaminated with radioactive material controlled under this license.

### **3.5 Building 5**

Building 5 contains approximately 60,000 square feet of floor space. The main bay and each of the three wings of the structure contain office space which occupies a total of 27,000 square feet of the facility. The balance of the building is used for mechanical testing and research/development. Work in the laboratory areas is roughly evenly divided among activities that require the handling of radioactive materials and those that involve non-radioactive materials. Each area that uses radioactive materials - the radiochemistry laboratory, metallography laboratory, mechanical testing laboratories, Boronometer test area (in the adjoining Building 16) - is established and maintained as a separate restricted area.

### **3.6 Building 6**

Liquid effluents from SNM Laboratory activities in Building 5 drain to any one of ten 2,000 gallon retention tanks, located in Building 6. Four 10,000 gallon dilution tanks in Building 6 are used for diluting liquid effluents to within regulatory limits prior to filtration and evaporation, whereupon the dried sludge is disposed of as solid radioactive waste.

### **3.7 Building 16**

The Boronometer test area is in Building 16. Sealed special nuclear material sources are used in this area. Routine surveys of this building indicate that the building is not contaminated.

### **3.9 Building 18**

This building contains a scale reactor hydraulic test loop. Occasionally, simulated fuel rods containing source material are used in this test loop. The rods are maintained sealed, and are also stored in this building. Routine surveys of this building indicate that the building is not contaminated.

## **4.0 DECOMMISSIONING CRITERIA**

This Decommissioning Funding Plan is for the Type A Broad Scope license for CE's facilities at 2000 Day Hill Road, Windsor, CT, License No. 06-00217-06 Docket No. 030-03754.

### **4.1 Residual Contamination Criteria**

Cost estimates were based on the assumption that facilities and equipment would be released for unrestricted use when residual contamination met the criteria established in Regulatory Guide 1.86, Reference (1), as shown in Table 4.1, which is consistent with "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Material", Reference (2). Estimates are further based on the assumption that soils will be free released according to NRC Branch Technical Position: "Disposal or On-Site Storage of Residual Thorium or Uranium", Reference (3).

### **4.2 Salvage**

The salvage value of any material or equipment was not included in this DFP. Likewise, the costs associated with moving equipment to the Hematite Missouri Fuel Manufacturing Plant or CE's Southeast Nuclear Service Center prior to decommissioning are beyond the scope of this plan.

### **4.3 Low Level Waste**

This plan assumes that a Low Level Waste (LLW) burial site will be available to bury material and equipment that does not meet free release criteria. Also included in the cost estimate is the projected burial cost and surcharges, totaling an average of \$400/ft<sup>3</sup>, for LLW to be buried and the cost for containers (B-25) and transportation.

### **4.4 Estimation Methodology**

In generating the cost estimates provided in the following sections, facility buildings were broken down into separate areas or rooms. The volume and/or dimensions of equipment, structures, and materials within those areas and rooms were physically measured. These measurements were used to estimate the volume of low level waste that can be expected from decommissioning. The same measurements were used to estimate the duration of dismantling and decontamination operations that will be required to complete decommissioning. The estimates take into account waste reduction operations that will be undertaken during decommissioning.

For the purposes of these estimates, it has been assumed that loose surface contamination on floors, walls, ceilings, and other surfaces will be removed and that fixed contamination in the floors will be scabbled off or otherwise removed.

Provisions have been made to include sufficient contingency funds in the cost estimates. Further revisions and refinements to the plan that may better define the cost estimates may also result in reduction of associated contingency funding.

Estimates provided in this Plan are shown in 1995 dollars. A summary of the cost estimates is given in Table 4.2. The details of the costs estimates are given in the tables of Section 5.0.

#### **4.5 Duration of Decommissioning**

Cost estimates are based on the assumption that the majority of the decontamination and decommissioning activities will be completed within two years of commencing.

#### **4.6 Decontamination Methodology**

Cost estimates are also based on the assumption that decontamination tasks will be completed using methodologies drawn from the following listing:

- 1)Hand Wiping: It is anticipated that the majority of the contaminated equipment and materials will be cleaned using hand wiping. This will involve manually cleaning equipment, structure, and/or material surfaces using rags, maslin, paper and/or abrasive pads and a cleaning solution such as Alconox or similar. Decontamination solutions will be carefully selected to ensure that mixed waste is not generated. This method has been selected because it is a simple and effective method for routine decontamination tasks and personnel are easily trained to safely use this technique. Rags, etc., used in these operations may be laundered reused.
- 2)Hydrolasing: This methodology is an available option for removal of widespread areas of loose surface contamination. This method will only be utilized in an enclosed area that is set up specifically for hydrolasing. Specific allowances will be made for the recapture and recycling of contaminated water.
- 3)CO<sub>2</sub> Cleaning: This technology is an available option for surface cleaning by means of tiny, solidified pellets of CO<sub>2</sub>. The gaseous CO<sub>2</sub> is then collected by a suction line and passes through a HEPA filter. Advantages to this process include its effectiveness at cleaning intricate surfaces, its lack of physical surface damage, and its lack of secondary radioactive waste generation.



- 4) Strippable Paint: This material, commonly used in nuclear power plants, may have some applicability in two areas. First, it may be used to provide a removable, protective coating over decontaminated areas remaining in the vicinity of ongoing decontamination work. Second, it may be utilized to perform actual decontamination tasks on large smooth surfaces such as metal sheets or similar. If used, it is intended that, following its removal, the paint may be incinerated in an approved facility, thus reducing radioactive waste burial volumes.
- 5) Abrasive Media Cleaning: This process utilizes either sponge-like material, sand, or grit accelerated by high pressure air to effect controlled decontamination of contaminated surfaces. These media have the advantage of being reusable, to a degree. When exhausted, the sponge material may be incinerated in an approved facility, resulting in relatively small volumes of low level waste. The sand and/or grit will be disposed of as low level radioactive waste if it exceeds the criteria listed in Reference (3).
- 6) Material Surface Removal: In cases where hand wiping or other surface cleaning methods are insufficient to remove contaminants present, removal of material surfaces may be required. For tools, equipment, and other metal objects, grinders may be utilized to remove contaminants that would otherwise be considered fixed contamination. This will avoid the necessity of disposing of large inventories of materials as radioactive waste. For contaminated structural materials such as concrete floors and walls, scabblers and scarifiers may be utilized to remove contaminated surface from those materials. To the extent practical, engineering controls will be used to reduce aerosols that can result from scabbling and/or scarifying operations. Scabbling has been proven successful in a number of areas and buildings during recent decontamination projects.

**Table 4.1**  
**Acceptable Surface Contamination Levels**

NUCLIDE <sup>a</sup>	AVERAGE <sup>b c</sup>	MAXIMUM <sup>b d</sup>	REMOVABLE <sup>b e</sup>
U-nat, U-235, U-238, and associated decay products	5,000 dpm $\alpha$ /100cm <sup>2</sup>	15,000 dpm $\alpha$ /100cm <sup>2</sup>	1,000 dpm $\alpha$ /100 cm <sup>2</sup>
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100cm <sup>2</sup>	300 dpm/100cm <sup>2</sup>	20 dpm/100cm <sup>2</sup>
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100cm <sup>2</sup>	3000 dpm/100cm <sup>2</sup>	200 dpm/100cm <sup>2</sup>
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5000 dpm $\beta\gamma$ /100cm <sup>2</sup>	15,000 dpm $\beta\gamma$ /100cm <sup>2</sup>	1000 dpm $\beta\gamma$ /100cm <sup>2</sup>

- <sup>a</sup> Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.
- <sup>b</sup> As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- <sup>c</sup> Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.
- <sup>d</sup> The maximum contamination level applies to an area of not more than 100 cm<sup>2</sup>.
- <sup>e</sup> The amount of removable radioactive material per 100 cm<sup>2</sup> of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

**Table 4.2**  
**Summary of DFP Cost Estimates**

Description	Table Herein	Table of Appendix F, Reg. Guide 3.66	Cost Estimate Summary
Unit Cost for Workers	Table 5.1	Table 2	(included)
Planning and Preparation	Table 5.2	Table 1	\$257,638.63
Cost for Surveying Non-Contaminated Areas	Table 5.3	Table 3	\$607,254.12
Cost for Decon/Dismantle of Radiological Areas	Table 5.4	Table 3	\$534,058.21
Equipment and Supplies	Table 5.5	Table 4	(included)
Packaging, Shipping, and Disposal of Radioactive Waste	Table 5.6	Table 5, 6, and 7	\$592,500.00
Restoration	Table 5.7	Table 8	(included)
Final Radiation Survey	Table 5.8	Table 9	(included)
Stabilization	Table 5.9	Table 10	(not applicable)
Total			\$1,991,450.90

**SECTION 5.0  
DECOMMISSIONING  
COST ESTIMATES**

**Table 5.1**  
**Unit Cost for Workers**  
 (Table 2 of Appendix F, Reg. Guide 3.66)

<u>Classification</u>	<u>\$/Hour</u>
Project Manger	\$50.90
Decontamination Technicians	
Supervisor	\$37.41
Senior	\$24.16
Junior	\$21.97
Health Physics Technicians	
Supervisor	\$41.70
Senior	\$31.90
Junior	\$24.85
Health Physicist	\$50.90
Engineer	\$55.55
Clerical	\$10.96
Labor	\$22.00
Craft	\$35.00

Note: Wage rates are from cognizant services companies and include overhead expenses.

**Table 5.2**  
**Planning and Preparation**  
 (Table 1 of Appendix F, Reg. Guide 3.66)

1. Preparation of Documentation for Regulatory Agencies

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	300	\$50.90	\$15,270.00
Project Manager	80	\$50.90	\$4,072.00
Clerical	200	\$10.96	\$2,192.00
Total			\$21,534.00

2. Submission of Decommissioning Plan to NRC when required by 10 CFR 30/70

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	1000	\$50.90	\$50,900.00
Project Manager	200	\$50.90	\$10,180.00
Clerical	400	\$10.96	\$4,384.00
Total			\$65,464.00

3. Development of Work Plans

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	500	\$50.90	\$25,450.00
Project Manager	125	\$50.90	\$6,362.50
Clerical	200	\$10.96	\$2,192.00
Total			\$34,004.50

**Table 5.2 (Cont.)**  
**Planning and Preparation**  
 (Table 1 of Appendix F, Reg. Guide 3.66)

4. Procurement of Special Equipment

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	100	\$50.90	\$5,090.00
Project Manager	100	\$50.90	\$5,090.00
Clerical	40	\$10.96	\$438.40
		Total	\$10,618.40

5. Staff Training

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	40	\$50.90	\$2,036.00
Project Manager	0	\$50.90	\$0.00
Clerical	100	\$10.96	\$1,096.00
H.P. Supervisor	500	\$41.70	\$20,850.00
		Total	\$23,982.00

6. Characterization of Radiological Condition of Facility

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	100	\$50.90	\$5,090.00
Project Manager	100	\$50.90	\$5,090.00
Clerical	100	\$10.96	\$1,096.00
H.P. Supervisor	200	\$41.70	\$8,340.00
		Total	\$19,616.00

**Table 5.2 (Cont.)**  
**Planning and Preparation**  
 (Table 1 of Appendix F, Reg. Guide 3.66)

7. Other

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	200	\$50.90	\$10,180.00
Project Manager	200	\$50.90	\$10,180.00
Clerical	200	\$10.96	\$2,192.00
H.P. Supervisor	200	\$41.70	\$8,340.00
Total			\$30,892.00

Subtotal		\$206,110.90
CONTINGENCY OF 25%		0.25
Total		\$257,638.63



**Table 5.3**  
**Cost for Surveying Non-contaminated Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

1. Cost for surveying non-contaminated areas

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Bldg 1	26,934 <sup>a</sup> (w,f,c)	599	\$24.85	\$14,885.15
Misc <sup>b</sup> (e,p,v)	3120	150	\$24.85	\$3,727.50
Bldg 1A	21,162 <sup>a</sup> (w,f,c)	424	\$24.85	\$10,536.40
Misc <sup>b</sup> (e,p,v)	2988	106	\$24.85	\$2,634.10
Bldg 2/2A	96,950 <sup>a</sup> (w,f,c)	1835	\$24.85	\$45,599.75
Misc <sup>b</sup> (e,p,v)	6540	500	\$24.85	\$12,425.00
Bldg 3/3A (x-ray lab)	3060 <sup>a</sup> (w,f,c)	115	\$24.85	\$2,857.75
Misc <sup>b</sup> (e,p,v)	500	40	\$24.85	\$994.00
Bldg 5	172,792 <sup>a</sup> (w,f,c)	3110	\$24.85	\$77,283.50
Misc <sup>b</sup> (e,p,v)	8000	864	\$24.85	\$21,470.40
Bldg 16 (boronometer lab)	2160 <sup>a</sup> (w,f,c)	90	\$24.85	\$2,236.50
Misc <sup>b</sup> (e,p,v)	320	20	\$24.85	\$497.00
Bldg 18	13,480 <sup>a</sup> (w,f,c)	155	\$24.85	\$3,851.75
Misc <sup>b</sup> (e,p,v)	550	30	\$24.85	\$745.50

2. Cost for reviewing non-contaminated areas survey data.

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
(1, 1A, 2, 2A, 3, 3A, 5, 6, 16, 18)	—	400	\$50.90	\$20,360.00

<sup>a</sup> (w,f,c) indicates walls, floor, and ceiling

<sup>b</sup> (e,p,v) indicates electrical, piping, and ventilation

**Table 5.3 (Cont.)**  
**Cost for Surveying Non-contaminated Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

3. Cost of gridding non-contaminated areas.

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
(1, 1A, 2, 2A, 3, 3A,5, 6, 16, 18)	337,908 <sup>a</sup> (w,f,c)	5885	\$22.00	\$129,470.00

4. Cost of Instrumentation support and supplies.

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
(1, 1A, 2, 2A, 3, 3A,5, 6, 16, 18)	—	400	\$31.90	\$12,760.00
Supplies	—	—	—	\$10,000.00

5. Cost for collecting and analyzing volumetric samples

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
(1, 1A, 2, 2A, 3, 3A,5, 6, 16, 18)	—	400	\$50.90	\$20,360.00
Grid layout	101590	2257	\$22.00	\$49,654.00
Collecting	—	300	\$24.85	\$7,455.00
Analyses (600 @ \$60 each)	—	—	—	\$36,000.00

Subtotal	\$485,803.30
CONTINGENCY OF 25%	0.25
Total	\$607,254.12

<sup>a</sup> (w,f,c) indicates walls, floor, and ceiling

<sup>b</sup> (e,p,v) indicates electrical, piping, and ventilation

**Table 5.4**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 1 (Control zone 5)				
- Decon/Dismantle <sup>(a)</sup> equipment	1848	100	\$21.97	\$2,197.00
- Ventilation (Removal)	40 (ft)	40	\$35.00	\$1,400.00
- Supplies	—	—	—	\$2,000.00
- Survey/H.P. Coverage	1848	100	\$24.85	\$2,485.00
- H.P. Support	1848	10	\$50.90	\$509.00
- Craft	—	20	\$35.00	\$700.00
Building 2 (Control Zone 1)				
- Decon/Dismantle <sup>(a)</sup> equipment	4800	240	\$21.97	\$5,272.80
- Ventilation (Removal)	200 (ft)	40	\$35.00	\$1,400.00
- Supplies	—	—	—	\$2,500.00
- Survey/H.P. Coverage	4800	240	\$24.85	\$5,964.00
- H.P. Support	4800	30	\$50.90	\$1,527.00
- Craft	—	40	\$35.00	\$1,400.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 2 (Control zone 2)				
- Decon/Dismantle <sup>(a)</sup> equipment	1152	85	\$21.97	\$1,867.45
- Ventilation (Removal)	100 (ft)	40	\$35.00	\$1,400.00
- Supplies	—	—	—	\$3,000.00
- Survey/H.P. Coverage	1152	85	\$24.85	\$2,112.25
- H.P. Support	1152	10	\$50.90	\$509.00
- Craft	—	40	\$35.00	\$1,400.00
Building 2 (Control Zone 3)				
- Decon/Dismantle <sup>(a)</sup> equipment	780	46	\$21.97	\$1,010.62
- Ventilation (Removal)	20 (ft)	30	\$35.00	\$1,050.00
- Supplies	—	—	—	\$2,000.00
- Survey/H.P. Coverage	780	46	\$24.85	\$1,143.10
- H.P. Support	780	10	\$50.90	\$509.00
- Craft	—	20	\$35.00	\$700.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 2 (Control zone 4A)				
- Decon/Dismantle <sup>(a)</sup> equipment	1640	120	\$21.97	\$2,636.40
- Ventilation (Removal)	20 (ft)	30	\$35.00	\$1,050.00
- Supplies	—	—	—	\$3,000.00
- Survey/H.P. Coverage	1640	120	\$24.85	\$2,982.00
- H.P. Support	1640	20	\$50.90	\$1,018.00
- Craft	—	40	\$35.00	\$1,400.00
Building 2 (Control Zone 4B)				
- Decon/Dismantle <sup>(a)</sup> equipment	2056	115	\$21.97	\$2,526.55
- Ventilation (Removal)	20 (ft)	40	\$35.00	\$1,400.00
- Supplies	—	—	—	\$5,000.00
- Survey/H.P. Coverage	2056	115	\$24.85	\$2,857.75
- H.P. Support	2056	20	\$50.90	\$1,018.00
- Craft	—	50	\$35.00	\$1,750.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 106)				
- Decon/Dismantle <sup>(a)</sup> equipment	2148	120	\$21.97	\$2,636.40
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	—	—	—	\$2,000.00
- Survey/H.P. Coverage	2148	120	\$24.85	\$2,982.00
- H.P. Support	1848	10	\$50.90	\$509.00
- Craft	—	15	\$35.00	\$525.00
Building 5 (Room 218)				
- Decon/Dismantle <sup>(a)</sup> equipment	1,292	75	\$21.97	\$1,647.75
- Ventilation (Removal)	100 (ft)	40	\$35.00	\$1,400.00
- Supplies	—	—	—	\$1,500.00
- Survey/H.P. Coverage	1,292	75	\$24.85	\$1,863.75
- H.P. Support	1,292	15	\$50.90	\$763.50
- Craft	—	20	\$35.00	\$700.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 221)				
- Decon/Dismantle <sup>(a)</sup> equipment	1080	60	\$21.97	\$1,318.20
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	—	—	—	\$3,000.00
- Survey/H.P. Coverage	1080	60	\$24.85	\$1,491.00
- H.P. Support	1848	10	\$50.90	\$509.00
- Craft	—	40	\$35.00	\$1,400.00
Building 5 (Room 224A)				
- Decon/Dismantle <sup>(a)</sup> equipment	2176	120	\$21.97	\$2,636.40
- Ventilation (Removal)	75 (ft)	30	\$35.00	\$1,050.00
- Supplies	—	—	—	\$2,500.00
- Survey/H.P. Coverage	2176	120	\$24.85	\$2,982.00
- H.P. Support	1848	20	\$50.90	\$1,018.00
- Craft	—	10	\$35.00	\$350.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 224; C, D. G. H)				
- Decon/Dismantle <sup>(a)</sup> equipment	3088	180	\$21.97	\$3,954.60
- Ventilation (Removal)	100 (ft)	40	\$35.00	\$1,400.00
- Supplies	----	----	----	\$5,000.00
- Survey/H.P. Coverage	3088	180	\$24.85	\$4,473.00
- H.P. Support	1848	20	\$50.90	\$1,018.00
- Craft	----	50	\$35.00	\$1,750.00
Building 5 (Room 225)				
- Decon/Dismantle <sup>(a)</sup> equipment	3240	180	\$21.97	\$3,954.60
- Ventilation	0 (ft)	0	\$35.00	\$0.00
- Supplies	----	----	----	\$4,000.00
- Survey/H.P. Coverage	3240	180	\$24.85	\$4,473.00
- H.P. Support	3240	10	\$50.90	\$509.00
- Craft	----	20	\$35.00	\$700.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.



**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 228)				
- Decon/Dismantle <sup>(a)</sup> equipment	4540	200	\$21.97	\$4,394.00
- Ventilation (Removal)	140 (ft)	40	\$35.00	\$1,400.00
- Supplies	—	—	—	\$5,000.00
- Survey/H.P. Coverage	4540	200	\$24.85	\$4,970.00
- H.P. Support	4540	20	\$50.90	\$1,018.00
- Craft	—	50	\$35.00	\$1,750.00
Building 5 (Room 231)				
- Decon/Dismantle <sup>(a)</sup> equipment	1020	55	\$21.97	\$1,208.35
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	—	—	—	\$1,000.00
- Survey/H.P. Coverage	1020	55	\$24.85	\$1,366.75
- H.P. Support	1020	10	\$50.90	\$509.00
- Craft	—	10	\$35.00	\$350.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 231A)				
- Decon/Dismantle <sup>(a)</sup> equipment	980	40	\$21.97	\$878.80
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	----	----	----	\$1,250.00
- Survey/H.P. Coverage	980	40	\$24.85	\$994.00
- H.P. Support	980	10	\$50.90	\$509.00
- Craft	----	10	\$35.00	\$350.00
Building 5 (Room 232)				
- Decon/Dismantle <sup>(a)</sup> equipment	1120	50	\$21.97	\$1,098.50
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	----	----	----	\$2,000.00
- Survey/H.P. Coverage	1120	50	\$24.85	\$1,242.50
- H.P. Support	1120	10	\$50.90	\$509.00
- Craft	----	10	\$35.00	\$350.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 232A and B)				
- Decon/Dismantle <sup>(a)</sup> equipment	9768	320	\$21.97	\$7,030.40
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	—	—	—	\$5,000.00
- Survey/H.P. Coverage	9768	320	\$24.85	\$7,952.00
- H.P. Support	9768	40	\$50.90	\$2,036.00
- Craft	—	40	\$35.00	\$1,400.00
Building 5 (Room 305)				
- Decon/Dismantle <sup>(a)</sup> equipment	1548	85	\$21.97	\$1,867.45
- Ventilation (Removal)	120 (ft)	40	\$35.00	\$1,400.00
- Supplies	—	—	—	\$2,000.00
- Survey/H.P. Coverage	1548	85	\$24.85	\$2,112.25
- H.P. Support	1548	10	\$50.90	\$509.00
- Craft	—	50	\$35.00	\$1,750.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 5 (Room 308)				
- Decon/Dismantle <sup>(a)</sup> equipment	740	40	\$21.97	\$878.80
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	-----	-----	-----	\$2,000.00
- Survey/H.P. Coverage	740	40	\$24.85	\$994.00
- H.P. Support	740	10	\$50.90	\$509.00
- Craft	-----	10	\$35.00	\$350.00
Building 5 (Room 309)				
- Decon/Dismantle <sup>(a)</sup> equipment	4240	320	\$21.97	\$7,030.40
- Ventilation (Removal)	259 (ft)	80	\$35.00	\$2,800.00
- Supplies	-----	-----	-----	\$11,000.00
- Survey/H.P. Coverage	4240	320	\$24.85	\$7,952.00
- H.P. Support	4240	45	\$50.90	\$2,290.50
- Craft	-----	110	\$35.00	\$3,850.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

**Table 5.4 (Cont.)**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 6 (Retention/Dilution Tanks)				
- Decon/Dismantle <sup>(a)</sup> equipment	—	300	\$21.97	\$6,591.00
- Ventilation (Removal)	0 (ft)	0	\$35.00	\$0.00
- Supplies	—	—	—	\$7,000.00
- Survey/H.P. Coverage	—	300	\$24.85	\$7,455.00
- H.P. Support	—	40	\$50.90	\$2,036.00
- Craft	—	360	\$35.00	\$12,600.00
Buildings (1, 1A, 2, 2A, 5, 6,) (Underground Piping)				
- Decon/Dismantle	—	575	\$21.97	\$12,632.75
- Supplies/equipment	—	—	—	\$100,000.00
- Survey/H.P. Coverage	—	300	\$24.85	\$7,455.00
- H.P. Support	—	120	\$50.90	\$6,108.00
- Craft	—	680	\$35.00	\$23,800.00

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, floor, and ceiling.

Subtotal		\$427,246.57
CONTINGENCY OF 25%		0.25
	Total	\$534,058.21

**Table 5.5**  
**Equipment and Supplies**  
(Table 4 of Appendix F, Reg. Guide 3.66)

Cost of equipment and supplies have been included in Table 5.3 "Cost for Surveying Non-contaminated Areas" and 5.4 "Cost for Decon/Dismantle of Radiological Areas" of this DFP. The types, quantity, and cost will depend on the work performed. Within the DFP, a total of \$181,750.00 has been included to cover the cost of equipment and supplies (e.g., smears, rags, HEPA units, strippable paint, soil removal/rigging equipment, etc.).

**Table 5.6**  
**Packaging, Shipping and Disposal of Radioactive Wastes**  
 (Table 5, 6, and 7 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Waste Type<sup>(a)</sup></u>	<u>Volume (ft<sup>3</sup>)</u>	<u>Cost<sup>(b)</sup></u>
1. Disposal of Radioactive Wastes			
Bldg 1 - Control zone 5	Solid	85	\$34,000.00
Bldg 2/2A			
- Control zone 1	Solid	100	\$40,000.00
- Control zone 2	Solid	100	\$40,000.00
- Control zone 3	Solid	25	\$10,000.00
- Control zone 4A	Solid	90	\$36,000.00
- Control zone 4B	Solid	210	\$84,000.00
Bldg 5			
- Room 106	Solid	10	\$4,000.00
- Room 218	Solid	20	\$8,000.00
- Room 221	Solid	10	\$4,000.00
- Room 224A	Solid	5	\$2,000.00
- Room 224 (C,D,G,H)	Solid	90	\$36,000.00
- Room 225	Solid	10	\$4,000.00
- Room 228	Solid	30	\$12,000.00
- Room 231	Solid	30	\$12,000.00
- Room 231A	Solid	5	\$2,000.00

<sup>(a)</sup> Indicates wood, metal, wallboard, concrete, floor tiles, etc.

<sup>(b)</sup> Cost based upon average of \$400/ft<sup>3</sup> of waste.

**Table 5.6 (Cont.)**  
**Packaging, Shipping and Disposal of Radioactive Wastes**  
 (Table 5, 6, and 7 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Waste Type<sup>(a)</sup></u>	<u>Volume (ft<sup>3</sup>)</u>	<u>Cost<sup>(b)</sup></u>
Bldg 5 (Cont.)			
- Room 232	Solid	10	\$4,000.00
- Room 232 A and B	Solid	10	\$4,000.00
- Room 305	Solid	10	\$4,000.00
- Room 308	Solid	30	\$12,000.00
- Room 309	Solid	20	\$8,000.00
- Room 320A	Solid	10	\$4,000.00
- Room 321	Solid	30	\$12,000.00
Bldg 6			
- Tanks (14)	Solid	180	\$72,000.00
Ancillary Areas			
- Piping	Solid	40	\$16,000.00
2. Packaging and Shipping - Bldg (1, 1A, 2, 2A, 5, 6)			
- Containers and Transportation	Solid	-----	\$10,000.00

Subtotal	\$474,000.00
CONTINGENCY OF 25%	.25
Total	\$592,500.00

<sup>(a)</sup> Indicates wood, metal, wallboard, concrete, floor tiles, etc.

<sup>(b)</sup> Cost based upon average of \$400/ft<sup>3</sup> of waste.



**Table 5.7**  
**Restoration of Contaminated Areas on Facility Ground**  
(Table 8 of Appendix F, Reg. Guide 3.66)

The estimates of the preceding tables include costs for remediating the facilities to release for unrestricted use. Therefore, necessary costs are included and additional costs for restoration are not applicable.

**Table 5.8**  
**Final Radiation Survey**  
(Table 9 of Appendix F, Reg. Guide 3.66)

A total of 10,889 man-hours have been estimated in this DFP for surveying which includes the final radiation survey. Also, 780 man-hours have been included in the estimates for supervision support of the final radiation survey. See Tables 5.3 "Cost for Surveying Non-contaminated Areas" and 5.4 "Cost for Decon/Dismantle of Radiological Areas."

**Table 5.9**  
**Site Stabilization, Long-term Surveillance**  
(Table 10 of Appendix F, Reg. Guide 3.66)

The estimates of the preceding tables include costs for remediating the facilities to release for unrestricted use. Therefore, additional costs for site stabilization or long term surveillance are not applicable.

## **6.0 FINANCIAL ASSURANCE METHOD**

### **A. Standby Trust Agreement**

10 CFR 30.25(e) and 10 CFR 70.25(e) require that a description of the method of assuring funds for decommissioning be contained in each decommissioning funding plan. In References (6 & 7), CE submitted to the NRC the previous financial assurance for decommissioning associated with License No. 06-00217-06. An executed Standby Trust Agreement was included in that submittal. Combustion Engineering continues to use the surety method permitted by 10 CFR 30.25(f)(2) and 10 CFR 70.25(f)(2); the Standby Trust Agreement of References(6 & 7) continues to be valid.

### **B. Surety Bond**

The attachment to this Decommissioning Funding Plan provides an appropriately executed rider to the existing surety bond, as submitted to the NRC by Reference (6), to increase its limit from \$750,000 to \$2,000,000.00. This amount is based on and consistent with the cost estimates for decommissioning summarized in Table 4.2 and detailed in Section 5.0 herein.

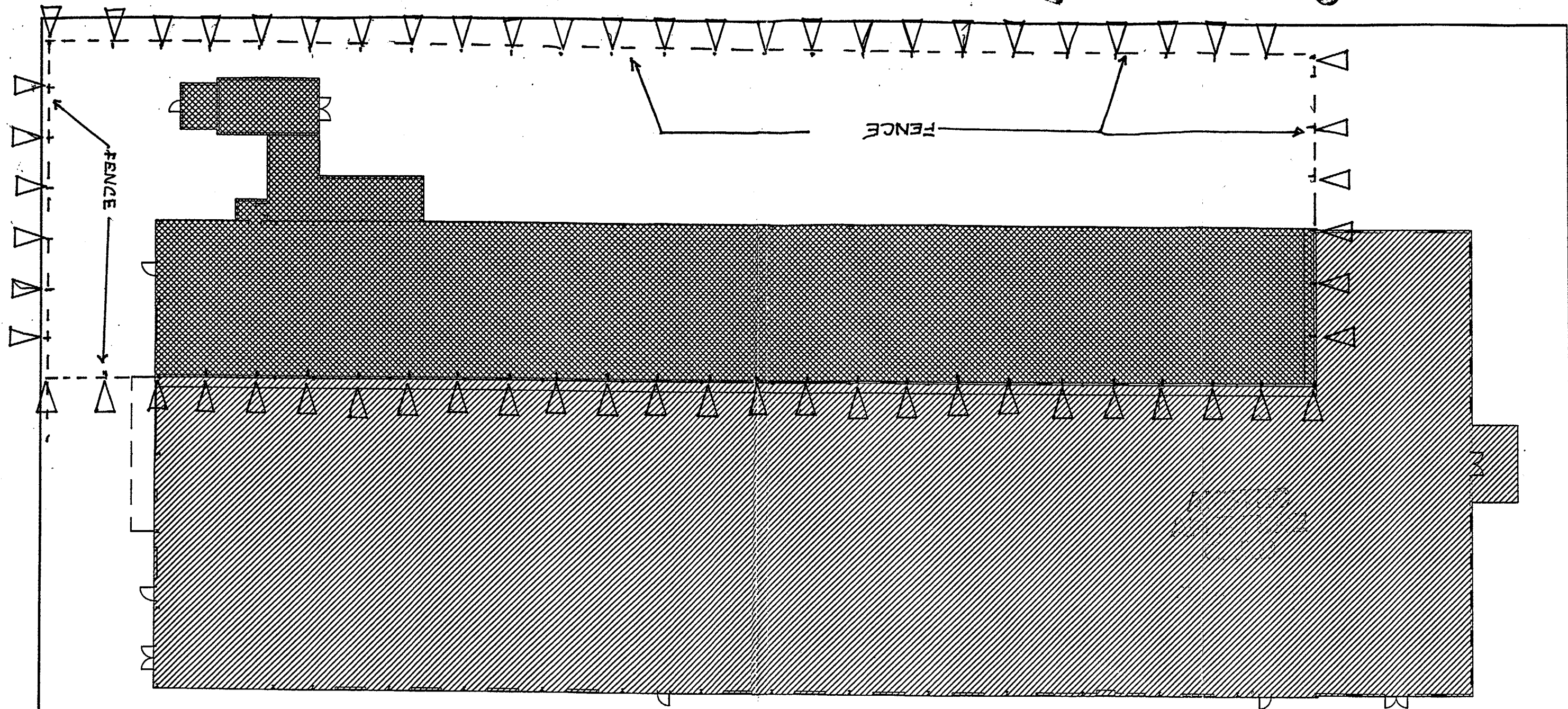
### **C. Cost Estimate and Funding Adjustments**

The estimated decommissioning costs are based on 1995 dollars. 10 CFR 70.25(e) and 10 CFR 30.35(e) require that decommissioning cost estimates and associated funding levels be adjusted "periodically over the life of the facility." CE will adjust the DFP upon the next license renewal.



## 7.0 REFERENCES


1. USNRC Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors", June 1974
2. "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Material", USNRC, Division of Industrial and Medical Nuclear Safety, April 1993
3. NRC Branch Technical Position: "Disposal or On-Site Storage of Residual Thorium or Uranium (NRC, 1981, 46FR52061)
4. "Standard Format and Content Guide for Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72", USNRC, NUREG-1336, Rev. 1 (August 1989)
5. "Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72", USNRC, Regulatory Guide 3.66 (Task DG-3002), (June 1990)
6. CE (J. F. Conant) letter to NRC (L. H. Bettenhausen), LD-90-049, dated July 19, 1990, "Financial Assurance for Decommissioning"

**ATTACHMENT I**  
**RIDER TO INCREASE SURETY BOND**



**BUILDING 17 - FIRST FLOOR PLAN**

-  CONTAMINATION CONTROLLED / RESTRICTED AREA
-  UNRESTRICTED AREA

 - TLD LOCATIONS - APPROXIMATE

9610070316-1

**CHH** CLOHESSY HERLANDS & HARRIS, LLC  
 PO Box 95  
 Simsbury, CT 06070-0095  
 860-651-3777  
 Fax 860-651-7316



ABB COMBUSTION ENGINEERING NUCLEAR OPERATIONS  
 FIELD SERVICES

BUILDING 17  
 WINDSOR, CONNECTICUT

DATE	04/24/1996
SCALE	N.T.S.
PROJECT NUMBER	95208
DRAWN BY	WON
REVISION:	3

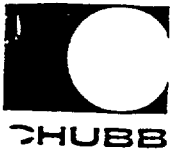
**Table 4.2**  
**Summary of DFP Cost Estimates**

Description	Table Herein	Table of Appendix F, Reg. Guide 3.66	Cost Estimate Summary
Unit Cost for Workers	Table 5.1	Table 2	(included)
Planning and Preparation	Table 5.2	Table 1	\$206,110.90
Cost for Surveying Non-Contaminated Areas	Table 5.3	Table 3	\$ 91,135.50
Cost for Decon/Dismantle of Radiological Areas	Table 5.4-A Table 5.4-B	Table 3 Table 3	\$88,267.42 \$185,955.88
Cost for Decon/Dismantle of Piping System Bldg. 17	Table 5.4-c	Table 5.7 of NUREG 1754 Addendum 1	\$25,746.95
Equipment and Supplies	Table 5.5	Table 4	(included)
Packaging, Shipping, and Disposal of Radioactive Waste	Table 5.6	Table 5, 6, and 7	\$620,000.00
Restoration	Table 5.7	Table 8	(included)
Final Radiation Survey	Table 5.8	Table 9	(included)
Stabilization	Table 5.9	Table 10	(not applicable)
Total			\$1,217,216.70

+ 25% Contingency      \$304,304.18

**GRAND TOTAL      \$1,521,520.90**





# CHUBB GROUP OF INSURANCE COMPANIES

100 William Street, New York, New York 10038-4568

## FEDERAL INSURANCE COMPANY

RIDER to be attached to and form a part  
of Bond No. ~~15126698~~ wherein  
Combustion Engineering, Inc.

is named as Principal, and FEDERAL  
INSURANCE COMPANY, as Surety, in favor of  
U.S. Nuclear Regulatory Commission

in the amount of \$750,000.00  
effective May 24, 1990

-----  
IT IS HEREBY STIPULATED AND AGREED THAT effective May 24, 1995  
said bond is hereby amended as follows:

The bond shall be increased:

From: Seven hundred fifty thousand & 00/100 (\$750,000.00)

To: Two million & 00/100 (\$2,000,000.00)

and that Combustion Engineering, Inc.  
shall be held and firmly bound and hereby binds itself, its  
successors and assigns, as Principal, and FEDERAL INSURANCE COMPANY  
hereby binds itself, its successors and assigns, as Surety, in  
accordance with the terms, provisions and conditions of said bond  
as so amended.

IN WITNESS WHEREOF, the said Principal and said Surety have  
signed or caused this Rider to be duly signed and their respective  
seals to be hereunto affixed this 12th day of May  
19 95.

Combustion Engineering, Inc.

By: 

Assistant Secretary

FEDERAL INSURANCE COMPANY

By: 

Vincent Moy  
Attorney-in-fact

POWER OF ATTORNEY  
FEDERAL INSURANCE COMPANY  
ATTN: SURETY DEPARTMENT  
15 Mountain View Road, Warren, NJ 07059  
(908) 580-2000

Know all Men by these Presents, That FEDERAL INSURANCE COMPANY, an Indiana Corporation, has constituted and appointed, and does hereby  
create and appoint Vincent Moy, William J. Paterno and Catherine Rosano of New York, New York -----

each its true and lawful Attorney-in-Fact to execute under such designation in its name and to affix its corporate seal to and deliver for and on its behalf as  
surety thereon or otherwise, bonds or obligations (other than Bail Bonds) given or executed in the course of its business, and any instruments amending or  
altering the same, and consents to the modification or alteration of any instruments referred to in said bonds or obligations.

In Witness Whereof, the said FEDERAL INSURANCE COMPANY has, pursuant to its By-Laws, caused these presents to be signed by its Vice-President and Assistant Secretary and its corporate seal to be  
hereby affixed this 21st day of June 19 94



Kenneth C. Wendel

Assistant Secretary

FEDERAL INSURANCE COMPANY

By

Gerardo G. Maunz

Vice-President

STATE OF NEW JERSEY  
County of Somerset

SS.

On this 21st day of June 19 94, before me personally came Kenneth C. Wendel to me known and by me known to be Assistant Secretary of FEDERAL INSURANCE  
COMPANY, the corporation described in and which executed the foregoing Power of Attorney, and the said Kenneth C. Wendel being by me duly sworn, did depose and say that he is Assistant Secretary of FEDERAL  
INSURANCE COMPANY and knows the corporate seal thereof; that the seal affixed to the foregoing Power of Attorney is such corporate seal and was thereto affixed by authority of the By-Laws of said Company,  
and that he signed said Power of Attorney as Assistant Secretary of said Company by like authority; and that he is acquainted with Gerardo G. Maunz and knows him to be the Vice-President of said Company,  
and that the signature of said Gerardo G. Maunz subscribed to said Power of Attorney is in the genuine handwriting of said Gerardo G. Maunz and was thereto subscribed by authority of said By-Laws and in  
his presence.

Notarial Seal



STATE OF NEW JERSEY  
County of Somerset

SS.

Acknowledged and Sworn to before me  
on the date above written

Christ A. Scarone  
Notary Public

CERTIFICATION

CHRIST A. SCARONE  
Notary Public, State of New Jersey  
My Comm. Expires October 2, 1994

The undersigned, Assistant Secretary of FEDERAL INSURANCE COMPANY, do hereby certify that the following is a true excerpt from the By-Laws of the said Company as adopted by its Board of Directors  
on June 13, 1974 and most recently amended March 2, 1990 and that this By-Law is in full force and effect.

ARTICLE XVIII

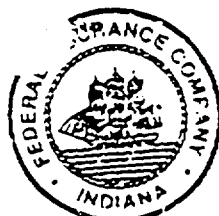
Section 2. All bonds, undertakings, contracts and other instruments other than as above for and on behalf of the Company which it is authorized by law or its charter to execute, may and shall be executed  
in the name and on behalf of the Company either by the Chairman or the Vice-Chairman or the President or a Vice-President, jointly with the Secretary or an Assistant Secretary, under their respective  
designations, except that any one or more officers or attorneys-in-fact designated in any resolution of the Board of Directors or the Executive Committee, or in any power of attorney executed as provided  
for in Section 3 below, may execute any such bond, undertaking or other obligation as provided in such resolution or power of attorney.

Section 3. All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the Vice-Chairman or the President or a Vice-  
President or an Assistant Vice-President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature  
of each of the following officers: Chairman, Vice Chairman, President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary and the seal of the Company may be affixed by facsimile  
to any power of attorney or to any certificate relating thereto appointing Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory  
in the nature thereof, and any such power of attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by  
such facsimile signature and facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached.

Further certify that said FEDERAL INSURANCE COMPANY is duly licensed to transact fidelity and surety business in each of the States of the United States of America, District of Columbia, Puerto Rico, and each of the  
Provinces of Canada with the exception of Prince Edward Island; and is also duly licensed to become sole surety on bonds, undertakings, etc., permitted or required by the law.

The undersigned Assistant Secretary of FEDERAL INSURANCE COMPANY do hereby certify that the foregoing Power of Attorney is now in full force and effect.

Given under my hand and the seal of said Company at Warren, N.J. this 12th day of May 19 95



Assistant Secretary

STATE OF NEW YORK )  
COUNTY OF NEW YORK )

On this 12th day of May, 19 95 before me personally came  
Vincent Moy who, being by me duly sworn, did depose and say  
that he/she is an Attorney-In-Fact of the **FEDERAL INSURANCE COMPANY**, and knows the  
corporate seal thereof, that the seal affixed to said annexed instrument is such corporate seal, and  
was thereto affixed by authority of the Power of Attorney of said Company, of which a Certified  
Copy is hereto attached, and that he/she signed said Instrument as an Attorney-In-Fact of said  
Company by like authority

Acknowledged and Sworn to before me  
on the date above written

ANA W. OLIVERAS  
NOTARY PUBLIC, State of New York  
No. 03-497617a  
Qualified in Bronx County  
Commission Expires Jan. 14, 19 97



## STATEMENT ASSETS, LIABILITIES AND SURPLUS TO POLICYHOLDERS

Statutory Basis

DECEMBER 31, 1993

(in thousands of dollars)

ASSETS		LIABILITIES AND SURPLUS TO POLICYHOLDERS	
Cash.....	\$ 5,253	Outstanding Losses and Loss Expenses.....	\$4,425,194
United States Treasury Bonds.....	217,699	Unearned Premiums.....	990,348
United States Government and Federal Agency Guaranteed Bonds.....	189,859	Provision for Reinsurance.....	51,972
State and Municipal Bonds.....	3,148,953	Loss Portfolio Transfer.....	(140,854)
Other Bonds.....	413,945	Other Liabilities.....	530,812
Stocks.....	325,509	TOTAL LIABILITIES.....	5,857,432
Short Term Investments.....	713,720		
Other Invested Assets.....	158,527		
TOTAL INVESTMENTS.....	5,184,475		
Investments in Affiliates:			
Vigilant Insurance Company.....	317,750	Capital Stock.....	13,957
Great Northern Insurance Company.....	111,566	Paid-In Surplus.....	472,686
Pacific Indemnity Company.....	543,069	Unassigned Funds.....	908,292
Bellemead Development Corporation.....	412,569	Unrealized Appreciation of Investments.....	400,795
CC Canada Holdings Ltd.....	77,043		
Other Affiliates.....	94,840	SURPLUS TO POLICYHOLDERS.....	1,784,060
Net Premiums Receivable.....	447,232		
Other Assets.....	292,818	TOTAL LIABILITIES AND SURPLUS TO POLICYHOLDERS.....	\$7,451,492
TOTAL ADMITTED ASSETS.....	\$7,451,492		

Investments are valued in accordance with requirements of the National Association of Insurance Commissioners.  
Investments valued at \$16,745 are deposited with government authorities as required by law.


State, County &amp; City of New York, - ss

Richard E. Light, Assistant Secretary of the Federal Insurance Company being duly sworn, deposes and says that the foregoing Statement of Assets, Liabilities and Surplus to Policyholders of said Federal Insurance Company on December 31, 1993 is true and correct and is a true abstract of the Annual Statement of said Company as filed with the Secretary of the Treasury of the United States for the 12 months ending December 31, 1993.

Subscribed and sworn to before me  
this \_\_\_\_\_ day of \_\_\_\_\_, 1994.

  
Notary Public

SELDON L. SPORN  
Notary Public, State of New York  
NO. 11-48523  
Qualified to Notary Public  
Commission Expires December 3, 1994

  
Assistant Secretary

**Combustion Engineering, Inc.**

**2000 Day Hill Road  
Windsor, CT 06095-0500**

**Decommissioning  
Funding Plan**

**Part 2  
Building 17**

**License No. 06-00217-06**

**Docket No. 030-03754**

# DECOMMISSIONING FUNDING PLAN

## TABLE OF CONTENTS

1.0	INTRODUCTION .....	3
2.0	SCOPE .....	3
3.0	FACILITY DESCRIPTION.....	3
3.1	Building 17.....	3
4.0	DECOMMISSIONING CRITERIA.....	6
4.1	Residual Contamination Criteria .....	6
4.2	Salvage .....	6
4.3	Low Level Waste.....	6
4.4	Estimation Methodology.....	6
4.5	Duration of Decommissioning .....	7
4.6	Decontamination Methodology.....	7
5.0	DECOMMISSIONING COST ESTIMATES .....	11
6.0	FINANCIAL ASSURANCE METHOD.....	22
7.0	REFERENCES .....	23

## 1.0 INTRODUCTION

This Decommissioning Funding Plan (DFP) is pursuant to 10 CFR 70.25 and 30.35 and contains the information required by 10 CFR 70.25(e) and 10 CFR 30.35(e). This DFP consists of seven parts: Introduction, Scope, Facility Description, Decommissioning Criteria, Decommissioning Cost Estimates, Financial Assurance Method and References.

## 2.0 SCOPE

This Decommissioning Funding Plan is for the Combustion Engineering, Inc. (CE), Type A Broad Scope License No. 06-00217-06 for facilities located at 2000 Day Hill Road, Windsor, Connecticut. This part of the Plan includes Building 17.

## 3.0 FACILITY DESCRIPTION

Building #17 is the former Nuclear Fuel Manufacturing Facility. The building consists of three (3) bays, A, B, and C. This part of the decommissioning plan addresses primarily Bay C and its environs, primarily because an extensive remediation of the building took place between 1993 and 1995. Bay C is currently an empty area 300ft x 40ft x 30ft. The floor is scarified concrete, the walls are concrete cinder block, which have been cleaned. The contamination levels on the floor and walls are generally below the release criteria set forth in Table 4.1. The roof and its attendant joists are contaminated to a level exceeding the release criteria set forth in Table 4.1. A HEPA filtered, exhaust fan unit is the only piece of equipment left in Bay C. It is expected that this unit will be used for byproduct operations once reconstruction is completed. The intent is to introduce byproduct material into Bay C and perform operations similar to the ones being carried out in Buildings 2 & 2A.

The decommissioning costs for this building will be similar to the costs for buildings 2/2A (see Table 5.4 pages 18-21 of DFP Part 1) for byproduct material. The additional (i.e. "leftover") costs will be for the decontamination or dismantlement of Bay C, the removal of contaminated piping associated with the building, and final release surveys for uranium and byproduct material.

## **4.0 DECOMMISSIONING CRITERIA**

This Decommissioning Funding Plan is for the Type A Broad Scope license for CE's Building 17 facilities at 2000 Day Hill Road, Windsor, CT, License No. 06-00217-06 Docket No. 030-03754.

### **4.1 Residual Contamination Criteria**

Cost estimates were based on the assumption that facilities and equipment would be released for unrestricted use when residual contamination met the criteria established in Regulatory Guide 1.86, Reference (1), as shown in Table 4.1, which is consistent with "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Material", Reference (2). Estimates are further based on the assumption that soils will be free released according to NRC Branch Technical Position: "Disposal or On-Site Storage of Residual Thorium or Uranium", Reference (3).

### **4.2 Salvage**

The salvage value of any material or equipment was not included in this DFP. Likewise, the costs associated with moving equipment to the Hematite Missouri Fuel Manufacturing Plant or CE's Southeast Nuclear Service Center prior to decommissioning are beyond the scope of this plan.

### **4.3 Low Level Waste**

This plan assumes that a Low Level Waste (LLW) burial site will be available to bury material and equipment that does not meet free release criteria. Also included is the projected burial cost and surcharges, totaling an average of \$400/ft<sup>3</sup>, for LLW to be buried and the cost for containers (B-25) and transportation.

### **4.4 Estimation Methodology**

Since Building 17 is under an approved Decommissioning Plan, it is Combustion Engineering's intent to maintain currently approved Decommissioning Funding Plan levels (i.e. \$2,000,000) that is bonded under License SNM-1067, in favor of the U.S. Nuclear Regulatory Commission, and will be maintained in a current status. A copy of the bond rider is enclosed.



Provisions have been made to include sufficient contingency funds in the cost estimates. Further revisions and refinements to the plan that may better define the cost estimates may also result in reduction of associated contingency funding.

Estimates provided in this Plan are shown in 1995 dollars. A summary of the cost estimates is given in Table 4.2. The details of the costs estimates are given in the tables of Section 5.0.

#### **4.5 Duration of Decommissioning**

Cost estimates are based on the assumption that the majority of the decontamination and decommissioning activities will be completed within two years of commencing.

#### **4.6 Decontamination Methodology**

Cost estimates are also based on the assumption that decontamination tasks will be completed using methodologies drawn from the following listing:

- 1) Hand Wiping: It is anticipated that the majority of the contaminated equipment and materials will be cleaned using hand wiping. This will involve manually cleaning equipment, structure, and/or material surfaces using rags, maslin, paper and/or abrasive pads and a cleaning solution such as Alconox or similar. Decontamination solutions will be carefully selected to ensure that mixed waste is not generated. This method has been selected because it is a simple and effective method for routine decontamination tasks and personnel are easily trained to safely use this technique. Rags, etc., used in these operations may be laundered and reused.
- 2) Hydrolasing: This methodology is an available option for removal of widespread areas of loose surface contamination. This method will only be utilized in an enclosed area that is set up specifically for hydrolasing. Specific allowances will be made for the recapture and recycling of contaminated water.
- 3) CO<sub>2</sub> Cleaning: This technology is an available option for surface cleaning by means of tiny, solidified pellets of CO<sub>2</sub>. The gaseous CO<sub>2</sub> is then collected by a suction line and passes through a HEPA filter. Advantages to this process include its effectiveness at cleaning intricate surfaces, its lack of physical surface damage, and its lack of secondary radioactive waste generation.

- 4) **Strippable Paint:** This material, commonly used in nuclear power plants, may have some applicability in two areas. First, it may be used to provide a removable, protective coating over decontaminated areas remaining in the vicinity of ongoing decontamination work. Second, it may be utilized to perform actual decontamination tasks on large smooth surfaces such as metal sheets or similar. If used, it is intended that, following its removal, the paint may be incinerated in an approved facility, thus reducing radioactive waste burial volumes.
- 5) **Abrasive Media Cleaning:** This process utilizes either sponge-like material, sand, or grit accelerated by high pressure air to effect controlled decontamination of contaminated surfaces. These media have the advantage of being reusable, to a degree. When exhausted, the sponge material may be incinerated in an approved facility, resulting in relatively small volumes of low level waste. The sand and/or grit will be disposed of as low level radioactive waste if it exceeds the criteria listed in Reference (3).
- 6) **Material Surface Removal:** In cases where hand wiping or other surface cleaning methods are insufficient to remove contaminants present, removal of material surfaces may be required. For tools, equipment, and other metal objects, grinders may be utilized to remove contaminants that would otherwise be considered fixed contamination. This will avoid the necessity of disposing of large inventories of materials as radioactive waste. For contaminated structural materials such as concrete floors and walls, scabblers and scarifiers may be utilized to remove contaminated surface from those materials. To the extent practical, engineering controls will be used to reduce aerosols that can result from scabbling and/or scarifying operations. Scabbling has been proven successful in a number of areas and buildings during recent decontamination projects.

**Table 4.1**  
**Acceptable Surface Contamination Levels**

NUCLIDE <sup>a</sup>	AVERAGE <sup>b c</sup>	MAXIMUM <sup>b d</sup>	REMOVABLE <sup>b e</sup>
U-nat, U-235, U-238, and associated decay products	5,000 dpm $\alpha/100\text{cm}^2$	15,000 dpm $\alpha/100\text{cm}^2$	1,000 dpm $\alpha/100$ $\text{cm}^2$
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I- 129	100 dpm/100cm <sup>2</sup>	300 dpm/100cm <sup>2</sup>	20 dpm/100cm <sup>2</sup>
Th-nat, Th-232, Sr-90 Ra-223, Ra-224, U-232 I-126, I-131, I-133	1000 dpm/100cm <sup>2</sup>	3000 dpm/100cm <sup>2</sup>	200 dpm/100cm <sup>2</sup>
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5000 dpm $\beta\gamma/100\text{cm}^2$	15,000 dpm $\beta\gamma/100\text{cm}^2$	1000 dpm $\beta\gamma/100\text{cm}^2$

<sup>a</sup> Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

<sup>b</sup> As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

<sup>c</sup> Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

<sup>d</sup> The maximum contamination level applies to an area of not more than 100 cm<sup>2</sup>.

<sup>e</sup> The amount of removable radioactive material per 100 cm<sup>2</sup> of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

**Table 4.2**  
**Summary of DFP Cost Estimates**

Description	Table Herein	Table of Appendix F, Reg. Guide 3.66	Cost Estimate Summary
Unit Cost for Workers	Table 5.1	Table 2	(included)
Planning and Preparation	Table 5.2	Table 1	\$123,077.00
Cost for Surveying Non-Contaminated Areas	Table 5.3	Table 3	\$ 43,980.00
Cost for Decon/Dismantle of Radiological Areas	Table 5.4-A Table 5.4-B	Table 3 Table 3	\$ 84,138.00 \$158,580.00
Equipment and Supplies	Table 5.5	Table 4	(included)
Packaging, Shipping, and Disposal of Radioactive Waste	Table 5.6	Table 5, 6, and 7	\$620,000.00
Restoration	Table 5.7	Table 8	(included)
Final Radiation Survey	Table 5.8	Table 9	(included)
Stabilization	Table 5.9	Table 10	(not applicable)
		Total	\$1,029,775.00

+25% Contingency      \$ 257,443.75

**GRAND TOTAL      \$1,287,218.75**

**SECTION 5.0  
DECOMMISSIONING  
COST ESTIMATES**

**Table 5.1**  
**Unit Cost for Workers**  
(Table 2 of Appendix F, Reg. Guide 3.66)

<u>Classification</u>	<u>\$/Hour</u>
Project Manger	\$50.90
Decontamination Technicians	
Supervisor	\$37.41
Senior	\$24.16
Junior	\$21.97
Health Physics Technicians	
Supervisor	\$41.70
Senior	\$31.90
Junior	\$24.85
Health Physicist	\$50.90
Engineer	\$55.55
Clerical	\$10.96
Labor	\$22.00
Craft	\$35.00

Note: Wage rates are from cognizant services companies and include overhead expenses.

**Table 5.2**  
**Planning and Preparation**  
 (Table 1 of Appendix F, Reg. Guide 3.66)

1. Preparation of Documentation for Regulatory Agencies

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	200	\$50.90	\$10,180.00
Project Manager	80	\$50.90	\$4,072.00
Clerical	200	\$10.96	\$2,192.00
Total			\$16,444.00

2. Submission of Decommissioning Plan to NRC when required by 10 CFR 30

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	600	\$50.90	\$30,540.00
Project Manager	100	\$50.90	\$ 5,090.00
Clerical	400	\$10.96	\$4,384.00
Total			\$40,014.00

3. Development of Work Plans

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	250	\$50.90	\$12,725.00
Project Manager	80	\$50.90	\$4,072.00
Clerical	200	\$10.96	\$2,192.00
Total			\$18,989.00

**Table 5.2 (Cont.)**  
**Planning and Preparation**  
 (Table 1 of Appendix F, Reg. Guide 3.66)

4. Procurement of Special Equipment

No additional cost associated with this item, as we will have all necessary equipment from the operational phase.

5. Staff Training

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	40	\$50.90	\$2,036.00
Project Manager	0	\$50.90	\$0.00
Clerical	100	\$10.96	\$1,096.00
H.P. Supervisor	200	\$41.70	\$ 8,340.00
Total			\$11,472.00

6. Characterization of Radiological Condition of Facility

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	100	\$50.90	\$5,090.00
Project Manager	100	\$50.90	\$5,090.00
Clerical	100	\$10.96	\$1,096.00
H.P. Supervisor	200	\$41.70	\$8,340.00
Total			\$19,616.00



**Table 5.2 (Cont.)**  
**Planning and Preparation**  
 (Table 1 of Appendix F, Reg. Guide 3.66)

7. Other

<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
H.P. Engineer	100	\$50.90	\$ 5090.00
Project Manager	100	\$50.90	\$ 5090.00
Clerical	100	\$10.96	\$2,192.00
H.P. Supervisor	200	\$41.70	\$ 4,170.00
Total			\$16,542.00

**Total \$123,077.00**

**Table 5.3**  
**Cost for Surveying Non-contaminated Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

3. Cost of gridding /surveying non-contaminated areas.

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
17	66,000	600	\$22.00	\$13,200.00

4. Cost of Instrumentation support and supplies.

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
17	---	100	\$31.90	\$3,190.00
Supplies	---	---	---	\$5,000.00

5. Cost for collecting and analyzing volumetric samples

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
17	---	100	\$50.90	\$5,090.00
Grid layout		600	\$22.00	\$13,200.00
Collecting	---	150	\$22.00	\$3,300.00
Analyses (100 @ \$60 each)	---	---	---	\$6,000.00

**Total \$ 43,980.00**

**Table 5.4-A**  
**Cost for Decon/Dismantle of Radiological Areas**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)<sup>(b)</sup></u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 17 ( Control Zones).				
- Decon/Dismantle <sup>(a)</sup> equipment	10,420	606	\$21.97	\$13,313.82
- Ventilation (Removal)	500(ft)	250	\$35.00	\$8,750.00
- Supplies	—	—	—	\$20,000.00
- Survey/H.P. Coverage **	26,400	970	\$24.85	\$24,104.50
- H.P. Support**	26,400	144	\$50.90	\$7,329.60
- Craft		—	\$35.00	\$10,640.00
Total				\$84,137.92

<sup>(a)</sup> Indicates hoods, benches, walls, ceiling, etc.

<sup>(b)</sup> Indicates walls, and floor only

\*\* Indicates floor and walls only

**Table 5.4 - B**  
**Cost for Decon/ Dismantle of Radiological Area**  
 (Table 3 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Building 17 (Dismantle Structure)				
- Decon/Dismantle <sup>(a)</sup>	38,400	3,200	\$21.97	\$70,340.00
- Supplies	-----	-----	-----	\$20,000.00
- Survey/H.P. Coverage	38,400	800	\$24.85	\$19,880.00
- H.P. Support	38,400	400	\$50.90	\$20,360.00
- Craft	38,400	800	\$35.00	\$28,000.00
			Total	\$158,580.00

<sup>(a)</sup> Indicates: Floor, Walls, and Roof

**Table 5.5**  
**Equipment and Supplies**  
(Table 4 of Appendix F, Reg. Guide 3.66)

Cost of equipment and supplies have been included in Table 5.3 "Cost for Surveying Non-contaminated Areas" and 5.4 "Cost for Decon/Dismantle of Radiological Areas" of this DFP. The types, quantity, and cost will depend on the work performed. Within the DFP, a total of \$45,000.00 has been included to cover the cost of equipment and supplies (e.g., smears, rags, HEPA units, strippable paint, soil removal/rigging equipment, etc.).

**Table 5.6**  
**Packaging, Shipping and Disposal of Radioactive Wastes**  
 (Table 5, 6, and 7 of Appendix F, Reg. Guide 3.66)

<u>Building</u>	<u>Waste Type<sup>(a)</sup></u>	<u>Volume (ft<sup>3</sup>)</u>	<u>Cost <sup>(b)</sup></u>
Disposal of Radioactive Wastes			
Building 17 - Control Zones	Solid	600	\$240,000
Building 17 - Structure**	Solid	3,500	\$350,000
Building 17 - Underground Piping	Solid	300	\$30,000
		Total	\$620,000.00

<sup>(a)</sup> Indicates wood, metal, wallboard, concrete, floor tiles, etc.

<sup>(b)</sup> Cost based upon average of \$400/ft<sup>3</sup> of byproduct waste and \$100/ft<sup>3</sup> of uranium bearing waste.

\*\* Includes all of the roof and portions of the main structure

**Table 5.7**  
**Restoration of Contaminated Areas on Facility Ground**  
(Table 8 of Appendix F, Reg. Guide 3.66)

The estimates of the preceding tables include costs for remediating the facilities to release for unrestricted use. Therefore, necessary costs are included and additional costs for restoration are not applicable.

**Table 5.8**  
**Final Radiation Survey**  
(Table 9 of Appendix F, Reg. Guide 3.66)

A total of 3,170 man-hours have been estimated in this DFP for surveying which includes the final radiation survey. Also, 544 man-hours have been included in the estimates for supervision support of the final radiation survey. See Tables 5.3 "Cost for Surveying Non-contaminated Areas" and 5.4 "Cost for Decon/Dismantle of Radiological Areas."



**Table 5.9**  
**Site Stabilization, Long-term Surveillance**  
(Table 10 of Appendix F, Reg. Guide 3.66)

The estimates of the preceding tables include costs for remediating the facilities to release for unrestricted use. Therefore, additional costs for site stabilization or long term surveillance are not applicable.

## **6.0 FINANCIAL ASSURANCE METHOD**

### **A. Standby Trust Agreement**

10 CFR 30.25(e) and 10 CFR 70.25(e) require that a description of the method of assuring funds for decommissioning be contained in each decommissioning funding plan. In References (6 & 7), CE submitted to the NRC the previous financial assurance for decommissioning associated with License No. 06-00217-06. An executed Standby Trust Agreement was included in that submittal. Combustion Engineering continues to use the surety method permitted by 10 CFR 30.25(f)(2) and 10 CFR 70.25(f)(2); the Standby Trust Agreement of References(6 & 7) continues to be valid.

### **B. Surety Bond**

The attachment to this Decommissioning Funding Plan provides an appropriately executed rider to the existing surety bond, as submitted to the NRC by Reference (6). This amount is based on and consistent with the cost estimates for decommissioning summarized in Table 4.2 and detailed in Section 5.0 herein and in Part 1.

### **C. Cost Estimate and Funding Adjustments**

The estimated decommissioning costs are based on 1995 dollars. 10 CFR 70.25(e) and 10 CFR 30.35(e) require that decommissioning cost estimates and associated funding levels be adjusted "periodically over the life of the facility." CE will adjust the DFP upon the next license renewal.

## 7.0 REFERENCES

1. USNRC Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors", June 1974
2. "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Material", USNRC, Division of Industrial and Medical Nuclear Safety, April 1993
3. NRC Branch Technical Position: "Disposal or On-Site Storage of Residual Thorium or Uranium (NRC, 1981, 46FR52061)
4. "Standard Format and Content Guide for Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72", USNRC, NUREG-1336, Rev. 1 (August 1989)
5. "Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72", USNRC, Regulatory Guide 3.66 (Task DG-3002), (June 1990)
6. CE (J. F. Conant) letter to NRC (L. H. Bettenhausen), LD-90-049, dated July 19, 1990, "Financial Assurance for Decommissioning"
7. Decommissioning Funding Plan Part 1 of License 06-00217-06.

**ATTACHMENT I**

**RIDER TO SURETY BOND FOR  
BUILDING 17**



# CHUBB GROUP OF INSURANCE COMPANIES

100 William Street, New York, New York 10038

## FEDERAL INSURANCE COMPANY

RIDER to be attached to and form a part of  
Bond No. 8126-69-74 wherein FEDERAL INSURANCE  
COMPANY is named Surety, on behalf of COMBUSTION  
ENGINEERING, INC. as Principal, in favor of  
U.S. NUCLEAR REGULATORY COMMISSION as Obligee,  
in the sum of \$750,000.00 dated May 24, 1990,  
effective May 24, 1990

-----  
IT IS HEREBY UNDERSTOOD AND AGREED that effective the 12th day of  
June, 1992 the penalty of this bond is INCREASED

FROM: Seven Hundred and Fifty Thousand and 00/100-----  
-----Dollars (\$750,000.00)

TO: Two Million and 00/100-----Dollars (\$2,000,000.00)  
as to losses occurring after said effective date.

Provided, however, that the liability of the Principal and Surety  
hereon shall not be cumulative or in any event exceed the revised  
bond amount referred to herein.

It is hereby stipulated and agreed that effective June 12, 1992  
said bond is hereby amended as follows:

That the BOND NUMBER of said bond be changed from 8126-69-74 to  
8126-79-74.

The attached bond shall be subject to all its agreements,  
limitations and conditions except as herein expressly modified.

Signed, sealed and dated this 12th day of June, 1992.

COMBUSTION ENGINEERING, INC.

BY: *J.F.M. Corcoran*

*J.F.M. Corcoran, Treasurer*

FEDERAL INSURANCE COMPANY

BY: *David B. Norris, Jr.*

*David B. Norris, Jr.,*  
Attorney-in-fact

Know all men by these Presents, That the FEDERAL INSURANCE COMPANY, 15 Mountain View Road, Warren, New Jersey, an Indiana Corporation constituted and appointed, and does hereby constitute and appoint David B. Norris, Jr., Richard G. Hight, Greg Truvilla, Edward J. Reilly, Tammy B. Noren, Barton S. Pitts, Anna Maria Lovecchio, Maria Cardigno, Helen Brown and Earnestine Porter of New York, New York-----


True and lawful Attorney-in-Fact to execute under such designation in its name and to affix its corporate seal to and deliver for and on its behalf; any and all bonds or obligations (other than Bail Bonds) given or executed in the course of its business, and any instruments amending or modifying the same, and consents to the modification or alteration of any instruments referred to in said bonds or obligations.


In Witness Whereof, the said FEDERAL INSURANCE COMPANY has, pursuant to its By-Laws, caused these presents to be signed by its Vice President and Assistant Secretary and its corporate seal hereto affixed this 21st day of February 1992

Corporate Seal



FEDERAL INSURANCE COMPANY  
By

  
Richard D. O'Connor  
Assistant Secretary

  
James D. Dixon  
Vice President


STATE OF NEW JERSEY  
County of Somerset } ss.

On the 21st day of February 1992, before me personally came Richard D. O'Connor to me known and by me known to be Assistant Secretary of the FEDERAL INSURANCE COMPANY, the corporation described in and which executed the foregoing Power of Attorney, and the said Richard D. O'Connor being by me duly sworn, did depose and say that he is Assistant Secretary of the FEDERAL INSURANCE COMPANY and knows the corporate seal thereof; that the seal affixed to the foregoing Power of Attorney is such corporate seal and was thereto affixed by authority of the By-Laws of said Company, and that he signed said Power of Attorney as Assistant Secretary of said Company by like authority; and that he is acquainted with James D. Dixon and knows him to be the Vice President of said Company, and that the signature of said James D. Dixon subscribed to said Power of Attorney is in the genuine handwriting of said James D. Dixon and was thereto subscribed by authority of said By-Laws in deponent's presence.

Notary Seal

Acknowledged and Sworn to before me  
on the date above written.



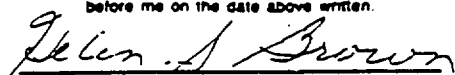
  
JANET A. SCARONI  
Notary Public, State of New Jersey  
No. 2001520  
Commission Expires October 2, 1994

### NOTARIAL ACKNOWLEDGEMENT

County of New York, ss.

On the 12 day of June 1992, before me personally came David B. Norris, Jr., to me known, who, being by me duly sworn, did depose and say that he is an Attorney-in-Fact of the FEDERAL INSURANCE COMPANY, the Corporation described in and which executed the annexed instrument; that he knows the corporate seal; that it was so affixed by order and authority of the Board of Directors of said corporation, and he signed his name thereto by like order and authority.

HELEN S. BROWN  
NOTARY PUBLIC, State of New York  
No. 31-4682129  
Qualifying in New York County  
Commission Expires December 31, 1992

Sworn to and Acknowledged  
before me on the date above written.  
  
(Notary's Signature, Description and Seal)

The undersigned, Assistant Secretary of the FEDERAL INSURANCE COMPANY, do hereby certify that the following is a true excerpt from the By-Laws of the said Company as adopted by its Board of Directors March 2, 1990 and that this By-Law is in full force and effect

# ARTICLE XVIII

Section 2 All bonds, underwritings, contracts and other instruments other than as above for and on behalf of the Company which it is authorized by law or its charter to execute may and shall be executed in the name and on behalf of the Company either by the Chairman or the Vice Chairman or the President or a Vice President, jointly with the Secretary or an Assistant Secretary under their respective designations, except that any one or more officers or attorneys-in-fact designated in any resolution of the Board of Directors or the Executive Committee, or in any power of attorney executed as provided for in Section 3 below, may execute any such bond, undertaking or other obligation as provided in such resolution or power of attorney

Section 3 All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the Vice Chairman or the President or a Vice President or an Assistant Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, Vice Chairman, President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary and the seal of the Company may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and underwritings and other writings obligatory in the nature thereof, and any such power of attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached."

I further certify that said FEDERAL INSURANCE COMPANY is duly licensed to transact fidelity and surety business in each of the States of the United States of America, District of Columbia, Puerto Rico, and in the Provinces of Canada with the exception of Prince Edward Island; and is also duly licensed to become sole surety on bonds, underwritings, etc., permitted or required by law

The undersigned Assistant Secretary of FEDERAL INSURANCE COMPANY, do hereby certify that the foregoing Power of Attorney is in full force and effect

Witness my hand and the seal of said Company at Warren, N.J., this 12 day of June 1992

State Seal



*J. M. Moley*  
Assistant Secretary

## Financial Statement of Federal Insurance Company as of December 31, 1990 IN THOUSANDS OF DOLLARS STATUTORY BASIS

ASSETS		LIABILITIES AND SURPLUS TO POLICYHOLDERS	
Short Term Investments	\$ 186,734	Outstanding Losses and Loss Expenses	\$ 2,935,643
United States Treasury Bonds	315,035	Unearned Premiums	871,957
United States Government and Federal Agency Guaranteed Bonds	276,270	Accrued Expenses	80,181
State and Municipal Bonds	2,177,474	Non-Admitted Reinsurance	30,185
Other Bonds	414,420	Dividends to Policyholders	24,746
Common Stocks	209,554	Loss Portfolio Transfer	(145,626)
Other Invested Assets	87,099	Other Liabilities	198,332
<b>TOTAL INVESTMENTS</b>	<b>3,666,586</b>		
		<b>TOTAL LIABILITIES</b>	<b>3,995,418</b>
Investments in Affiliates:		Capital Stock	13,987
Vigilant Insurance Company	200,591	Paid-in Surplus	472,986
Great Northern Insurance Company	68,809	Unassigned Funds	591,747
Pacific Indemnity Company	321,258	Unrealized Appreciation of Investments	325,912
Bellemeade Development Corporation	376,501		
C.C. Canada Holdings Ltd	68,062	<b>SURPLUS TO POLICYHOLDERS</b>	<b>1,404,632</b>
Other Affiliates	47,482		
Cash	12,963	<b>TOTAL LIABILITIES AND SURPLUS TO POLICYHOLDERS</b>	<b>\$ 5,400,050</b>
Net Premiums Receivable	402,322		
Other Assets	235,476		
<b>TOTAL ADMITTED ASSETS</b>	<b>\$ 5,400,050</b>		

Investments are valued in accordance with requirements of the National Association of Insurance Commissioners.  
Investments valued at \$13,173 are deposited with government authorities as required by law.



15 Mountain View Road, P. O. Box 1615, Warren, New Jersey 07061-1615

## FEDERAL INSURANCE COMPANY

RIDER to be attached to and form a part of  
Bond No. 812669801 wherein  
FEDERAL INSURANCE COMPANY  
is named as Surety, on behalf of  
Combustion Engineering, Inc.  
as Principal, in favor of  
U.S. Nuclear Regulatory Commission  
as Oblige, in the sum of Two million and 00/100 (\$2,000,000.00)  
dated 05/24/90, effective 08/20/96

IT IS HEREBY UNDERSTOOD AND AGREED that effective the 20th day of August 1996 the penalty of this bond is increased from Two Million and 00/100 (\$2,000,000.00) to Three Million Six Hundred Thousand and 00/100 (\$3,600,000.00) as to losses occurring after said effective date.

Provided, however, that the liability of the Principal and Surety hereon shall not be cumulative or in any event exceed the revised bond amount referred to herein.

The attached bond shall be subject to all its agreements, limitations and conditions except as herein expressly modified.

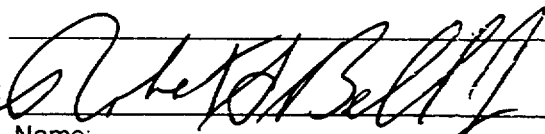
Signed, sealed and dated this 20th day of August, 1996.

Combustion Engineering, Inc.

If bond amount is being DECREASED sign below  
& return a copy **with original signature** to the  
Surety:  
ACCEPTED

By: \_\_\_\_\_  
(Signature of Oblige)  
Name:  
Title:

By:

 (SEAL)  
Name:

Title:

By:

 (SEAL)  
FEDERAL INSURANCE COMPANY

Name: Catherine Rosano, Attorney-in-Fact  
ATTORNEY-IN-FACT

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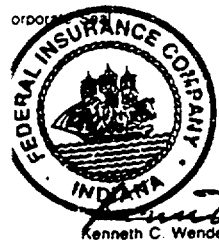


**FEDERAL INSURANCE COMPANY**  
**ATTN: SURETY DEPARTMENT**  
15 Mountain View Road, Warren, NJ 07059  
(908) 580-2000

Know all Men by these Presents, That **FEDERAL INSURANCE COMPANY**, an Indiana Corporation, has constituted and appointed, and does hereby constitute and appoint **Vincent Moy, William J. Paterno and Catherine Rosano** of New York, New York -----

as its true and lawful Attorney-in-Fact to execute under such designation in its name and to affix its corporate seal to and deliver for and on its behalf as surety thereon or otherwise, bonds or obligations (other than Bail Bonds) given or executed in the course of its business, and any instruments amending or altering the same, and consents to the modification or alteration of any instruments referred to in said bonds or obligations.

In Witness Whereof, the said **FEDERAL INSURANCE COMPANY** has, pursuant to its By-Laws, caused these presents to be signed by its Vice-President and Assistant Secretary and its corporate seal to be hereunto affixed this 21st day of June 19 94



Kenneth C. Wendel

Assistant Secretary

**FEDERAL INSURANCE COMPANY**

By

*Gerardo G. Mauriz*

Gerardo G. Mauriz

Vice-President

STATE OF NEW JERSEY  
County of Somerset

SS.

On this 21st day of June 19 94, before me personally came Kenneth C. Wendel to me known and by me known to be Assistant Secretary of **FEDERAL INSURANCE COMPANY**, the corporation described in and which executed the foregoing Power of Attorney, and the said Kenneth C. Wendel being by me duly sworn, did depose and say that he is Assistant Secretary of **FEDERAL INSURANCE COMPANY** and knows the corporate seal thereof; that the seal affixed to the foregoing Power of Attorney is such corporate seal and was thereto affixed by authority of the By-Laws of said Company, and that he signed said Power of Attorney as Assistant Secretary of said Company by like authority; and that he is acquainted with Gerardo G. Mauriz and knows him to be the Vice-President of said Company, and that the signature of said Gerardo G. Mauriz subscribed to said Power of Attorney is in the genuine handwriting of said Gerardo G. Mauriz and was thereto subscribed by authority of said By-Laws and in the presence of the said Gerardo G. Mauriz.

Notarial Seal



STATE OF NEW JERSEY  
County of Somerset

SS.

Acknowledged and Sworn to before me  
on the date above written.

*Janet A. Scarone*

Notary Public

CERTIFICATION

**JANET A. SCARONE**  
Notary Public, State of New Jersey  
My Comm. Expires October 2, 1994

I, the undersigned, Assistant Secretary of **FEDERAL INSURANCE COMPANY**, do hereby certify that the following is a true excerpt from the By-Laws of the said Company as adopted by its Board of Directors on June 13, 1974 and most recently amended March 2, 1990 and that this By-Law is in full force and effect.

**"ARTICLE XVIII**

Section 2. All bonds, undertakings, contracts and other instruments other than as above for and on behalf of the Company which it is authorized by law or its charter to execute, may and shall be executed in the name and on behalf of the Company either by the Chairman or the Vice-Chairman or the President or a Vice-President, jointly with the Secretary or an Assistant Secretary, under their respective designations, except that any one or more officers or attorneys-in-fact designated in any resolution of the Board of Directors or the Executive Committee, or in any power of attorney executed as provided for in Section 3 below, may execute any such bond, undertaking or other obligation as provided in such resolution or power of attorney.

Section 3. All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the Vice-Chairman or the President or a Vice-President or an Assistant Vice-President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, Vice Chairman, President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary and the seal of the Company may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such power of attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached."

I further certify that said **FEDERAL INSURANCE COMPANY** is duly licensed to transact fidelity and surety business in each of the States of the United States of America, District of Columbia, Puerto Rico, and each of the Provinces of Canada with the exception of Prince Edward Island; and is also duly licensed to become sole surety on bonds, undertakings, etc., permitted or required by the law.

I, the undersigned Assistant Secretary of **FEDERAL INSURANCE COMPANY**, do hereby certify that the foregoing Power of Attorney is now in full force and effect.

Given under my hand and the seal of said Company at Warren, N.J., this \_\_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_\_

**AUG 20 1996**

*Gerardo G. Mauriz*  
Assistant Secretary



**State of NEW YORK**

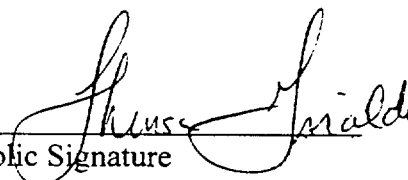
**County of NEW YORK**

On this 20th day of August, 19 96 before me personally came  
Catherine Rosano who, being by me duly sworn, did depose and say that he/she is an  
Attorney-In-Fact of the **Federal Insurance Company**, and knows the corporate seal thereof; that  
the seal affixed to said annexed instrument is such corporate seal, and was thereto affixed by  
authority of the Power of Attorney of said Company, of which a Certified Copy is hereto  
attached, and that he/she signed said Instrument as an Attorney-In-Fact of said Company by like  
authority.

THEREESA GIRALDO  
NOTARY PUBLIC, State of New York  
No. 01G15023501  
Qualified in Kings County  
Commission Expires Feb. 7, 19 98

Acknowledged and Sworn to before me  
on the date above written

\_\_\_\_\_  
Notary Public Signature



# FEDERAL INSURANCE COMPANY

## STATEMENT OF ASSETS, LIABILITIES AND SURPLUS TO POLICYHOLDERS

Statutory Basis

DECEMBER 31, 1995

(in thousands of dollars)

ASSETS		LIABILITIES AND SURPLUS TO POLICYHOLDERS	
Cash .....	\$ 5,102	Outstanding Losses and Loss Expenses .....	\$4,904,156
United States Treasury Bonds .....	329,054	Unearned Premiums .....	1,114,215
United States Government and Federal Agency Guaranteed Bonds .....	432,767	Provision for Reinsurance .....	42,598
State and Municipal Bonds .....	3,751,147	Other Liabilities .....	410,848
Other Bonds .....	452,940	<b>TOTAL LIABILITIES .....</b>	<b>6,471,817</b>
Stocks .....	172,029		
Short Term Investments .....	754,662		
Other Invested Assets .....	178,294		
<b>TOTAL INVESTMENTS .....</b>	<b>6,075,995</b>		
Investments in Affiliates:		Capital Stock .....	13,987
Vigilant Insurance Company .....	435,739	Paid-In Surplus .....	472,986
Great Northern Insurance Company .....	122,343	Unassigned Funds .....	1,347,361
Pacific Indemnity Company .....	500,834	Unrealized Appreciation of Investments .....	433,116
Bellemead Development Corporation .....	416,578	<b>SURPLUS TO POLICYHOLDERS .....</b>	<b>2,267,450</b>
CC Canada Holdings Ltd. ....	97,135		
Other Affiliates .....	128,576	<b>TOTAL LIABILITIES AND SURPLUS TO POLICYHOLDERS .....</b>	<b>\$8,739,267</b>
Net Premiums Receivable .....	510,914		
Other Assets .....	451,153		
<b>TOTAL ADMITTED ASSETS .....</b>	<b>\$8,739,267</b>		

Investments are valued in accordance with requirements of the National Association of Insurance Commissioners.  
Investments valued at \$17,019 are deposited with government authorities as required by law.

State, County & City of New York, — ss:

Anna Maria Lovecchio, Assistant Secretary \_\_\_\_\_ of the Federal Insurance Company  
being duly sworn, deposes and says that the foregoing Statement of Assets, Liabilities and Surplus to Policyholders of said  
Federal Insurance Company on December 31, 1995 is true and correct and is a true abstract of the Annual Statement of said  
Company as filed with the Secretary of the Treasury of the United States for the 12 months ending December 31, 1995.

Subscribed and sworn to before me  
this \_\_\_\_\_ day of \_\_\_\_\_, 1996.

  
Notary Public

HELEN S. BROWN  
Notary Public, State of New York  
No. 31-4682129  
Qualified in New York County  
Commission Expires December 31, 1996

  
Assistant Secretary



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

September 9, 1999

Mr. Robert S. Bell, Jr.,  
Vice President and General Counsel  
ABB Combustion Engineering  
Nuclear Power, Inc.  
P.O. Box 500  
2000 Day Hill road  
Windsor, CT 06095-0500

SUBJECT: COMBUSTION ENGINEERING, INC., STANDBY TRUST AGREEMENTS

Dear Mr. Bell:

In accordance with your letter dated August 30, 1999, to Mr. Stuart A. Treby, Nuclear Regulatory Commission (NRC), a signed document is being enclosed for you to terminate the three Standby Trust Agreements that formerly covered NRC licensees SNM-33, SNM-1067, and 06-00217-06.

If you have any questions regarding this matter, I can be reached at (301) 415-8155 or e-mail at [AXS5@nrc.gov](mailto:AXS5@nrc.gov).

Sincerely,

A handwritten signature in cursive script, reading "Sean Soong".

Sean Soong  
Licensing Team 1  
Licensing and International  
Safeguards Branch  
Division of Fuel Cycle Safety  
and Safeguards, NMSS

Licenses: SNM-33  
SNM-1067  
06-00217-06

Enclosure: As stated

B/123

ITEM # 172

August 29, 1999

Citibank Global Agency and Trust  
111 Wall Street, 5<sup>th</sup> Floor  
New York, NY 10043

Attention: Ms. Debbie DeMarco

Re: Standby Trust Agreements dated July 1, 1990 by and between  
Combustion Engineering, Inc., referred to as "Grantor", F/B/O the U.S.  
Nuclear Regulatory Commission (NRC), and Citibank, NA as "Trustee":  
File Numbers 793770 (NRC License SNM-33),  
793771 (NRC License 06-00217-06), and  
793772 (NRC License SNM-1067)

Dear Ms. DeMarco:

Please be advised that we, the undersigned, hereby jointly terminate Citibank's  
appointment as trustee under the above-referenced trust agreements, releasing  
Citibank from any further duties or obligations as trustee.

Very truly yours,

U.S. Nuclear Regulatory Commission (NRC)

By: Theresa A. Smith

Title: Chief, Licensing & Inspection Support Branch, NRC

Date: 9/1/99

Combustion Engineering, Inc.

By: Robert S. Bell, Jr.

Title: Vice President and Assistant Secretary

Date: August 29, 1999

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