



RESPONSE TO FREEDOM OF INFORMATION ACT (FOIA) / PRIVACY ACT (PA) REQUEST

2000-0149

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RESPONSE TYPE FINAL PARTIAL

REQUESTER

George D. Hess

DATE JUL 17 2000

PART I. -- INFORMATION RELEASED

- No additional agency records subject to the request have been located.
- Requested records are available through another public distribution program. See Comments section.
- APPENDICES **A** Agency records subject to the request that are identified in the listed appendices are already available for public inspection and copying at the NRC Public Document Room.
- APPENDICES **B** Agency records subject to the request that are identified in the listed appendices are being made available for public inspection and copying at the NRC Public Document Room.
- Enclosed is information on how you may obtain access to and the charges for copying records located at the NRC Public Document Room, 2120 L Street, NW, Washington, DC.
- APPENDICES **B** Agency records subject to the request are enclosed.
- Records subject to the request that contain information originated by or of interest to another Federal agency have been referred to that agency (see comments section) for a disclosure determination and direct response to you.
- We are continuing to process your request.
- See Comments.

PART I.A -- FEES

AMOUNT *
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- You will be billed by NRC for the amount listed.
- None. Minimum fee threshold not met.
- You will receive a refund for the amount listed.
- Fees waived.

* See comments for details

PART I.B -- INFORMATION NOT LOCATED OR WITHHELD FROM DISCLOSURE

- No agency records subject to the request have been located.
- Certain information in the requested records is being withheld from disclosure pursuant to the exemptions described in and for the reasons stated in Part II.
- This determination may be appealed within 30 days by writing to the FOIA/PA Officer, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Clearly state on the envelope and in the letter that it is a "FOIA/PA Appeal."

PART I.C COMMENTS (Use attached Comments continuation page if required)

SIGNATURE - FREEDOM OF INFORMATION ACT AND PRIVACY ACT OFFICER

Carol Ann Reed

**APPENDIX A
RECORDS ALREADY AVAILABLE IN THE PDR**

<u>NO.</u>	<u>DATE</u>	<u>ACCESSION NUMBER</u>	<u>DESCRIPTION/(PAGE COUNT)</u>
1.	1/14/82	8201290360	USNRC Ltr to Combustion Engineering, Inc. (16 pgs)
2.	11/30/83	8502250861	CE Power Systems Ltr/Request for Renewal Application (120 pgs)
3.	12/13/83	8502250855	USNRC Ltr to Combustion Engineering, Inc. (1 pg)
4.	11/29/84	8412110347	USNRC Ltr to Combustion Engineering, Inc. (2 pgs)
5.	11/21/84	8412110352	CE Power Systems Ltr to USNRC (Official Record Copy) (2 pgs)
6.	1/21/85	8502250846	CE Power Systems Ltr to USNRC (2 pgs)
7.	2/11/85	8504250512	CE Power Systems Ltr to USNRC (15 pgs)
8.	2/12/85	8502250837	USNRC Ltr to Combustion Engineering, Inc. (2 pgs)
9.	4/10/85	8504160239	USNRC Notice of Significant Licensee Meeting (2 pgs)
10.	4/10/85	8504250478	USNRC Ltr to Combustion Engineering, Inc. & Insp Rpt (6 pgs)
11.	5/28/85	8506030530	USNRC Ltr to Combustion Engineering, Inc. (4 pgs)
12.	6/19/85	8506260495	Combustion Engineering, Inc. Ltr to USNRC (3 pgs)

13.	7/31/85	8803150172	USNRC Ltr to Combustion Engineering, Inc. (2 pgs)
14.	9/27/85	8510070204	USNRC Ltr/Insp Rpt for Combustion Engineering, Inc. (28 pgs)
15.	4/23/86	8604300098	USNRC Ltr/Insp Rpt for Combustion Engineering, Inc. (20 pgs)
16.	5/22/86	9008080284	USNRC Ltr to Combustion Engineering, Inc. (2 pgs)
17.	7/1/86	8607140306	USNRC Ltr/Region I Form 198-D (12 pgs)
18.	7/30/86	8608050167	USNRC Ltr to Combustion Engineering, Inc. (3 pgs)
19.	10/1/86	8610090247	2 Ltrs - USNRC to Combustion Eng., Inc. & CE to USNRC (2 pgs)
20.	9/25/87	8807060255	Combustion Engineering, Inc. Ltr to USNRC (Request for License Amendment (17 pgs)
21.	10/30/87	8807060246	USNRC Ltr to Combustion Engineering, Inc. (2 pgs)
22.	4/22/88	8805030496	USNRC Ltr/Insp Rpt - Combustion Engineering, Inc. 88-001 (23 pgs)
23.	5/20/88	8808250180	Combustion Engineering, Inc. Ltr/Encl. (5 pgs)
24.	8/17/88	8808250175	USNRC Ltr to Combustion Engineering, Inc. (2 pgs)
25.	1/5/90	9001220245	ABB Ltr to USNRC (3 pgs)
26.	6/2/90	9011280173	USNRC Ltr to ABB Combustion Engineering Nuclear Power (2 pgs)
27.	10/30/90	9011050296	ABB Ltr to USNRC (2 pgs)
28.	11/19/90	9012040238	ABB Ltr to USNRC (1 pg)

29.	8/26/91	9109040229	USNRC Ltr/Insp Rpt Combustion Engineering, Inc. (12 pgs)
30.	10/11/91	9112200124	USNRC Ltr to ABB Combustion Engineering, Inc. (2 pgs)
31.	3/12/92	9203200052	USNRC Ltr/Insp Rpt Combustion Engineering, Inc. (18 pgs)
32.	6/16/92	9210290367	USNRC Ltr to Combustion Engineering, Inc. (2 pgs)
33.	Undated	9406220064	USNRC Form 591 - Safety Inspection (5/16-18/94) (13 pgs)
34.	7/19/94	9410180257	USNRC Ltr to ABB Combustion Engineering, Inc. (2 pgs)
35.	8/17/94	9410170359	USNRC Ltr to ABB Combustion Engineering, Inc. (2 pgs)
36.	12/16/94	9501110501	USNRC Ltr to ABB Combustion Engineering, Inc. (1 pg)
37.	6/27/96	9610020077	ABB Ltr to USNRC (5 pgs)
38.	6/11/96	9606250203	USNRC Ltr to Combustion Engineering, Inc. (32 pgs)
39.	1/9/97	9701210447	ABB Ltr to USNRC (2 pgs)
40.	8/26/97	9709020069	USNRC Lt to Combustion Engineering (2 pgs)
41.	10/1/97	9710100312	USNRC Ltr/Insp Rpt to Combustion Engineering (37 pgs)
42.	10/27/97	9710310167	USNRC Ltr to Combustion Engineering (2 pgs)
43.	8/4/98	9808180009	USNRC Safety & Compliance Insp. - Combustion Engineering (34 pgs)
44.	3/18/99	9908030300	USNRC Ltr to ABB (2 pgs)
45.	6/29/99	9907060291	USNRC Ltr to ABB (1 pg)

46.	10/18/97	9710240190	Ltr from D. Cirelli to NRC (13 pages)
47.	06/18/99	9907160211	Ltr from R. S. Bell to NRC (24 pages)
48.	08/30/99	9909020185	Ltr from R. S. Bell to S. Treby (2 pages)

**APPENDIX B
RECORDS BEING RELEASED IN THEIR ENTIRETY**

<u>NO.</u>	<u>DATE</u>	<u>DESCRIPTION/(PAGE COUNT)</u>
1.	Undated	License No. 06-00217-06 w/ Amendments (78 pgs)
2.	8/25/58	Transmittal of License Compliance Insp Report ((11 pgs)
3.	9/3/58	US Atomic Energy Commission (USAEC) Internal Memo (1 pg)
4.	12/29/58	USAEC Ltr to Combustion Engineering, Inc. (2 pgs)
5.	11/13/59	Combustion Engineering, Inc. Ltr to USAEC (1 pg)
6.	11/16/59	USAEC Ltr to Combustion Engineering, Inc. (1 pg)
7.	1/23/61	Combustion Engineering, Inc. Ltr to USAEC (1 pg)
8.	1/24/61	USAEC Memo from H. Price to R. Kirkman (15 pgs)
9.	2/9/61	USAEC Ltr to Combustion Engineering, Inc. (1 pg)
10.	2/23/61	Memo to Isotopes Branch File (1 pg)
11.	5/3/61	USAEC Ltr to Combustion Engineering, Inc. (3 pgs)
12.	6/22/62	Combustion Engineering, Inc. Ltr to USAEC (2 pgs)
13.	7/6/62	Combustion Engineering, Inc. Ltr to USAEC (1 pg)
14.	7/10/62	USAEC Ltr to Combustion Engineering, Inc. (1 pg)
15.	7/10/62	USAEC Ltr to Combustion Engineering, Inc. (1 pg)
16.	7/11/62	USAEC Ltr to Combustion Engineering, Inc. (1 pg)
17.	3/20/63	USAEC Form 591- Insp. Findings & Licensee Acknowledgment (4 pgs)
18.	3/19/63	USAEC Ltr to Combustion Engineering, Inc. (1 pg)
19.	3/20/63	Combustion Engineering, Inc. Ltr to USAEC (1 pg)

20. 3/27/64 USAEC Ltr to Combustion Engineering, Inc. (1 pg)
21. 10/6/64 USAEC Ltr to Combustion Engineering, Inc. (1 pg)
22. 12/6/62 Chart of Radioactive Sources (1 pg)
23. Undated USAEC Form 591- Insp Findings/Licensee Acknowledgment (13 pgs)
24. 10/22/64 USAEC Ltr to Combustion Engineering, Inc. (3 pgs)
25. 11/4/64 Combustion Engineering, Inc. Ltr to USAEC (1 pg)
26. 11/10/64 USAEC Ltr to Combustion Engineering, Inc. (1 pg)
27. Undated Form AEC-591 (date of insp. 1/9/69) (1 pg)
28. Undated Form AEC-591 (date of insp. 9/29-10/1/70) (1 pg)
29. 8/27/73 USAEC Ltr to Combustion Engineering, Inc. (18 pgs)
30. 9/17/73 Combustion Engineering, Inc. Ltr to USAEC (1 pg)
31. 9/27/73 USAEC Ltr to Combustion Engineering, Inc. (1 pg)
32. 3/25/75 USAEC Field Notes (15 pgs)
33. 4/17/75 USAEC Ltr to Combustion Engineering, Inc. (3 pgs)
34. Undated IE 1 Form 74 - Statistical Data Control Form (1 pg)
35. Undated Inspection Outstanding Items (Region I Work Form) (1 pg)
36. Undated USAEC Form 591 (Date of Inspection 3/10/76) (9 pgs)
37. Undated USAEC Form 591 (Date of Inspection 5/26/77) (10 pgs)
38. 12/7/77 US Nuclear Regulatory Commission (USNRC) Ltr to Combustion Engineering, Inc. (8 pgs)
39. 2/24/78 CE Power Systems Ltr and Encls. To USNRC (49 pgs)
40. 3/9/78 USNRC Ltr to Combustion Engineering, Inc. (1 pg)

41. 5/1/78 USNRC Ltr to Combustion Engineering, Inc. (9 pgs)
42. 10/30/78 CE Power Systems Ltr to US NRC (5 pgs)
43. 11/1/78 USNRC Ltr to Combustion Engineering, Inc. (11 pgs)
44. 12/8/78 USNRC Ltr to Combustion Engineering, Inc. (2 pgs)
45. 4/17/80 USNRC Ltr & Insp. Rpt - Combustion Engineering, Inc. (12 pgs)
46. 9/4/80 USNRC Ltr & Insp. Rpt - Combustion Engineering, Inc. (10 pgs)
47. 9/30/80 CE Power Systems Ltr to USNRC (1 pg)
48. 10/15/80 USNRC Ltr to Combustion Engineering, Inc. (1 pg)
49. 1/12/81 CE Power Systems Ltr to USNRC (1 pg)
50. 11/10/81 USNRC Form 218 Telephone or Verbal Conversation Record (1 pg)
51. 2/4/82 CE Power Systems Ltr to USNRC (3 pgs)
52. 2/25/82 USNRC Ltr to Combustion Engineering, Inc. (2 pgs)
53. 9/19/83 USNRC Ltr & Insp Rpt 83-03/01 (14 pgs)
54. Undated CE Power Systems Ltr to USNRC (2 pgs)
55. 10/20/83 USNRC Ltr to Combustion Engineering, Inc. (1 pg)
56. Undated Materials Radiological Protection Section Licensee Event Rpt. (1 pg)
57. 1/11/85 Conversation Record (1 pg)
58. 4/12/85 Combustion Engineering, Inc. Ltr to USNRC (1 pg)
59. 4/17/85 USNRC Memorandum (5 pgs)
60. 5/7/85 USNRC Memorandum (1 pg)
61. 5/13/86 Combustion Engineering, Inc. Ltr to USNRC (2 pgs)
62. 5/19/86 Combustion Engineering, Inc. Ltr to USNRC (5 pgs)

63. 12/8/88 USNRC Region I - NMSS Licensee Event Report (34 pgs)
64. 7/15/88 Combustion Engineering, Inc. Ltr to USNRC (2 pgs)
65. 1/10/90 USNRC Ltr to Combustion Engineering, Inc. (1 pg)
66. 1/17/90 Combustion Engineering, Inc. Ltr to USNRC (1 pg)
67. 3/7-8/90 USNRC Safety Inspection - Combustion Engineering, Inc. (20 pgs)
68. 3/12/90 USNRC Ltr/Encls. (137 pgs)
69. 4/24/90 ABB Ltr to USNRC (10 pgs)
70. 7/19/90 ABB Ltr to USNRC (1 pg)
71. 10/31/90 ABB Ltr to USNRC (2 pgs)
72. 11/1/90 ABB Ltr to USNRC (2 pgs)
73. 11/6/90 ABB Ltr to USNRC (1 pg)
74. 9/27/90 USNRC Ltr to ABB (1 pg)
75. 7/12/90 USNRC Ltr to ABB (1 pg)
76. 11/23/92 ABB Ltr to USNRC (5 pgs)
77. 1/20/93 USNRC Ltr ABB Combustion Engineering, Inc. (2 pgs)
78. 4/8/93 USNRC Telephone or Verbal Conversation Record (1 pg)
79. 4/20/93 USNRC Telephone or Verbal Conversation Record (1 pg)
80. 5/25/93 USNRC Ltr to ABB Combustion Engineering, Inc. (1 pg)
81. 2/17/94 ABB Combustion Engineering, Inc. to USNRC (4 pgs)
82. 7/7/94 ABB Ltr to USNRC (1 pg)
83. 5/31/95 USNRC Ltr to ABB Combustion Engineering, Inc. (1 pg)
84. 6/27/95 USNRC Ltr to ABB Combustion Engineering, Inc. (13 pgs)
85. 10/6/95 USNRC Ltr to ABB Combustion Engineering, Inc. (4 pgs)

86. 11/15/95 ABB Combustion Engineering, Incl. Ltr to USNRC (8 Pgs)
87. 11/15/95 ABB Combustion Engineering, Inc. Ltr to USNRC (License Renewal Application (45 pgs)
88. 2/14/96 Telephone Conversation Record (1 pg)
89. 1/12/96 ABB Combustion Engineering, Inc. Ltr (1 pg)
90. 1/16/96 Telephone Conversation Record (1 pg)
91. 2/25/96 USNRC Ltr to Combustion Engineering, Inc. (4 pgs)
92. 5/8/96 ABB Combustion Engineering, Inc. (1 pg)
93. 5/10/96 ABB Combustion Engineering, Inc. (1 pg)
94. 6/12/96 USNRC Ltr to Combustion Engineering, Inc. (3 pgs)
95. 6/18/96 ABB Comb. Engineering, Inc. - Inter-Office Correspondence (10 pgs)
96. 7/10/96 ABB Ltr to USNRC (18 pgs)
97. 7/17/96 ABB Ltr to USNRC (6 pgs)
98. 7/18/96 Telephone Conversation Record (1 pg)
99. 7/18/96 ABB Ltr to USNRC (9 pgs)
100. 7/29/96 Telephone Conversation Record (1 pg)
101. 8/12/96 Telephone Conversation Record (1 pg)
102. 8/16/96 ABB Ltr to USNRC (6 pgs)
103. 9/5/96 USNRC Ltr to Combustion Engineering, Inc. (1 pg)
104. 9/17/96 ABB Ltr to USNRC (1 pg)
105. 10/1/96 USNRC Ltr to Combustion Engineering (1 pg)
106. 9/3/97 ABB Ltr to USNRC (1 pg)
107. 12/15/98 ABB Ltr to USNRC (8 pgs)

- 108. 1/25/99 Telephone Conversation Record (1 pg)
- 109. 5/17/99 USNRC Ltr to G. Proco (2 pgs)
- 110. 6/3/99 ABB Ltr to USNRC w/Application (15 pgs)
- 111. 6/9/99 Telephone Conversation Record (1 pg)
- 112. 6/11/99 ABB Fax to USNRC (4 pgs)
- 113. 6/16/99 USNRC Ltr to ABB (1 pg)
- 114. 7/14/99 USNRC Memo (11 pgs)
- 115. 9/3/99 USNRC Ltr to Combustion Engineering (2 pgs)
- 116. 1/24/00 ABB Ltr/ Encl. to USNRC (20 pgs)
- 117. 1/27/00 ABB Ltr to USNRC (1 pg)
- 118. 2/4/00 USNRC Ltr to ABB C-E Nuclear Power , Inc. (2 pgs)
- 119. 10/30/90 Ltr from R Vaughan to M Knapp (2 pages)
- 120. 05/18/95 Broad Scope License No. 06-00217-06 Renewal Application (141 pages)
- 121. 04/23/96 Ltr from D. A. Cirelli to D. White (91 pages)
- 122. No date Ltr from Chubb Group of Insurance Companies (4 pages)
- 123. 9/09/99 Ltr from S. Soong to R. S. Bell, Jr (2 pages)

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MATERIALS LICENSE

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Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p style="text-align: center;">Licensee</p> <p>1. ABB C-E Nuclear Power, Inc.</p> <p style="text-align: center; font-size: 2em;">18</p> <p>2. 2000 Day Hill Road P.O. Box 500 Windsor, Connecticut 06095-0500</p>	<p>In accordance with letter dated January 27, 2000,</p> <p>3. License number 06-00217-06 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration date February 28, 2001</p> <hr/> <p>5. Docket No. 030-03754 Reference No.</p>
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|---|---|---|
| <p>6. Byproduct, source, and/or special nuclear material</p> <p>A. Any byproduct material with Atomic Numbers 1 through 83</p> <p>B. Any byproduct material with Atomic Numbers 84 through 103</p> <p>C. Source material</p> <p>D. Cesium 137</p> <p>E. Americium 241</p> | <p>7. Chemical and/or physical form</p> <p>A. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, reactor coolant samples, or calibration sources</p> <p>B. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples</p> <p>C. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples</p> <p>D. Sealed sources</p> <p>E. Sealed neutron sources</p> | <p>8. Maximum amount that licensee may possess at any one time under this license</p> <p>A. 50 curies</p> <p>B. Not to exceed 3 millicuries per nuclide and 30 millicuries total</p> <p>C. 75 kilograms</p> <p>D. 215 curies</p> <p>E. Not to exceed 1 curie per source and 10 curies total</p> |
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ITEM # 1

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

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License Number

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Docket or Reference Number

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|---|----------------------------------|--|
| 6. Byproduct, source, and/or special nuclear material | 7. Chemical and/or physical form | 8. Maximum amount that licensee may possess at any one time under this license |
| F. Americium 241 | F. Sealed neutron sources | F. Not to exceed 10 curies per source and 100 curies total |
| G. Neptunium 237 | G. Oxide wires | G. Not to exceed 0.5 millicuries per wire and 5 millicuries total |
| H. Uranium 233 | H. Any | H. 1 gram |
| I. Uranium 235 | I. Any | I. 7 grams |
| J. Uranium 235 | J. Fission chambers | J. Not to exceed 1.7 grams per chamber and 13.6 grams total |
| K. Plutonium | K. Any | K. 1 milligram |
| L. Uranium 235 | L. Any | L. 325 grams, including less than 5 kilograms UF ₆ |
| M. Natural and/or depleted uranium | M. Any | M. 10,000 kilograms, including less than 5 kilograms UF ₆ |
| N. Plutonium 238 | N. Sealed sources | N. Not to exceed 1 gram per source and 4 grams total |
9. Authorized use:
- A. through E. Research and development as defined in 10 CFR 30.4; possession incident to maintenance, repair, decontamination, and study of reactor components.
- F. 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.
- G. through J. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- K. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.
- L. Research and development as defined in 10 CFR 70.4 in the licensee's facilities located at Buildings 1, 2, 5, 6, 16, 17 and 18.
- M. Research and development in the licensee's facilities located at Buildings 1, 2, 5, 6, 16, 17 and 18.
- N. For storage only.

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License Number

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CONDITIONS

10. Licensed material may be used only at the licensee's facilities located at 2000 Day Hill Road, Windsor, Connecticut.
11. A. Licensed material shall be used by, or under the supervision of, individuals designated in writing by the Radiation Safety Committee, Dese A. Cirelli, Chairperson.
- B. The Radiation Safety Officer for this license is Stephen M. Sorensen.
12. Licensed material shall not be used in or on human beings.
13. A. Sealed sources and detector cells containing licensed material shall be tested for leakage and/or contamination at intervals not to exceed six months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed three years.
- B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed three months.
- C. In the absence of a certificate from a transferor indicating that a leak test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
- E. Sealed sources and detector cells need not be leak tested if:
- (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or
 - (iii) the half-life of the isotope is 30 days or less; or
 - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
 - (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

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- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source or detector cell shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within five days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source or detector cell involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
14. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
 15. The licensee shall not acquire licensed material in a sealed source or device unless the source or device has been registered with the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or equivalent regulations of an Agreement State.
 16. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.
 17. The licensee shall conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license.
 18. Radioactive waste generated shall be stored in accordance with the statements, representations, and procedures included with the waste storage plan described in the licensee's application dated May 18, 1995.
 19. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
 20. Notwithstanding the date this amendment was signed, this amendment becomes effective on the date of the closing of ownership transfer of assets, so long as that transfer occurs not later than 30 days from the date of the letter transmitting this license to the former licensee.
 21. The licensee shall notify the Administrator of the appropriate NRC Regional Office listed in Appendix D to Part 20 by letter or facsimile not later than 30 days after the date of the letter transmitting this license to the former licensee of the date the transfer occurred.

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22. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated May 18, 1995
- B. Letter dated June 27, 1995
- C. Letter dated November 15, 1995
- D. Letter dated April 23, 1996
- E. Letter dated July 10, 1996
- F. Letter dated July 17, 1996
- G. Letter dated August 16, 1996
- H. Letter dated December 15, 1998

For the U.S. Nuclear Regulatory Commission

Original signed by John R. McGrath

Date February 4, 2000

By

 John R. McGrath
 Nuclear Materials Safety Branch 2
 Division of Nuclear Materials Safety
 Region I
 King of Prussia, Pennsylvania 19406

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MATERIALS LICENSE

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Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p>Licensee</p> <p>1. ABB Combustion Engineering Nuclear Power, Inc.</p> <p>2. 2000 Day Hill Road P.O. Box 500 Windsor, Connecticut 06095-0500</p>	<p>In accordance with letter dated June 3, 1999,</p> <p>3. License number 06-00217-06 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration date February 28, 2001</p> <hr/> <p>5. Docket No. 030-03754 Reference No.</p>
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| 6. Byproduct, source, and/or special nuclear material | 7. Chemical and/or physical form | 8. Maximum amount that licensee may possess at any one time under this license |
| 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. Source material | C. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples | C. 75 kilograms |
| D. Cesium 137 | D. Sealed sources | D. 215 curies |
| E. Americium 241 | E. Sealed neutron sources | E. Not to exceed 1 curie per source and 10 curies total |

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Duplicate MATERIALS LICENSE SUPPLEMENTARY SHEET

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License Number 06-00217-06
Docket or Reference Number 030-03754
Amendment No. 44

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| 6. Byproduct, source, and/or special nuclear material | 7. Chemical and/or physical form | 8. Maximum amount that licensee may possess at any one time under this license |
| F. Americium 241 | F. Sealed neutron sources | F. Not to exceed 10 curies per source and 100 curies total |
| G. Neptunium 237 | G. Oxide wires | G. Not to exceed 0.5 millicuries per wire and 5 millicuries total |
| H. Uranium 233 | H. Any | H. 1 gram |
| I. Uranium 235 | I. Any | I. 7 grams |
| J. Uranium 235 | J. Fission chambers | J. Not to exceed 1.7 grams per chamber and 13.6 grams total |
| K. Plutonium | K. Any | K. 1 milligram |
| L. Uranium 235 | L. Any | L. 325 grams, including less than 5 kilograms UF ₆ |
| M. Natural and/or depleted uranium | M. Any | M. 10,000 kilograms, including less than 5 kilograms UF ₆ |
| N. Plutonium 238 | N. Sealed sources | N. Not to exceed 1 gram per source and 4 grams total |

9. Authorized use:

- A. through E. Research and development as defined in 10 CFR 30.4; possession incident to maintenance, repair, decontamination, and study of reactor components.
- F. 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.
- G. through J. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- K. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.
- L. Research and development as defined in 10 CFR 70.4 in the licensee's facilities located at Buildings 1, 2, 5, 6, 16, 17 and 18.
- M. Research and development in the licensee's facilities located at Buildings 1, 2, 5, 6, 16, 17 and 18.
- N. For storage only.

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MATERIALS LICENSE
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License Number

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Docket or Reference Number

030-03754

Amendment No. 44

CONDITIONS

10. Licensed material may be used only at the licensee's facilities located at 2000 Day Hill Road, Windsor, Connecticut.
11. A. Licensed material shall be used by, or under the supervision of, individuals designated in writing by the Radiation Safety Committee, Dese A. Cirelli, Chairperson.
- B. The Radiation Safety Officer for this license is Stephen M. Sorensen.
12. Licensed material shall not be used in or on human beings.
13. A. Sealed sources and detector cells containing licensed material shall be tested for leakage and/or contamination at intervals not to exceed six months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed three years.
- B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed three months.
- C. In the absence of a certificate from a transferor indicating that a leak test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
- E. Sealed sources and detector cells need not be leak tested if:
- (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or
 - (iii) the half-life of the isotope is 30 days or less; or
 - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
 - (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval; they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

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- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source or detector cell shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within five days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source or detector cell involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
14. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
15. The licensee shall not acquire licensed material in a sealed source or device unless the source or device has been registered with the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or equivalent regulations of an Agreement State.
16. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.
17. The licensee shall conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license.
18. Radioactive waste generated shall be stored in accordance with the statements, representations, and procedures included with the waste storage plan described in the licensee's application dated May 18, 1995.
19. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
20. Notwithstanding the date this amendment was signed, this amendment becomes effective on the date of the closing of ownership transfer of assets, so long as that transfer occurs not later than 30 days from the date of the letter transmitting this license to the former licensee.
21. The licensee shall notify the Administrator of the appropriate NRC Regional Office listed in Appendix D to Part 20 by letter or facsimile not later than 30 days after the date of the letter transmitting this license to the former licensee of the date the transfer occurred.

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Amendment No. 44

22. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated May 18, 1995
- B. Letter dated June 27, 1995
- C. Letter dated November 15, 1995
- D. Letter dated April 23, 1996
- E. Letter dated July 10, 1996
- F. Letter dated July 17, 1996
- G. Letter dated August 16, 1996
- H. Letter dated December 15, 1998

For the U.S. Nuclear Regulatory Commission

Original signed by John R. McGrath

Date June 21, 1999

By _____

John R. McGrath
Nuclear Materials Safety Branch 2
Division of Nuclear Materials Safety
Region I
King of Prussia, Pennsylvania 19406

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MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p style="text-align: center;">Licensee</p> <p>1. Combustion Engineering, Inc.</p> <p>2. 2000 Day Hill Road P.O. Box 500 Windsor, Connecticut 06095-0500</p>	<p>In accordance with the application dated December 15, 1998,</p> <p>3. License number 06-00217-06 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration date February 28, 2001</p> <hr/> <p>5. Docket No. 030-03754 Reference No.</p>
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| <p>6. Byproduct, source, and/or special nuclear material</p> <p>A. Any byproduct material with Atomic Numbers 1 through 83</p> <p>B. Any byproduct material with Atomic Numbers 84 through 103</p> <p>C. Source material</p> <p>D. Cesium 137</p> <p>E. Americium 241</p> | <p>7. Chemical and/or physical form</p> <p>A. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, reactor coolant samples, or calibration sources</p> <p>B. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples</p> <p>C. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples</p> <p>D. Sealed sources</p> <p>E. Sealed neutron sources</p> | <p>8. Maximum amount that licensee may possess at any one time under this license</p> <p>A. 50 curies</p> <p>B. Not to exceed 3 millicuries per nuclide and 30 millicuries total</p> <p>C. 75 kilograms</p> <p>D. 215 curies</p> <p>E. Not to exceed 1 curie per source and 10 curies total</p> |
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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
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Docket or Reference Number
030-03754

Amendment No. 43

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
F. Americium 241	F. Sealed neutron sources	F. Not to exceed 10 curies per source and 100 curies total
G. Neptunium 237	G. Oxide wires	G. Not to exceed 0.5 millicuries per wire and 5 millicuries total
H. Uranium 233	H. Any	H. 1 gram
I. Uranium 235	I. Any	I. 7 grams
J. Uranium 235	J. Fission chambers	J. Not to exceed 1.7 grams per chamber and 13.6 grams total
K. Plutonium	K. Any	K. 1 milligram
L. Uranium 235	L. Any	L. 325 grams, including less than 5 kilograms UF ₆
M. Natural and/or depleted uranium	M. Any	M. 10,000 kilograms, including less than 5 kilograms UF ₆
N. Plutonium 238	N. Sealed sources	N. Not to exceed 1 gram per source and 4 grams total

9. Authorized use:

- A. through E. Research and development as defined in 10 CFR 30.4; possession incident to maintenance, repair, decontamination, and study of reactor components.
- F. 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.
- G. through J. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- K. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.
- L. Research and development as defined in 10 CFR 70.4 in the licensee's facilities located at Buildings 1, 2, 5, 6, 16, 17 and 18.
- M. Research and development in the licensee's facilities located at Buildings 1, 2, 5, 6, 16, 17 and 18.
- N. For storage only.

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Amendment No. 43

CONDITIONS

10. Licensed material may be used only at the licensee's facilities located at 2000 Day Hill Road, Windsor, Connecticut.
11. A. Licensed material shall be used by, or under the supervision of, individuals designated in writing by the Radiation Safety Committee, Dese A. Cirelli, Chairperson.
- B. The Radiation Safety Officer for this license is Stephen M. Sorensen.
12. Licensed material shall not be used in or on human beings.
13. A. Sealed sources and detector cells containing licensed material shall be tested for leakage and/or contamination at intervals not to exceed six months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed three years.
- B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed three months.
- C. In the absence of a certificate from a transferor indicating that a leak test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
- E. Sealed sources and detector cells need not be leak tested if:
- (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or
 - (iii) the half-life of the isotope is 30 days or less; or
 - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
 - (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No

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sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source or detector cell shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within five days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source or detector cell involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
14. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
15. The licensee shall not acquire licensed material in a sealed source or device unless the source or device has been registered with the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or equivalent regulations of an Agreement State.
16. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.
17. The licensee shall conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license.
18. Radioactive waste generated shall be stored in accordance with the statements, representations, and procedures included with the waste storage plan described in the licensee's application dated May 18, 1995.
19. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

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20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated May 18, 1995
- B. Letter dated June 27, 1995
- C. Letter dated November 15, 1995
- D. Letter dated April 23, 1996
- E. Letter dated July 10, 1996
- F. Letter dated July 17, 1996
- G. Letter dated August 16, 1996
- H. Letter dated December 15, 1998

For the U.S. Nuclear Regulatory Commission

Original signed by John R. McGrathDate March 18, 1999

By

John R. McGrath
John R. McGrath
Nuclear Materials Safety Branch 2
Division of Nuclear Materials Safety
Region I
King of Prussia, Pennsylvania 19406

CORRECTED COPY

MATERIALS LICENSE

Amendment No. 42

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

OFFICIAL RECORD COPY

<p>Licensee</p> <p>1. Combustion Engineering, Inc.</p> <p>2. 2000 Day Hill Road P.O. Box 500 Windsor, Connecticut 06095-0500</p>	<p>In accordance with the application dated April 23, 1996,</p> <p>3. License Number 06-00217-06 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration Date February 28, 2001</p> <hr/> <p>5. Docket or Reference No. 030-03754</p>
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6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
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. Source material	C. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples	C. 75 kilograms
D. Cesium 137	D. Sealed sources	D. 215 curies
E. Americium 241	E. Sealed neutron sources	E. Not to exceed 1 curie per source and 10 curies total
F. Americium 241	F. Sealed neutron sources	F. Not to exceed 10 curies per source and 100 curies total
G. Neptunium 237	G. Oxide wires	G. Not to exceed 0.5 millicuries per wire and 5 millicuries total
H. Uranium 233	H. Any	H. 1 gram
I. Uranium 235	I. Any	I. 7 grams
J. Uranium 235	J. Fission chambers	J. Not to exceed 1.7 grams per chamber and 13.6 grams total

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License Number

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Docket or Reference Number

030-03754

Amendment No. 42

K. Plutonium	K. Any	K. 1 milligram
L. Uranium 235	L. Any	L. 325 grams, including less than 5 kilograms UF ₆
M. Natural and/or depleted uranium	M. Any	M. 10,000 kilograms, including less than 5 kilograms UF ₆
N. Plutonium 238	N. Sealed sources	N. Not to exceed 1 gram per source and 4 grams total

9. Authorized use

- A. through E. Research and development as defined in 10 CFR 30.4; possession incident to maintenance, repair, decontamination, and study of reactor components.
- F. 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.
- G. through J. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- K. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.
- L. Research and development as defined in 10 CFR 70.4 in the licensee's facilities located at Buildings 1, 2, 5, 6, 16, 17 and 18.
- M. Research and development in the licensee's facilities located at Buildings 1, 2, 5, 6, 16, 17 and 18.
- N. For storage only.

CONDITIONS

- 10. Licensed material may be used only at the licensee's facilities located at 2000 Day Hill Road, Windsor, Connecticut.
- 11. A. Licensed material shall be used by, or under the supervision of, individuals designated in writing by the Radiation Safety Committee, Dese A. Cirelli, Chairperson.
B. The Radiation Safety Officer for this license is Stephen M. Sorensen.
- 12. Licensed material shall not be used in or on human beings.
- 13. A. Sealed sources and detector cells containing licensed material shall be tested for leakage and/or contamination at intervals not to exceed six months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed three years.
B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed three months.

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- C. In the absence of a certificate from a transferor indicating that a leak test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
- E. Sealed sources and detector cells need not be leak tested if:
- (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or
 - (iii) the half-life of the isotope is 30 days or less; or
 - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
 - (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source or detector cell shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within five days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source or detector cell involved, the test results, and corrective action taken.
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14. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
15. The licensee shall not acquire licensed material in a sealed source or device unless the source or device has been registered with the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or equivalent regulations of an Agreement State.
16. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.

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Docket or Reference Number

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- 17. The licensee shall conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license.
- 18. Radioactive waste generated shall be stored in accordance with the statements, representations, and procedures included with the waste storage plan described in the licensee's application dated May 18, 1995.
- 19. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
- 20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - A. Application dated May 18, 1995
 - B. Letter dated June 27, 1995
 - C. Letter dated November 15, 1995
 - D. Letter dated April 23, 1996
 - E. Letter dated July 10, 1996
 - F. Letter dated July 17, 1996
 - G. Letter dated August 16, 1996

For the U.S. Nuclear Regulatory Commission

Original Signed By:
Duncan White

Date OCT - 1 1996

By Nuclear Materials Safety Branch
Region I
King of Prussia, Pennsylvania 19406

MATERIALS LICENSE

Amendment No. 42

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

OFFICIAL RECORD COPY

<p style="text-align: center;">Licensee</p> <p>1. Combustion Engineering, Inc.</p> <p>2. 2000 Day Hill Road P.O. Box 500 Windsor, Connecticut 06095-0500</p>	<p>In accordance with the application dated April 23, 1996,</p> <p>3. License Number 06-00217-06 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration Date February 28, 2001</p> <hr/> <p>5. Docket or Reference No. 030-03754</p>
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| <p>6. Byproduct, Source, and/or Special Nuclear Material</p> <p>A. Any byproduct material with Atomic Numbers 1 through 83</p> <p>B. Any byproduct material with Atomic Numbers 84 through 103</p> <p>C. Source material</p> <p>D. Cesium 137</p> <p>E. Americium 241</p> <p>F. Americium 241</p> <p>G. Neptunium 237</p> <p>H. Uranium 233</p> <p>I. Uranium 235</p> <p>J. Uranium 235</p> | <p>7. Chemical and/or Physical Form</p> <p>A. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, reactor coolant samples, or calibration sources</p> <p>B. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples</p> <p>C. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples</p> <p>D. Sealed sources</p> <p>E. Sealed neutron sources</p> <p>F. Sealed neutron sources</p> <p>G. Oxide wires</p> <p>H. Any</p> <p>I. Any</p> <p>J. Fission chambers</p> | <p>8. Maximum Amount that Licensee May Possess at Any One Time Under This License</p> <p>A. 50 curies</p> <p>B. Not to exceed 3 millicuries per nuclide and 30 millicuries total</p> <p>C. 75 kilograms</p> <p>D. 215 curies</p> <p>E. Not to exceed 1 curie per source and 10 curies total</p> <p>F. Not to exceed 10 curies per source and 100 curies total</p> <p>G. Not to exceed 0.5 millicuries per wire and 5 millicuries total</p> <p>H. 1 gram</p> <p>I. 7 grams</p> <p>J. Not to exceed 1.7 grams per chamber and 13.6 grams total</p> |
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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number

06-00217-06

Docket or Reference Number

030-03754

Amendment No. 42

K. Plutonium	K. Any	K. 1 milligram
L. Uranium 235	L. Any	L. 325 grams, including less than 5 kilograms UF ₆
M. Natural and/or depleted uranium	M. Any	M. 10,000 kilograms, including less than 5 kilograms UF ₆
N. Plutonium 238	N. Sealed sources	N. Not to exceed 1 gram per source and 4 grams total

9. Authorized use

- A. through E. Research and development as defined in 10 CFR 30.4; possession incident to maintenance, repair, decontamination, and study of reactor components.
- F. 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.
- G. through J. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- K. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.
- L. Research and development as defined in 10 CFR 70.4 in the licensee's facilities located at Buildings 2, 5, 6, 17 and 18.
- M. Research and development in the licensee's facilities located at Buildings 2, 5, 6, 17 and 18.
- N. For storage only.

CONDITIONS

- 10. Licensed material may be used only at the licensee's facilities located at 2000 Day Hill Road, Windsor, Connecticut.
- 11. A. Licensed material shall be used by, or under the supervision of, individuals designated in writing by the Radiation Safety Committee, Dese A. Cirelli, Chairperson.
B. The Radiation Safety Officer for this license is Stephen M. Sorensen.
- 12. Licensed material shall not be used in or on human beings.
- 13. A. Sealed sources and detector cells containing licensed material shall be tested for leakage and/or contamination at intervals not to exceed six months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed three years.
B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed three months.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number

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Docket or Reference Number

030-03754

Amendment No. 42

- C. In the absence of a certificate from a transferor indicating that a leak test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
- E. Sealed sources and detector cells need not be leak tested if:
- (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or
 - (iii) the half-life of the isotope is 30 days or less; or
 - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
 - (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source or detector cell shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within five days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source or detector cell involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
14. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
15. The licensee shall not acquire licensed material in a sealed source or device unless the source or device has been registered with the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or equivalent regulations of an Agreement State.
16. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number

06-00217-06

Docket or Reference Number

030-03754

Amendment No. 42

17. The licensee shall conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license.
18. Radioactive waste generated shall be stored in accordance with the statements, representations, and procedures included with the waste storage plan described in the licensee's application dated May 18, 1995.
19. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - A. Application dated May 18, 1995
 - B. Letter dated June 27, 1995
 - C. Letter dated November 15, 1995
 - D. Letter dated April 23, 1996
 - E. Letter dated July 10, 1996
 - F. Letter dated July 17, 1996
 - G. Letter dated August 16, 1996

For the U.S. Nuclear Regulatory Commission

Original Signed By:
Duncan WhiteDate SEP - 5 1996By _____
Nuclear Materials Safety Branch
Region I
King of Prussia, Pennsylvania 19406

MATERIALS LICENSE

Amendment No. 41

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

OFFICIAL RECORD COPY

<p>Licensee</p> <p>1. Combustion Engineering, Inc.</p> <p>2. 1000 Prospect Hill Road Windsor, Connecticut 06095-0500</p>	<p>In accordance with the application dated May 18, 1995,</p> <p>3. License Number 06-00217-06 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration Date February 28, 2001</p> <hr/> <p>5. Docket or Reference No. 030-03754</p>
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6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
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. Any source material	C. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples	C. 75 kilograms
D. Cesium 137	D. Sealed sources	D. 215 curies
E. Americium 241	E. Sealed neutron sources	E. Not to exceed 1 curie per source and 10 curies total
F. Americium 241	F. Sealed neutron sources	F. Not to exceed 10 curies per source and 100 curies total
G. Neptunium 237	G. Oxide wires	G. Not to exceed 0.5 millicuries per wire and 5 millicuries total
H. Uranium 233	H. Any	H. 1 gram
I. Uranium 235	I. Any	I. 7 grams
J. Uranium 235	J. Fission chambers	J. Not to exceed 1.7 grams per chamber and 13.6 grams total

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 41

- | | | |
|------------------------------------|--------|--|
| K. Plutonium | K. Any | K. 1 milligram |
| L. Uranium 235 | L. Any | L. 341 grams, including less than 5 kilograms UF ₆ . |
| M. Natural and/or depleted uranium | M. Any | M. 10,000 kilograms, including less than 5 kilograms UF ₆ . |

9. Authorized use

- A. through E. Research and development as defined in 10 CFR 30.4; possession incident to maintenance, repair, decontamination, and study of reactor components.
- F. 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.
- G. through J. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- K. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.
- L. Research and development as defined in 10 CFR 70.4 in the licensee's facilities located at Buildings 2, 5, 6, and 18.
- M. Research and development in the licensee's facilities located at Buildings 2, 5, 6, and 18.

CONDITIONS

- 10. Licensed material may be used only at the licensee's facilities located at 1000 Prospect Hill Road, Windsor, Connecticut.
- 11. A. Licensed material shall be used by, or under the supervision of, individuals designated in writing by the Radiation Safety Committee, Dese A. Cirelli, Chairperson.
B. The Radiation Safety Officer for this license is Stephen M. Sorensen.
- 12. Licensed material shall not be used in or on human beings.
- 13. A. Sealed sources and detector cells containing licensed material shall be tested for leakage and/or contamination at intervals not to exceed six months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed three years.
B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed three months.
C. In the absence of a certificate from a transferor indicating that a leak test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.

MATERIALS LICENSE
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License number

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Docket or Reference number

030-03754

Amendment No. 41

- D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
- E. Sealed sources and detector cells need not be leak tested if:
- (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or
 - (iii) the half-life of the isotope is 30 days or less; or
 - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
 - (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source or detector cell shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within five days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source or detector cell involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
14. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
15. The licensee shall not acquire licensed material in a sealed source or device unless the source or device has been registered with the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or equivalent regulations of an Agreement State.
16. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.
17. The licensee shall conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

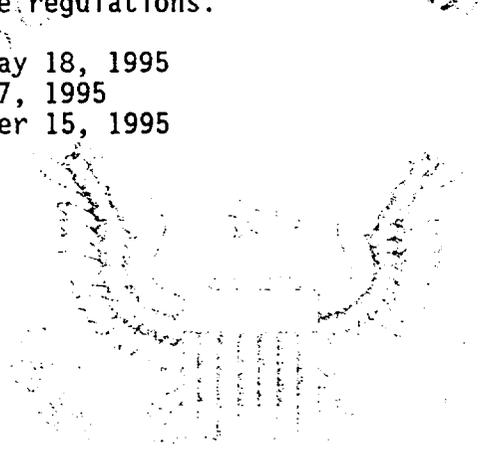
06-00217-06

Docket or Reference number

030-03754

Amendment No. 41

18. Radioactive waste generated shall be stored in accordance with the statements, representations, and procedures included with the waste storage plan described in the licensee's application dated May 18, 1995.
19. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Application dated May 18, 1995
 - B. Letter dated June 27, 1995
 - C. Letter dated November 15, 1995



For the U.S. Nuclear Regulatory Commission

Signed By:
Gordon White

Date _____

By _____
Nuclear Materials Safety Branch
Region I
King of Prussia, Pennsylvania 19406

MATERIALS LICENSE

Amendment No. 40

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p style="text-align: center;">Licensee</p> <p>1. ABB Combustion Engineering, Inc.</p> <p>2. 1000 Prospect Hill Road P. O. Box 500 Windsor, Connecticut 06095</p>	<p>In accordance with letter dated July 7, 1994,</p> <p>3. License number 06-00217-06 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration date June 30, 1995</p> <hr/> <p>5. Docket or Reference No. 030-03754</p>
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<p>6. Byproduct, source, and/or special nuclear material</p> <p>A. Any byproduct material with Atomic Numbers 1 through 83</p> <p>B. Any byproduct material with Atomic Numbers 84 through 103</p> <p>C. Cesium 137</p> <p>D. Americium 241</p> <p>E. Americium 241</p> <p>F. Neptunium 237</p> <p>G. Uranium 233</p> <p>H. Uranium 235</p> <p>I. Uranium 235</p> <p>J. Plutonium</p>	<p>7. Chemical and/or physical form</p> <p>A. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, reactor coolant samples, or calibration sources</p> <p>B. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples</p> <p>C. Sealed sources</p> <p>D. Sealed neutron sources</p> <p>E. Sealed neutron sources</p> <p>F. Oxide wires</p> <p>G. Any</p> <p>H. Any</p> <p>I. Fission chambers</p> <p>J. Any</p>	<p>8. Maximum amount that licensee may possess at any one time under this license</p> <p>A. 50 curies</p> <p>B. Not to exceed 3 millicuries per nuclide and 30 millicuries total</p> <p>C. 215 curies</p> <p>D. Not to exceed 1 curie per source and 10 curies total</p> <p>E. Not to exceed 10 curies per source and 100 curies total</p> <p>E. Not to exceed 0.5 millicuries per wire and 5 millicuries total</p> <p>G. 1 gram</p> <p>H. 7 grams</p> <p>I. Not to exceed 1.7 grams per chamber and 13.6 grams total</p> <p>J. 1 milligram</p>
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MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 40

9. Authorized use

- 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 material 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.

CONDITIONS

- 10. Licensed material may be used only at the licensee's facilities at 1000 Prospect Hill Road, Windsor, Connecticut.
- 11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the Radiation Safety Committee.
B. The Radiation Safety Officer for this license is Stephen M. Sorensen.
- 12. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed 3 years.
B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.
C. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
E. Sealed sources and detector cells need not be leak tested if:
 - (i) they contain only hydrogen 3; or
 - (ii) they contain only a gas; or
 - (iii) the half-life of the isotope is 30 days or less; or

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

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Docket or Reference number

030-03754

Amendment No. 40

(12. Continued)

CONDITIONS

- (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
- (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source shall be removed from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.

- 13. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in 10 CFR 20.203(a)(1), the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols.
- 14. Detector cells containing a titanium tritide foil or a scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding that specified by the manufacturer.
- 15. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 5 years from the date of each inventory.
- 16. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
- 17. The licensee shall not use licensed material in or on human beings or in field applications where activity is released except as provided otherwise by specific condition of this license.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number	06-00217-06
Docket or Reference number	030-03754
Amendment No. 40	

(Continued)

CONDITIONS

18. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders or detector cells by the licensee.
19. The licensee shall not acquire licensed material in a sealed source or in a device that contains a sealed source unless the source or device has been registered with the Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State.
20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - A. Application dated December 14, 1989
 - B. Letter dated March 30, 1990
 - C. Letter dated April 24, 1990
 - D. Letter dated November 23, 1992
 - E. Letter dated July 7, 1994

For the U.S. Nuclear Regulatory Commission

Original Signed By:
Francis M. Costello

By

Nuclear Materials Safety Branch
Region I
King of Prussia, Pennsylvania 19406

Date AUG 17 1994

MATERIALS LICENSE

Amendment No. 39

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee		In accordance with letter dated May 18, 1994,	
1. ABB Combustion Engineering, Inc.		3. License number 06-00217-06 is amended in its entirety to read as follows:	
2. 1000 Prospect Hill Road P. O. Box 500 Windsor, Connecticut 06095		4. Expiration date June 30, 1995	
		5. Docket or Reference No. 030-03754	
6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license	
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	E. 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	I. Not to exceed 1.7 grams per chamber and 13.6 grams total	
J. Plutonium	J. Any	J. 1 milligram	

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MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 39

9. Authorized use

- 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 material 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.

CONDITIONS

- 10. Licensed material may be used only at the licensee's facilities at 1000 Prospect Hill Road, Windsor, Connecticut.
- 11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the Radiation Safety Committee.
B. The Radiation Safety Officer for this license is Stephen M. Sorensen.
- 12. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed 3 years.
B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months. ★ ★ ★ ★ ★
C. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
E. Sealed sources and detector cells need not be leak tested if:
 - (i) they contain only hydrogen 3; or
 - (ii) they contain only a gas; or
 - (iii) the half-life of the isotope is 30 days or less; or

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 39

(12. Continued)

CONDITIONS

- (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
- (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source shall be removed from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
13. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in 10 CFR 20.203(a)(1), the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols.
14. Detector cells containing a titanium tritide foil or a scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding that specified by the manufacturer.
15. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 5 years from the date of each inventory.
16. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
17. The licensee shall not use licensed material in or on human beings or in field applications where activity is released except as provided otherwise by specific condition of this license.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

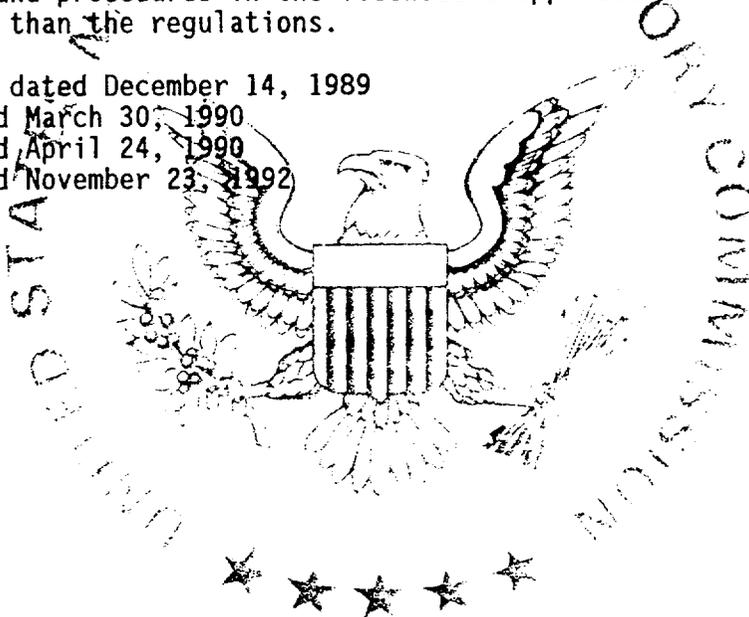
030-03754

Amendment No. 39

(Continued)

CONDITIONS

- 18. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders or detector cells by the licensee.
- 19. The licensee shall not acquire licensed material in a sealed source or in a device that contains a sealed source unless the source or device has been registered with the Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State.
- 20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - A. Application dated December 14, 1989
 - B. Letter dated March 30, 1990
 - C. Letter dated April 24, 1990
 - D. Letter dated November 23, 1992



For the U.S. Nuclear Regulatory Commission

Original Signed By:

Francis M. Costello

By

Nuclear Materials Safety Branch
Region I
King of Prussia, Pennsylvania 19406

Date

JUL 19 1992

CORRECTED COPY

MATERIALS LICENSE

Amendment No. 38

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee		
1. ABB Combustion Engineering, Inc. 2. 1000 Prospect Hill Road P. O. Box 500 Windsor, Connecticut 06095		In accordance with letter dated November 23, 1992, 3. License number 06-00217-06 is amended in its entirety to read as follows:
		4. Expiration date June 30, 1995
		5. Docket or Reference No 030-03754
6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
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	E. 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	I. Not to exceed 1.7 grams per chamber and 13.6 grams total
J. Plutonium	J. Any	J. 1 milligram

090049

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

CORRECTED COPY

Amendment No. 38

9. Authorized use

- 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 material 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.

CONDITIONS

- 10. Licensed material may be used only at the licensee's facilities at 1000 Prospect Hill Road, Windsor, Connecticut.
- 11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the Radiation Safety Committee.
B. The Radiation Safety Officer for this license is James M. Lambert.
- 12. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed 3 years.
B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.
C. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
E. Sealed sources and detector cells need not be leak tested if:
 - (i) they contain only hydrogen 3; or
 - (ii) they contain only a gas; or
 - (iii) the half-life of the isotope is 30 days or less; or

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

030-03754

CORRECTED COPY

Amendment No. 38

(12. Continued)

CONDITIONS

- (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
- (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source shall be removed from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
13. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in 10 CFR 20.203(a)(1), the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols.
14. Detector cells containing a titanium tritide foil or a scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding that specified by the manufacturer.
15. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 5 years from the date of each inventory.
16. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
17. The licensee shall not use licensed material in or on human beings or in field applications where activity is released except as provided otherwise by specific condition of this license.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

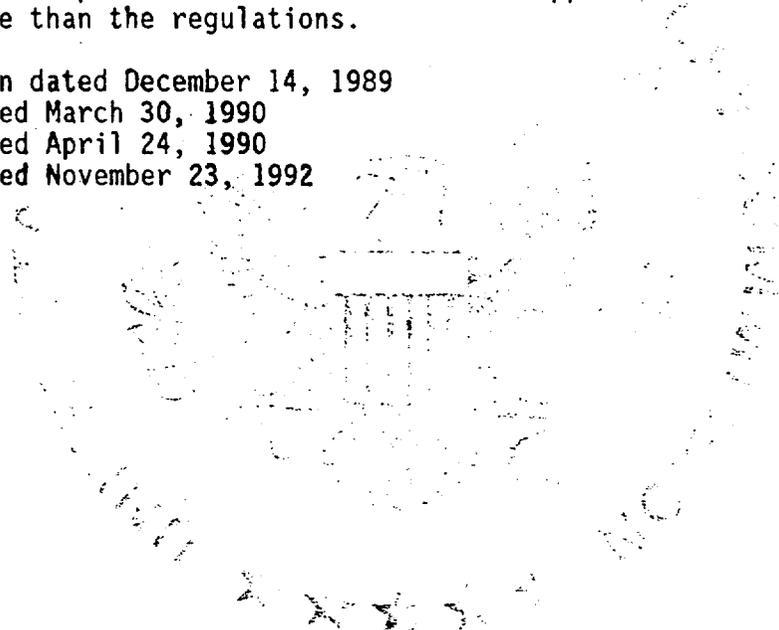
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Amendment No. 38

(Continued)

CONDITIONS

- 18. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders or detector cells by the licensee.
- 19. The licensee shall not acquire licensed material in a sealed source or in a device that contains a sealed source unless the source or device has been registered with the Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State.
- 20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - A. Application dated December 14, 1989
 - B. Letter dated March 30, 1990
 - C. Letter dated April 24, 1990
 - D. Letter dated November 23, 1992



For the U.S. Nuclear Regulatory Commission

Original Signed By:

By Ehizabeth Ullrich

Nuclear Materials Safety Branch
Region I

King of Prussia, Pennsylvania 19406

Date

MAY 25 1993

MATERIALS LICENSE

Amendment No. 38

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p style="text-align: center;">Licensee</p> <p>1. ABB Combustion Engineering Nuclear Power</p> <p>2. 1000 Prospect Hill Road P. O. Box 500 Windsor, Connecticut 06095</p>	<p>In accordance with letter dated November 23, 1992,</p> <p>3. License number 06-00217-06 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration date June 30, 1995</p> <hr/> <p>5. Docket or Reference No 030-03754</p>
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<p>6. Byproduct, source, and/or special nuclear material</p> <p>A. Any byproduct material with Atomic Numbers 1 through 83</p> <p>B. Any byproduct material with Atomic Numbers 84 through 103</p> <p>C. Cesium 137</p> <p>D. Americium 241</p> <p>E. Americium 241</p> <p>F. Neptunium 237</p> <p>G. Uranium 233</p> <p>H. Uranium 235</p> <p>I. Uranium 235</p> <p>J. Plutonium</p>	<p>7. Chemical and/or physical form</p> <p>A. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, reactor coolant samples, or calibration sources</p> <p>B. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples</p> <p>C. Sealed sources</p> <p>D. Sealed neutron sources</p> <p>E. Sealed neutron sources</p> <p>F. Oxide wires</p> <p>G. Any</p> <p>H. Any</p> <p>I. Fission chambers</p> <p>J. Any</p>	<p>8. Maximum amount that licensee may possess at any one time under this license</p> <p>A. 50 curies</p> <p>B. Not to exceed 3 millicuries per nuclide and 30 millicuries total</p> <p>C. 215 curies</p> <p>D. Not to exceed 1 curie per source and 10 curies total</p> <p>E. Not to exceed 10 curies per source and 100 curies total</p> <p>F. Not to exceed 0.5 millicuries per wire and 5 millicuries total</p> <p>G. 1 gram</p> <p>H. 7 grams</p> <p>I. Not to exceed 1.7 grams per chamber and 13.6 grams total</p> <p>J. 1 milligram</p>
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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 38

9. Authorized use

- A. through D. For use in research and development as defined in 10 CFR 30.4, and for possession incident to maintenance, repair, decontamination, and study of reactor components.
- E. For use in 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 material 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.

CONDITIONS

- 10. Licensed material may be used only at the licensee's facilities at 1000 Prospect Hill Road, Windsor, Connecticut.
- 11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the Radiation Safety Committee.
B. The Radiation Safety Officer for this license is James M. Limbert.
- 12. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed 3 years.
B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.
C. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
E. Sealed sources and detector cells need not be leak tested if:
 - (i) they contain only hydrogen 3; or
 - (ii) they contain only a gas; or
 - (iii) the half-life of the isotope is 30 days or less; or

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 38

(12. Continued)

CONDITIONS

- (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
- (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source shall be removed from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
13. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in 10 CFR 20.203(a)(1), the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols.
14. Detector cells containing a titanium tritide foil or a scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding that specified by the manufacturer.
15. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 5 years from the date of each inventory.
16. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
17. The licensee shall not use licensed material in or on human beings or in field applications where activity is released except as provided otherwise by specific condition of this license.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 38

(Continued)

CONDITIONS

18. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders or detector cells by the licensee.
19. The licensee shall not acquire licensed material in a sealed source or in a device that contains a sealed source unless the source or device has been registered with the Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State.
20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - A. Application dated December 14, 1989
 - B. Letter dated March 30, 1990
 - C. Letter dated April 24, 1990
 - D. Letter dated November 23, 1992

Date _____

JAN 20 1993

For the U.S. Nuclear Regulatory Commission

Original Signed By:

Elizabeth Ulrich

By _____

Nuclear Materials Safety Branch
Region I

King of Prussia, Pennsylvania 19406

MATERIALS LICENSE

Amendment No. 37

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee

- 1. ABB Combustion Engineering Nuclear Power
- 2. 1000 Prospect Hill Road
P. O. Box 500
Windsor, Connecticut 06095

In accordance with letter dated November 6, 1990,
3. License number 06-00217-06 is amended in its entirety to read as follows:

4. Expiration date June 30, 1995

5. Docket or Reference No 030-03754

6. Byproduct, source, and/or special nuclear material

7. Chemical and/or physical form

8. Maximum amount that licensee may possess at any one time under this license

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
D. Americium 241

C. Sealed sources
D. Sealed neutron sources

C. 215 curies
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
H. Uranium 235
I. Uranium 235

G. Any
H. Any
I. Fission chambers

G. 1 gram
H. 7 grams
I. Not to exceed 1.7 grams per chamber and 13.6 grams total

J. Plutonium
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REG1 LIC30
MATLSLICENSING PDR

J. Any

J. 1 milligram

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 37

9. Authorized use

- A. through D. For use in research and development as defined in 10 CFR 30.4, and for possession incident to maintenance, repair, decontamination, and study of reactor components.
- E. For use in 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 material 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.

CONDITIONS

- 10. Licensed material may be used only at the licensee's facilities at 1000 Prospect Hill Road, Windsor, Connecticut.
- 11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the Radiation Safety Committee.
B. The Radiation Safety Officer for this license is James M. Limbert.
- 12. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed 3 years.
B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.
C. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
E. Sealed sources and detector cells need not be leak tested if:
 - (i) they contain only hydrogen 3; or
 - (ii) they contain only a gas; or
 - (iii) the half-life of the isotope is 30 days or less; or
 - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 37

(12.E. Continued)

CONDITIONS

- (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
- F. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source shall be removed from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
13. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in 10 CFR 20.203(a)(1), the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols.
14. Detector cells containing a titanium tritide foil or a scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding that specified by the manufacturer.
15. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 5 years from the date of each inventory.
16. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
17. Licensed material shall not be used in or on human beings.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 37

(Continued)

CONDITIONS

18. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders or detector cells by the licensee.
19. The licensee shall not acquire licensed material in a sealed source or in a device that contains a sealed source unless the source or device has been registered with the Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State.
20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - A. Application dated December 14, 1989
 - B. Letter dated March 30, 1990
 - C. Letter dated April 24, 1990

For the U.S. Nuclear Regulatory Commission

Original Signed By

By John D. Kinneman

Nuclear Materials Safety Branch

Region I

King of Prussia, Pennsylvania 19406

Date Oct 11 1991

SECOND CORRECTED COPY

MATERIALS LICENSE

Amendment No. 36

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p>Licensee</p> <p>1. ABB Combustion Engineering Nuclear Power</p> <p>2. 1000 Prospect Hill Road P. O. Box 500 Windsor, Connecticut 06095</p>		<p>In accordance with application dated December 14, 1989,</p> <p>3. License number 06-00217-06 is amended in its entirety to read as follows:</p>	
		4. Expiration date	June 30, 1995
		5. Docket or Reference No	030-03754
6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license	
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. Plutonium	I. Any	I. 1 milligram	

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

SECOND CORRECTED COPY

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 36

9. Authorized use

- A. through D. For use in research and development as defined in Section 30.4(q) 10 CFR Part 30, and for possession incident to maintenance, repair, decontamination, and study of reactor components.
- E. For use in 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. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- G. through I. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.

CONDITIONS

- 10. Licensed material shall be used only at the licensee's facilities at 1000 Prospect Hill Road, Windsor, Connecticut.
- 11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the Radiation Safety Committee.
B. The Radiation Safety Officer for this license is James M. Limbert.
- 12. A(1) Each sealed source or detector cell acquired from another person and containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for contamination and/or leakage before use. In the absence of a certificate from a transferor indicating that a test has been made within 6 months before the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
(2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source or detector cell is exempt from such leak tests when the source or detector cell contains 100 microcuries or less of beta and/or gamma emitting materials or 10 microcuries or less of alpha emitting material.
(3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage before any use or transfer to another person unless they have been leak tested within 6 months before the date of use or transfer.
B. Each sealed source or detector cell fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source or detector cell. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source or detector cell until it has been repaired, decontaminated and retested.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

030-03754

SECOND CORRECTED COPY

Amendment No. 36

(12. Continued)

CONDITIONS

- C. Each sealed source containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed 6 months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed 3 months.
- D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or detector cell or from the surfaces of the device in which the sealed source or detector cell is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission. Records may be disposed of following Commission inspection.
- E. If the test required by Subsection A, or C, of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source or detector cell from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the date the leak test result is known with the U. S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allegheny Road, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.
13. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in Section 20.203(a)(5), of 10 CFR Part 20, the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.
14. Detector cells containing titanium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 225 degrees Centigrade.
15. Detector cells containing scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 325 degrees Centigrade.
16. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 3 years from the date of each inventory.
17. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
18. Licensed material shall not be used in or on human beings.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

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License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 36

(Continued)

CONDITIONS

- 19. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders or detector cells by the licensee.
- 20. The licensee shall not acquire licensed material in a sealed source or in a device that contains a sealed source unless the source or device has been registered with the Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State.
- 21. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - A. Application dated December 14, 1989
 - B. Letter dated March 30, 1990
 - C. Letter dated April 24, 1990

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Date SEP 27 1990

For the U.S. Nuclear Regulatory Commission
Original Signed By:
By Francis M. Costello
Nuclear Materials Safety Branch
Region I
King of Prussia, Pennsylvania 19406

CORRECTED COPY

MATERIALS LICENSE

Amendment No. 36

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee		In accordance with application dated December 14, 1989,
1. ABB Combustion Engineering Nuclear Power		3. License number 06-00217-06 is amended in its entirety to read as follows:
2. 1000 Prospect Hill Road P. U. Box 500 Windsoe, Connecticut 06095		4. Expiration date June 30, 1995
		5. Docket or Reference No 030-03754
6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
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	I. Not to exceed 1.7 grams per chamber and 13.6 grams total
J. Plutonium	J. Any	J. 1 milligram

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

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Amendment No. 36

9. Authorized use

- A. through D. For use in research and development as defined in Section 30.4(q) 10 CFR Part 30, and for possession incident to maintenance, repair, decontamination and study of reactor components.
- E. For use in 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 material 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.

CONDITIONS

- 10. Licensed material shall be used only at the licensee's facilities at 1000 Prospect Hill Road, Windsor, Connecticut.
- 11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the Radiation Safety Committee.
B. The Radiation Safety Officer for this license is James M. Limbert.
- 12. A(1) Each sealed source or detector cell acquired from another person and containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for contamination and/or leakage before use. In the absence of a certificate from a transferor indicating that a test has been made within 6 months before the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
(2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source or detector cell is exempt from such leak tests when the source or detector cell contains 100 microcuries or less of beta and/or gamma emitting materials or 10 microcuries or less of alpha emitting material.
(3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage before any use or transfer to another person unless they have been leak tested within 6 months before the date of use or transfer.
B. Each sealed source or detector cell fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source or detector cell. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source or detector cell until it has been repaired, decontaminated and retested.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

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Docket or Reference number

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Amendment No. 36

(12. Continued)

CONDITIONS

- C. Each sealed source containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed 6 months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed 3 months.
 - D. The test shall be capable of detecting the presence of 0.005 microcurie or radioactive material on the test sample. The test sample shall be taken from the sealed source or detector cell or from the surfaces of the device in which the sealed source or detector cell is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission. Records may be disposed of following Commission inspection.
 - E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source or detector cell from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the date the leak test result is known with the U. S. Nuclear Regulatory Commission, Region 1, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.
- 13. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in Section 20.203(a)(1), of 10 CFR Part 20, the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.
 - 14. Detector cells containing titanium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 225 degrees Centigrade.
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 - 16. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 3 years from the date of each inventory.
 - 17. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
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MATERIALS LICENSE
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License number

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Amendment No. 36

(Continued)

CONDITIONS

- 19. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders or detector cells by the licensee.
- 20. The licensee shall not acquire licensed material in a sealed source or in a device that contains a sealed source unless the source or device has been registered with the Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State.
- 21. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - A. Application dated December 14, 1989
 - B. Letter dated March 30, 1990
 - C. Letter dated April 24, 1990

For the U.S. Nuclear Regulatory Commission

Original Signed By:

Francis M. Costello

By

Nuclear Materials Safety Branch

Region I

King of Prussia, Pennsylvania 19406

Date

JUL 12 1990

MATERIALS LICENSE

Amendment No. 35

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p>Licensee</p> <p>1. ABB Combustion Engineering Nuclear Power</p> <p>2. 1000 Prospect Hill Road P. O. Box 500 Windsoe, Connecticut 06095</p>		<p>In accordance with application dated December 14, 1989,</p> <p>3. License number 06-00217-06 is amended in its entirety to read as follows:</p>
		<p>4. Expiration date June 30, 1995</p>
		<p>5. Docket or Reference No. 030-03754</p>
<p>6. Byproduct, source, and/or special nuclear material</p> <p>A. Any byproduct material with Atomic Numbers 1 through 83</p> <p>B. Any byproduct material with Atomic Numbers 84 through 103</p> <p>C. Cesium 137</p> <p>D. Americium 241</p> <p>E. Americium 241</p> <p>F. Neptunium 237</p> <p>G. Uranium 233</p> <p>H. Uranium 235</p> <p>I. Uranium 235</p> <p>J. Plutonium</p>	<p>7. Chemical and/or physical form</p> <p>A. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, reactor coolant samples, or calibration sources</p> <p>B. Irradiated and/or contaminated reactor components, inspection and test equipment, calibration sources or reactor coolant samples</p> <p>C. Sealed sources</p> <p>D. Sealed neutron sources</p> <p>E. Sealed neutron sources</p> <p>F. Oxide wires</p> <p>G. Any</p> <p>H. Any</p> <p>I. Fission Chambers</p> <p>J. Any</p>	<p>8. Maximum amount that licensee may possess at any one time under this license</p> <p>A. 50 curies</p> <p>B. Not to exceed 3 millicuries per nuclide and 30 millicuries total</p> <p>C. 215 curies</p> <p>D. Not to exceed 1 curie per source and 10 curies total</p> <p>E. Not to exceed 10 curies per source and 100 curies total</p> <p>F. Not to exceed 0.5 millicuries per wire and 5 millicuries total</p> <p>G. 1 gram</p> <p>H. 7 grams</p> <p>I. Not to exceed 1.7 grams per chamber and 13.6 grams total</p> <p>J. 1 milligram</p>

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 35

9. Authorized use

- A. through D. For use in research and development as defined in Section 30.4(q) 10 CFR Part 30, and for possession incident to maintenance, repair, decontamination and study of reactor components.
- E. For use in 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 material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
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MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 35

(12. Continued)

CONDITIONS

- C. Each sealed source containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed 6 months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed 3 months.
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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number	06-00217-06
Docket or Reference number	030-03754
Amendment No. 35	

(Continued)

CONDITIONS

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 - B. Letter dated March 30, 1990
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Date

JUN 02 1990

For the U.S. Nuclear Regulatory Commission

Original Signed By:

Francis M. Costello

By

Nuclear Materials Safety Branch
Region I

King of Prussia, Pennsylvania 19406

MATERIALS LICENSE

Amendment No. 35

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Licensee		In accordance with letter dated September 25, 1987,	
1. Combustion Engineering, Inc. Power Systems Group 2. 1000 Prospect Hill Road Windsor, Connecticut 06095		3. License number 06-00217-06 is amended in its entirety to read as follows:	
		4. Expiration date January 31, 1990	
		5. Docket or Reference No. 030-03754	
6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license	
A. Any byproduct material with Atomic Numbers between 1 and 83, inclusive	A. Any	A. Not to exceed 2 curies total	
B. Any byproduct material	B. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, or reactor coolant samples	B. Not to exceed 51 curies	
C. Cesium 137	C. Sealed sources	C. 125 curies	
D. Cobalt 60	D. Sealed sources	D. 250 millicuries	
E. Americium 241	E. Any	E. 1 millicurie	
F. Americium 241	F. Sealed neutron sources	F. 10 sources not to exceed 1.0 curie per source	
G. Americium 241	G. Sealed neutron sources	G. 10 sources not to exceed 10 curies per source	
H. Neptunium 237	H. Sealed sources	H. 10 sources not to exceed 0.5 millicuries per source	
I. Plutonium 238	I. Sealed Plutonium-berylliumneutron sources (MRC-PU8BE-XXX)	I. 80 curies (3.5 grams) Not to exceed 20 curies per source	
J. Any byproduct material with Atomic Nos. between 84 and 103, inclusive	J. Irradiated and/or contaminated reactor components, tools and equipment, test samples, or reactor coolant samples	J. Not to exceed 3 millicuries each nuclide Atomic Nos. between 84 and 103 inclusive	
K. Uranium 233	K. Any	K. 1 gram	
L. Uranium 235	L. Any	L. 7 grams	
M. Plutonium	M. Any	M. 1 gram	
N. Cesium 137	N. Sealed source (Amersham Model CO	N. 1.2 curies	

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

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030-03754

Amendment No. 35

9. Authorized use

- A. through E. For use in research and development as defined in Section 30.4(q) 10 CFR Part 30, and for possession incident to calibration maintenance, repair, decontamination, and study of reactor components.
- F. For use in 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.
- G. through I. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- J. through M. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.
- N. For use in J.L. Shepherd Model 28-6 Dosimeter Calibrator for calibration of instruments.

CONDITIONS

- 10. Licensed material shall be used only at the licensee's facilities, 100 Prospect Hill Road, Windsor, Connecticut.
- 11. Licensed material shall be used by, or under the supervision of, individuals designated by Philip R. Rosenthal or Steven M. Sorensen, Radiation Safety Officer.
- 12. A(1) Each sealed source or detector cell acquired from another person and containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for contamination and/or leakage before use. In the absence of a certificate from a transferor indicating that a test has been made within 6 months before the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
 - (2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source or detector cell is exempt from such leak tests when the source or detector cell contains 100 microcuries or less of beta and/or gamma emitting materials or 10 microcuries or less of alpha emitting material.
 - (3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage before any use or transfer to another person unless they have been leak tested within 6 months before the date of use or transfer.
- B. Each sealed source or detector cell fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source or detector cell. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source or detector cell until it has been repaired, decontaminated and retested.

MATERIALS LICENSE
SUPPLEMENTARY SHEETLicense number
06-00217-06Docket or Reference number
030-03754

Amendment No. 35

(12. continued)

CONDITIONS

- C. Each sealed source containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed 6 months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed 3 months.
- D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or detector cell or from the surfaces of the device in which the sealed source or detector cell is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission. Records may be disposed of following Commission inspection.
- E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source or detector cell from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the date the leak test result is known with the U. S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety and Safeguards Branch, 631 Park Avenue, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.
13. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in Section 20.203(a)(1), of 10 CFR Part 20, the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.
14. Detector cells containing titanium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 225 degrees Centigrade.
15. Detector cells containing scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 325 degrees Centigrade.
16. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 2 years from the date of each inventory.
17. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material".
18. Licensed material shall not be used in or on human beings.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number	06-00217-06
Docket or Reference number	030-03754
Amendment No. 35	

(Continued)

CONDITIONS

19. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated November 30, 1983
- B. Letter dated November 7, 1984
- C. Letter dated January 21, 1985
- D. Letter dated May 13, 1986
- E. Letter dated September 25, 1987

For the U.S. Nuclear Regulatory Commission

Original Signed By:
Jack Davis

Date 30 OCT 1987

By _____
Nuclear Materials Safety and
Safeguards Branch, Region I
King of Prussia, Pennsylvania 19406

MATERIALS LICENSE

Amendment No. 34

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee 1. Combustion Engineering, Inc. Power Systems Group 2. 1000 Prospect Hill Road Windsor, Connecticut 06095		In accordance with letter dated May 13, 1986, 3. License number 06-00217-06 is amended in its entirety to read as follows:	
		4. Expiration date January 31, 1990	
		5. Docket or Reference No. 030-03754	
6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license	
A. Any byproduct material with Atomic Numbers between 1 and 83, inclusive B. Any byproduct material	A. Any B. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, or reactor coolant samples	A. Not to exceed 2 curies total B. Not to exceed 51 curies	
C. Cesium 137 D. Cobalt 60 E. Americium 241 F. Americium 241	C. Sealed sources D. Sealed sources E. Any F. Sealed neutron sources	C. 125 curies D. 250 millicuries E. 1 millicurie F. 10 sources not to exceed 1.0 curie per source	
G. Americium 241	G. Sealed neutron sources	G. 10 sources not to exceed 10 curies per source	
H. Neptunium 237	H. Sealed sources	H. 10 sources not to exceed 0.5 millicuries per source	
I. Plutonium 238	I. Sealed Plutonium- berylliumneutron sources (MRC-PU8BE-XXX)	I. 80 curies (3.5 grams) Not to exceed 20 curies per source	
J. Any byproduct material with Atomic Nos. between 84 and 103, inclusive	J. Irradiated and/or contaminated reactor components, tools and equipment, test samples, or reactor coolant samples	J. Not to exceed 3 millicuries each nuclide Atomic Nos. between 84 and 103 inclusive	
K. Uranium 233 L. Uranium 235 M. Plutonium	K. Any L. Any M. Any	K. 1 gram L. 7 grams M. 2 grams	

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MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 34

9. Authorized use

- A. through E. For use in research and development as defined in Section 30.4(q) 10 CFR Part 30, and for possession incident to maintenance repair, decontamination, and study of reactor components.
- F. For use in 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.
- G. through I. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.
- J. through M. For possession as surface contamination on tools or equipment incident to maintenance, repair, modification or storage.

CONDITIONS

10. Licensed material shall be used only at the licensee's facilities, 100 Prospect Hill Road, Windsor, Connecticut.
11. Licensed material shall be used by, or under the supervision of, individuals designated by Philip R. Rosenthal or Edward Gordon, Radiation Safety Officer.
12. A(1) Each sealed source or detector cell acquired from another person and containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for contamination and/or leakage before use. In the absence of a certificate from a transferor indicating that a test has been made within 6 months before the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- (2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source or detector cell is exempt from such leak tests when the source or detector cell contains 100 microcuries or less of beta and/or gamma emitting materials or 10 microcuries or less of alpha emitting material.
- (3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage before any use or transfer to another person unless they have been leak tested within 6 months before the date of use or transfer.
- B. Each sealed source or detector cell fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source or detector cell. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source or detector cell until it has been repaired, decontaminated and retested.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 34

(12. continued)

CONDITIONS

- C. Each sealed source containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed 6 months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed 3 months.
- D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or detector cell or from the surfaces of the device in which the sealed source or detector cell is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission. Records may be disposed of following Commission inspection.
- E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source or detector cell from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the date the leak test result is known with the U. S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety and Safeguards Branch, 631 Park Avenue, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.
13. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in Section 20.203(a)(1), of 10 CFR Part 20, the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.
14. Detector cells containing titanium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 225 degrees Centigrade.
15. Detector cells containing scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 325 degrees Centigrade.
16. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 2 years from the date of each inventory.
17. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material".
18. Licensed material shall not be used in or on human beings.

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

"OFFICIAL RECORD COPY"

<p style="text-align: center;">Licensee</p> <p>1. Combustion Engineering, Inc. Power Systems Group</p> <p>2. 1000 Prospect Hill Road Windsor, Connecticut 06095</p>	<p>In accordance with application dated November 30, 1983</p> <p>3. License number 06-00217-06 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration date January 31, 1990</p> <hr/> <p>5. Docket or Reference No. 030-03754</p>
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6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Any byproduct material with Atomic Numbers between 1 and 83, inclusive	A. Any	A. Not to exceed 2 curies total
B. Any byproduct material	B. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, or reactor coolant samples	B. Not to exceed 51 curies total
C. Cesium 137	C. Sealed sources	C. 125 curies
D. Cobalt 60	D. Sealed sources	D. 250 millicuries
E. Americium 241	E. Any	E. 1 millicurie
F. Americium 241	F. Sealed neutron sources	F. 10 sources not to exceed 1.0 curie per source
G. Americium 241	G. Sealed neutron sources	G. 10 sources not to exceed 10 curies per source
H. Neptunium 237	H. Sealed sources	H. 10 sources not to exceed 0.5 millicuries per source
I. Plutonium 238	I. Sealed plutonium-beryllium neutron sources (MRC-PUBBE-XXX)	I. 80 curies (3.5 grams) Not to exceed 20 curies per source

9. Authorized use

A. through E. For use in research and development as defined in Section 30.4(q) 10 CFR Part 30, and for possession incident to maintenance, repair, decontamination, and study of reactor components.

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 33

(9.continued)

- F. For use in 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.
- G. through I. For possession, storage, and transfer to persons holding operating reactor licenses and/or to persons authorized to receive the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.

CONDITIONS

10. Licensed material shall be used only at the licensee's facilities, 100 Prospect Hill Road, Windsor, Connecticut.
11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 19, "Notices, Instructions, and Reports to Workers; Inspections" and Part 20, "Standards for Protection Against Radiation."
12. Licensed material shall be used by, or under the supervision of, individuals designated by Philip R. Rosenthal or Edward Gordon, Radiation Safety Officer.
13. A. (1) Each sealed source acquired from another person and containing licensed material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.
- (2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.
- (3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.
- B. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source until it has been repaired, decontaminated and retested.
- C. Each sealed source containing licensed material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 33

(13.continued)

CONDITIONS

- D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.
- E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the test with the U.S. Nuclear Regulatory Commission, Region I, 631 Park Avenue, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.
- 14. The licensee shall not use licensed material in or on human beings or in field applications where activity is released except as provided otherwise by specific condition of this license.
- 15. The licensee may transport licensed material or deliver licensed material to a carrier for transport in accordance with the provisions of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Material for Transport and Transportation of Radioactive Material Under Certain Conditions."
- 16. The licensee shall conduct a physical inventory every six (6) months to account for all sealed sources received and possessed under the license. The records of the inventories shall be maintained for two (2) years from the date of the inventory for inspection by the Commission, and shall include the quantities and kinds of licensed material, location of sealed sources and the date of the inventory.
- 17. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated November 30, 1983, and letters dated November 7, 1984, and January 21, 1985. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

For the U.S. Nuclear Regulatory Commission

Original Signed By

Jenny M. Johanson

Date

FEB 12 1985

By

Nuclear Materials Safety and
Safeguards Branch, Region I
King of Prussia, Pennsylvania 19406

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

030-03754

Amendment No. 32

“OFFICIAL RECORD COPY”

Combustion Engineering, Inc.
Power Systems Group
1000 Prospect Hill Road
Windsor, Connecticut 06095

In accordance with letter dated November 7, 1984, License Number 06-00217-06 is amended as follows:

Subitems 6., 7., 8. and 9. are amended to add:

6. Byproduct, source, and/or special nuclear material

7. Chemical and/or physical form

8. Maximum amount that licensee may possess at any one time under this license

G. Plutonium 238

G. Sealed plutonium-beryllium neutron sources (MRC-PU8BE-XXX)

G. 80 curies (3.5 grams) Not to exceed 20 curies per source

9. Authorized use

G. For possession, storage, and transfer to persons holding operating reactor licenses.

For the U.S. Nuclear Regulatory Commission

Original Signed By:

John E. Glenn

By

Nuclear Materials and Safeguards Branch
Region I

King of Prussia, Pennsylvania 19406

Date _____

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

06-00217-06

Docket or Reference number

Amendment No. 31

Combustion Engineering, Inc.
Power Systems Group
1000 Prospect Hill Road
Windsor, Connecticut 06095

In accordance with letter dated July 29, 1982, License Number 06-00217-06
is amended as follows:

To add:

- | | | |
|---|----------------------------------|--|
| 6. Byproduct, source, and/or special nuclear material | 7. Chemical and/or physical form | 8. Maximum amount that licensee may possess at any one time under this license |
| F. Neptunium 237 | F. Sealed sources (ORNL) | F. Not to exceed 0.5 milli-curie per source |

9. Authorized use

- F. For possession, storage, and distribution to persons holding operating reactor licenses.

For the U.S. Nuclear Regulatory Commission
Original Signed By
Paul R. Guinn

By: Material Licensing Branch

Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

Date: SEP 1 1982

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MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number 06-00217-06

Docket or Reference number

Amendment No. 30

Combustion Engineering, Inc.
Power Systems Group
1000 Prospect Hill Road
Windsor, Connecticut 06095

In accordance with letter dated December 29, 1981, License Number 06-00217-06 is amended as follows:

Subitems 6.E., 7.E., 8.E. and 9.E. are amended to read:

- | | | |
|---|---|--|
| 6. Byproduct, source, and/or special nuclear material | 7. Chemical and/or physical form | 8. Maximum amount that licensee may possess at any one time under this license |
| E. Americium 241 | E. Sealed sources (Amersham E. 2720 Series) | Not to exceed 10 curies per source |

9. Authorized use

E. For use in the testing and calibration of boron measuring devices and for distribution to persons holding operating reactor licenses and/or to persons authorized to received the licensed material pursuant to the terms and conditions of specific licenses issued by the Nuclear Regulatory Commission or an Agreement State.

Condition 16. is amended to read:

16. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated February 24, 1978; and letters dated October 30, 1978, January 12, 1981, December 29, 1981, and January 19, 1982. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

For the U.S. Nuclear Regulatory Commission
Original Signed By
Paul R. Guinn

Material Licensing Branch

Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

Date

MAY 26 1982

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number
06-00217-06

Docket or Reference number

Amendment No. 29

Combustion Engineering, Inc.
Power Systems Group
1000 Prospect Hill Road
Windsor, Connecticut 06095

In accordance with letter dated January 19, 1982, License Number 06-00217-06 is amended as follows:

Condition 16. is amended to read:

- 16. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated February 24, 1978; and letter dated October 30, 1978, January 12, 1981, and January 19, 1982. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

APR 20 1982

For the U.S. Nuclear Regulatory Commission

**Original Signed By
Paul R. Guinn**

Material Licensing Branch

By _____

Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

Date _____

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MATERIALS LICENSE

Supplementary Sheet

License Number 06-00217-06

Combustion Engineering, Inc.
Power Systems Group
1000 Prospect Hill Road
Windsor, Connecticut 06095

Docket or
Reference No. _____

Amendment No. 28

In accordance with letter dated January 12, 1981, License Number 06-00217-06
is amended as follows:

To add:

- | | | |
|---|--|--|
| 6. Byproduct, source, and/or special nuclear material | 7. Chemical and/or physical form | 8. Maximum amount that licensee may possess at any one time under this license |
| E. Americium 241 | E. Sealed sources (Monsanto Research Model 2727) | E. Not to exceed 10 curies total |

9. Authorized use

- E. For use in measurement of boron concentrations.

Date FEB 0 1981

For the U. S. Nuclear Regulatory Commission

JAMES A. JONES

by Material Licensing Branch

Division of Materials and Fuel Cycle
Facility Licensing
Washington, D. C. 20555

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Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 31, 32, 33, 34, 35, 36, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee		In accordance with application dated February 24, 1978,	
1. Combustion Engineering, Inc. Power Systems Group 2. 1000 Prospect Hill Road Windsor, Connecticut 06095		3. License number 06-00217-06 is amended in its entirety to read as follows:	
		4. Expiration date December 31, 1983	
		5. Docket or Reference No.	
6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license	
A. Any byproduct material with Atomic Numbers between 1 and 83, inclusive:	A. Any	A. Not to exceed 2 curies total except: Cesium 137 - 138 curies total	
B. Any byproduct material	B. Irradiated and/or contaminated reactor components, inspection and test equipment, test samples, monitoring instruments, or reactor coolant samples	B. Not to exceed 51 curies total	
C. Americium 241	C. Any	C. Not to exceed 1 millicurie total	
D. Americium 241	D. Sealed Neutron Sources	D. Not to exceed 1 curie per source and 20 curies total	
9. Authorized use			
A. through D. For use in research and development as defined in Section 30.4(g) 10 CFR Part 30, and for possession incident to maintenance, repair, decontamination, and study of reactor components.			

MATERIALS LICENSE

Supplementary Sheet

License Number 06-00217-06

Docket or
Reference No. _____

Amendment No. 27

CONDITIONS

10. Licensed material shall be used only at the licensee's address stated in Item 2. above.
11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 19, "Notices, Instructions and Reports to Workers; Inspections" and Part 20, "Standards for Protection Against Radiation."
12. Licensed material shall be used by, or under the supervision of, individuals designated by Philip R. Rosenthal, Radiation Protection Officer.
13. A. (1) Each sealed source acquired from another person and containing licensed material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.
(2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.
(3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.
- B. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source until it has been repaired, decontaminated and retested.

MATERIALS LICENSE

Supplementary Sheet

License Number 05-00217-06

Docket or
Reference No. _____

Amendment No. 27

CONDITIONS

13. continued

- C. Each sealed source containing licensed material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.
 - D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.
 - E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five (5) days of the test with the U. S. Nuclear Regulatory Commission, Region I, Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.
14. The licensee shall not use licensed material in or on human beings or in field applications where activity is released except as provided otherwise by specific condition of this license.
15. The licensee may transport licensed material or deliver licensed material to a carrier for transport in accordance with the provisions of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Material For Transport."
16. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in applications dated February 24, 1978 and October 30, 1978.

Date _____

DEC 11 1978

PG
12/9/78
PG/sc *WAT*

For the U. S. Nuclear Regulatory Commission
Original Signed By
PAUL R. GUINN
by License Management Branch

Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

Marvin M. Mann, Assistant Director
Division of Inspection, Headquarters

AUG 25 1958

Paul B. Klevin, Acting Director
Inspection Division, NYOO

TRANSMITTAL OF LICENSE COMPLIANCE INSPECTION REPORT - 10 CFR 30

SYMBOL: INS:LMA

Transmitted herewith is the following inspection report involving noncompliance:

Combustion Engineering, Inc.
Nuclear Division
Prospect Hill Road
Windsor, Connecticut

License No. 6-217-2, w/amend. 1, 2
6-217-3, w/amend. 1
6-217-4
6-217-5
6-217-6

No items of noncompliance were noted under License Nos. -3, -5, and -6.

Mr. R. L. Hoover, Manager of Health and Safety, was informed of the following items of noncompliance, noted under License Nos. -2 and -4, and indicated his willingness to take corrective action as required by the Commission:

20.203 "Caution signs, labels, and signals"

(e) (1) "Additional requirements" - in that the door to the water-cooled critical facility (Building 2) containing two neutron sources did not bear a sign reading, "Caution, Radioactive Material". However, a sign on this door read, "Caution, Exclusion Area, Authorized Personnel Only", and displayed the radiation symbol. (See Item 13 of report details).

(f) (1) "Containers" - in that cardboard tags attached to each of three neutron source handles did not bear the words,

(Continued)

ITEM # 2

B/2

AUG 25 1958

"Caution, Radioactive Material". However, these tags did bear the words, "Caution, Radiation, Po-Be Neutron Source". (See Item 13 of report details).

(f) (1) "Containers" - in that a neutron source contained within a critical assembly was not labeled or tagged in any way. (See Item 13 of report details).

40.10 "Restriction on transfers"

- in that the licensee received from the Fuller Brush Company and currently possesses 15 drums of thorium-magnesium alloy scrap, although not authorized by a license to do so. (See Item 19 of report details).

Inasmuch as no hazard is involved from these items of noncompliance, no follow-up inspection is recommended.

It is suggested that a letter be directed to Mr. Hoover confirming the understanding that corrective action is required.

Enclosure:
Insp. rpt. (2 cys.)

I-29

COMPLIANCE INSPECTION REPORT

1. Name and address of licensee Combustion Engineering, Inc. Nuclear Division Prospect Hill Road Windsor, Connecticut	2. Date of inspection <u>August 7, 1958</u> 3. Type of inspection <u>Initial</u> 4. 10 CFR Part(s) applicable <u>20 - 30</u>
--	---

5. License number(s), issue and expiration dates, scope and conditions (including amendments)

<u>Number</u>	<u>Date</u>	<u>Exp. Date</u>	<u>Scope and Conditions</u>
6-217-2	8/24/56	8/31/58	Scope: 45 curies Po ²¹⁰ as Mound Laboratory Polonium-Beryllium Neutron Sealed Source for activation of a sub-critical assembly. Conditions: #11-Byproduct material is to be used by, or under the supervision of, Karl E. Plumlee. #13-Licensed material shall be used as sealed source for purpose stated and source shall not be altered, opened, or combined. #14-Leak testing of the source licensed above shall be carried out at intervals of 90 days and records of the leak test results shall be furnished to the AEC upon request. #15-Licensee shall report to the Commission within 48 hours any incident which has resulted or could result in an exposure to any individual in excess of a dose of 3 rem or any incident involving loss of the licensed material.

(CONT.)

6. Inspection findings (and items of noncompliance)

The Nuclear Division of Combustion Engineering utilizes five Mound Laboratory Po-alpha-Be sources for critical assembly startup, neutron measurements and for calibration of neutron detection instruments. Small quantities of Au¹⁹⁸ and Cu⁶⁴ have been received in titanium samples irradiated at BNL. The licensed Ir¹⁹² source has been returned to the supplier. All activities involving licensed material are performed in the licensee's two critical facility buildings under the surveillance of a Health and Safety Group, headed by Reynold L. Hoover, who also acts as R.S.O. Radiological safety functions are the responsibility of a ten-member Health Physics Section of the Health and Safety Group. Radiological safety controls and disciplines are satisfactory. Adequate survey instrumentation, including neutron survey instruments, was on hand. Radiation, contamination, smear, and effluent monitoring is performed as required and on a routine basis. Leak testing procedures are adequate. Beta-gamma and/or gamma-neutron sensitive film badges and/or dosimeters are supplied to several hundred employees. Adequate records of surveys, leak test findings, film badge exposures and receipt of licensed material are maintained. Leak tests have been negative. Film badge exposures average 50 mr/2 wks. No wastes have been created during activities authorized by licenses covered in this report. Thorium-magnesium alloy scrap has been received for disposal from the Fuller Brush Company, although the licensee possesses no license for this material.

No items of noncompliance were noted under License Nos. -3, -5, and -6.

7. Date of last previous inspection None	8. Is "Company Confidential" information contained in this report? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Specify page(s) and paragraph(s))
---	--

DISTRIBUTION:

2 cys. - Division of Inspection, Headquarters
 2 cys. - Inspection Division, NYOO

Approved by: Lawrence R. Adams (Inspector)
Paul B. Klevin, Acting Director (Operations office)
New York
August 20, 1958 (Date report prepared)

If additional space is required for any numbered item above, the continuation may be extended to the reverse of this form using foot to head format, leaving sufficient margin at top for binding, identifying each item by number and noting "Continued" on the face of form under appropriate item.

ITEM 5 CONT.

<u>Number</u>	<u>Date</u>	<u>Exp. Date</u>	<u>Scope and Conditions</u>
6-217-2 Amend. 1	7/12/58	8/31/58	Scope: Maximum amount of Po^{210} as Mound Laboratory Polonium-Beryllium Sealed Source which the licensee may possess at any one time is increased from 1 source of 45 curies to 2 sources of 45 curies each - 90 curies total. Add as authorized use - calibration of neutron sensitive instrumentation. Conditions: No change.
6-217-2 Amend. 2	11/19/57	8/31/58	Scope: No change. Conditions: Delete Karl E. Plumlee and add Joseph S. Crudele as individual user.
6-217-3	8/13/57	8/31/59	Scope: 50 curies of Ir^{192} as Sealed Source (T. O. Model No. A-424) to be used in Technical Operations Model 412-A camera for the radiography of welds in the SIC submarine prototype hull. Conditions: #11-Byproduct material may be used at field locations designated by the licensee. #12-Byproduct material to be used by, or under the supervision of, Lionel Lewis. #13-Sealed source licensed above shall not be opened. #14-Written administrative instructions covering appropriate radiological protection phases of operational procedures and establishing responsibility for radiological protection, control, and security of the byproduct material shall be supplied individuals using or having responsibility for use of such material. #15-A curie of Ir^{192} is defined as that quantity of activity which presents a radiation intensity of 0.55 roentgens per hour at a distance of one meter.
6-217-3 Amend. 1	12/23/57	8/31/59	Scope: No change. Conditions: #11-The authorized place of use includes temporary job sites of the licensee in the state of Connecticut. Temporary use may be made in other states provided the AEC is notified of the location(s) of such use not later than four days after the first day of use.
6-217-4	8/14/57	8/31/58	Scope: 20 curies total - Each source not to exceed 10 curies Po^{210} as Sealed Po-Be Neutron Sources for use in critical experiments and in checking neutron instruments. Conditions: #11-Byproduct material to be used by, or under the supervision of, J. S. Crudele. #12-Sealed sources licensed above shall not be opened or combined. #13-Leak testing of sealed sources containing alpha-emitting byproduct material shall be carried out at intervals of three months and records of leak test results shall be furnished the AEC upon request.

(Continued)

ITEM 5 CONT.

<u>Number</u>	<u>Date</u>	<u>Exp. Date</u>	
6-217-5	9/26/57	9/30/59	Scope: 10 curies of Po^{210} as Sealed Source (Mound Laboratory Design) to be used for determination of neutron counts while loading fuel assemblies into a reactor core to assure that criticality is not reached. Conditions: #11-Byproduct material is to be used by, or under the supervision of Robert C. Harding or Reynold L. Hoover. #12-Sealed source licensed above shall not be opened. #13-Leak testing of sealed sources containing alpha-emitting byproduct material shall be carried out at intervals of three months and records of leak test results shall be furnished the AEC upon request.
6-217-6	3/10/58	3/31/60	Scope: 10 millicuries of Au^{198} , Cu^{64} as Metal foil and/or wire for activation analysis of titanium for use in flux wire program. Calibration of scintillation counter system. Conditions: #12-Byproduct materials shall be used by, or under the supervision of, Marvin Slater.

ITEM 6 CONT.

The only items of noncompliance observed or noted during the course of inspection of License Nos. -2 and -4 are as follows:

20.203 "Caution signs, labels, and signals"

(e) (1) "Additional requirements" - in that the door to the water-cooled critical facility (Building 2) containing two neutron sources did not bear a sign reading, "Caution, Radioactive Material". However, a sign on this door read, "Caution, Exclusion Area, Authorized Personnel Only", and displayed the radiation symbol. (See Item 13 of report details).

(f) (1) "Containers" - in that cardboard tags attached to each of three neutron source handles did not bear the words, "Caution, Radioactive Material". However, these tags did bear the words, "Caution, Radiation, Po-Be Neutron Source". (See Item 13 of report details).

(f) (1) "Containers" - in that a neutron source contained within a critical assembly was not labeled or tagged in any way. (See Item 13 of report details).

40.10 "Restriction on transfers"

- in that the licensee received from the Fuller Brush Company and currently possesses 15 drums of thorium-magnesium alloy scrap, although not authorized by a license to do so. (See Item 19 of report details).

PART 30 INSPECTION

Combustion Engineering, Inc.
Nuclear Division
Prospect Hill Road
Windsor, Connecticut

Date of Inspection: August 7, 1958

Persons Accompanying Inspector:

None

Persons Contacted:

Reynold L. Hoover, R.S.O., Manager, Health and Safety
Lionel Lewis, Supervisor, Health Physics Section
Ernie Barawski, Staff Member, Combustion Engineering Consulting Service
Marvin Slater, Supervisor, Experimental Physics
J. S. Crudele, Experimental Nuclear Physicist

9. Organization and Administration

The Nuclear Division of Combustion Engineering employs about 1100 people and is engaged in contract research and development of nuclear reactors and nuclear fuels. The Division currently has two privately-owned critical facilities and has an AEC contract for the development of the SIC prototype submarine reactor.

A Health and Safety Group under the direction of R. L. Hoover, the R.S.O., is composed of the following sections: Medical, Health Physics, Safety, Health Laboratory, and Fire Department. The Health Physics Section consists of four health physicists, two health physics trainees, and six monitors. Health physics services are supplied in all restricted areas, including both critical facilities (in Buildings 1 and 2) and fuel fabrication facilities. Two additional health physicists are currently being sought for the submarine reactor prototype site, now in the planning stage. Hoover, the R.S.O., gave his background and experience as follows: Bachelors Degree from the University of Illinois in biology with minor in physics, graduate work in genetics, University of Illinois, employed at Los Alamos from 1949 to 1952 in health physics work during field tests, Head of Monitoring Group and Acting Head of Health Physics Division at the Naval Radiological Defense Laboratory, San Francisco, between 1952 and 1954, Head of Analytical Laboratory Department at National Lead Company, Ohio, from 1954 to 1957, employed since 1957 as Head of Health and Safety Group at Combustion Engineering.

10. Procurement and Control of Licensed Material

Requisitions for byproduct material are originated by the prospective user, and are reviewed by Hoover, who ensures compliance with licensing regulations. Upon receipt, byproduct material containers are monitored and leak tested if necessary by a Health Physics representative. Notation of byproduct material receipt is entered in a Health Physics log book and a record is kept of location and user. Inventories of byproduct material are performed every six months.

11. Disposition of Byproduct Material on Hand, Records of Receipt and Transfer

Receipt and transfer records indicated the disposition of materials licensed under the various licenses to be as follows:

License -2, License -4:

Five polonium neutron sources are currently on hand. Mound Laboratory shipping notices indicate assay and date of shipment. Mr. Hoover has calculated present strengths. Information obtained is presented in the following table:

<u>Serial No.</u>	<u>Shipment Date</u>	<u>Source Strength On Shipment Date</u>	<u>Source Strength On 8/1/58</u>
N-247	April 25, 1956	7.78 curies	.12 curies
N-248	April 25, 1956	12.21 curies	.19 curies
N-415	December 31, 1957	10.7 curies	3.9 curies
N-302	October 29, 1956	20.6 curies	.8 curies
N-400	August 6, 1957	22.87 curies	3.8 curies

License -3:

Records indicated that the licensed 50 curie Iridium 192 source had been rented from Technical Operations during September, October, and November of 1957, and was returned to Technical Operations at the end of that period.

License -5:

According to Mr. Hoover, the polonium source licensed under -5 was never ordered.

License -6:

According to Mr. Slater, only two samples of service-irradiated material have been obtained under this license. Records indicated that service irradiations were performed at BNL 3/19/58 and 5/29/58. Irradiated materials, containing activity attributable to Gold 198 and Copper 64, were transported by the licensee's courier. Survey records indicate that the activity of each shipment as measured six inches from the container shielded in $\frac{1}{4}$ " of lead was 20 mr/hr.

12. Facilities for the Use and Storage of Byproduct Materials

The five polonium neutron sources on hand are stored and used in Buildings 1 and 2. Building 1 contains the flexible critical assembly and Building 2 contains the water-cooled critical assembly. Sources are used under the supervision of Mr. J. S. Crudele for critical assembly startup, neutron measurements, and calibration of neutron detectors.

In the flexible critical assembly room in Building 1 were the following sources: N-415, N-247, and N-248. N-415 had been lowered into the critical assembly during a low-power run. A housing for this source consisting of a large, paraffin-filled drum is installed above the critical assembly. Provisions exist such that the source may be remotely raised into the drum. Sources N-247 and N-248 were attached to six-foot handles and contained in a paraffin-filled 50-gallon drum.

In the water-cooled critical assembly room in Building 2 were located sources N-302 and N-400. N-400 had been temporarily assembled onto the end of a control rod, in the critical assembly. A large, paraffin-filled drum located above the critical assembly generally serves as a storage receptacle for this source. Provisions exist such that the source may be remotely lowered from the drum into the critical assembly. Source N-302, attached to a six-foot aluminum handle, was stored in a receptacle extending obliquely five feet downwards from the critical facility wall into the building foundation.

Both critical assembly rooms are equipped with, in addition to scram interlocks, time locks and micro-wave burglar alarms which are activated during non-working hours. Keys to the critical facilities are available only to crew chiefs. The licensee's entire facility is under 24-hour security patrol.

13. Posting and Labeling

Sources N-302, N-247, and N-248 were attached to six-foot aluminum handles. Each of these handles was tagged on the end farthest from the source with a cardboard sign reading, "Caution, Radiation, Po-Be Neutron Source". The cardboard tags also stated source activity in n/second, and curies, and the date corresponding to the calculation of stated activity, and bore the radiation symbol.

Source N-415, which was temporarily assembled onto a control rod in the water-cooled critical assembly, was not, according to Mr. Hoover, labeled or tagged in any way. Hoover stated he feels that it is impossible to tag or label neutron sources during such time as sources are in use in critical assemblies, for the reason that tags would introduce contamination into the cooling water, distort neutron flux, and become activated. He stated that he would be willing to tag the control rod to which the source was attached, but that the source was soon to be returned to the properly labeled source housing.

The three paraffin-filled drums mentioned in Item 12 were posted with labels bearing the words, "Caution, Radioactive Materials", and the radiation symbol.

The door to the critical facility in Building 1 bore signs reading, "Caution, Radiation Area, Radioactive Materials", and the radiation symbol. The door to the critical facility in Building 2 bore a sign reading, "Caution, Exclusion Area, Authorized Personnel Only", and displaying the radiation symbol.

14. Instrumentation

Adequate operable survey instrumentation on hand included the following: Thyac low-level beta-gamma survey meters, Juno high and low range beta-gamma survey meters, Sampson alpha survey meters, Nuclear-Chicago 2112-P alpha survey meters, Eberline gas flow proportional counters, Nemo fast and slow neutron survey meters, Gast and Staplex air samplers, an NMC continuous air monitor, scintillation counters, argon gas proportional counters, end window G-M counters, scalars, and accessory equipment.

15. Leak Tests

Records indicated that leak tests have been performed on the five licensed neutron sources on the required 90-day interval with the following exception: Standard leak tests have not been performed on the source used to activate the water-cooled assembly during such times as this assembly is run continuously for intervals of several weeks. During the time of continuous operation, however, water samples are taken from the cooling system. Five cc aliquots of cooling water are dried and counted by scintillometer daily. Mr. Hoover stated that leaking of the source would be ascertainable through assay of the cooling water. The sensitivity of the cooling water assay procedure is sufficient to allow the detection of the leakage of 0.05 microcuries of polonium. Records of the daily cooling water sample assays are maintained.

16. Surveys

Surveys are performed at least daily during all operations which might result in contamination or exposure of employees to radiation. Survey methods include air sampling, effluent sampling, smear testing, survey meter radiation checks, and personnel urinalysis. Survey findings are recorded and copies of survey reports are sent to interested persons, including Health and Safety supervision, and personnel responsible for operations at the various sites surveyed.

17. Personnel Monitoring

Personnel monitoring is accomplished by means of beta-gamma film badges, gamma-neutron film badges, gamma dosimeters, and gamma-neutron dosimeters. Approximately 400 employees wear personnel monitoring devices. Film badge service is supplied by the Nuclear Service Laboratory, Knoxville, Tennessee. Procedures for the minimization of radiation exposure, the reporting of film badge exposures to concerned personnel and supervision, and the maintenance of film badge exposure records were adequate. Records indicated that the highest film badge exposure received was 225 mr/2 wks., and that the average exposure is about 50 mr/2 wks.

18. Waste Disposal

Wastes have not been produced under byproduct material licenses. The licensee has elaborate hold-up tank systems and is also equipped for sealing wastes in concrete-filled 50-gallon drums. Drums are turned over to the Navy for disposal.

19. Receipt of Thorium-Magnesium Alloy from Fuller Brush Company

In the report of the inspection of the Fuller Brush Company (License No. C-3854), it was stated that ten drums, each containing up to 93 lbs. of scrap, were transferred by Fuller Brush Company to Combustion Engineering. The licensee's

records show that fifteen drums of magnesium chips (HM21XA) (weight not specified) had been received from the Fuller Brush Company, five each on 2/14/58, 3/14/58, and 5/27/58. According to Mr. Hoover, this transaction had been approved by Mr. Bert Ball, S.O.O., and was accomplished at the request of a Mr. Van Kleeck of the Connecticut State Air Pollution and Sanitation Authorities. This material is presently stored in the licensee's "Zirconium burning area". Mr. Hoover stated that he had planned to burn the material, but presently plans to hold it pending approval of a disposal procedure. Mr. Hoover stated that Combustion Engineering's Nuclear Division is not specifically licensed to receive and possess thorium-magnesium alloys, but that he intends to make application for an appropriate license.

20. AEC and Navy Contracts

The licensee presently holds the following AEC and Navy contracts: AT-30-3-148 (SIC); AT-11-1-403 (S3W); AT-11-1-540 (S5W); AT-36-1-56 (Sub-assembly for SIC); NOBS 73516; NOBS 72363.

Marvin M. Mann, Assistant Director
Division of Inspection, Headquarters

AUG 25 1958

Paul B. Klevin, Acting Director
Inspection Division, NYOO

TRANSMITTAL OF LICENSE COMPLIANCE INSPECTION REPORT - 10 CFR 30

SYMBOL: INS:LFA

Transmitted herewith is the following inspection report involving noncompliance:

Combustion Engineering, Inc.
Nuclear Division
Prospect Hill Road
Windsor, Connecticut

License No. 6-217-2, w/amend. 1, 2
6-217-3, w/amend. 1
6-217-4
6-217-5
6-217-6

No items of noncompliance were noted under license Nos. -3, -5, and -6.

Mr. R. L. Hoover, Manager of Health and Safety, was informed of the following items of noncompliance, noted under License Nos. -2 and -4, and indicated his willingness to take corrective action as required by the Commission:

20.203 "Caution signs, labels, and signals"

(e) (1) "Additional requirements" - in that the door to the water-cooled critical facility (Building 2) containing two neutron sources did not bear a sign reading, "Caution, Radioactive Material". However, a sign on this door read, "Caution, Exclusion Area, Authorized Personnel Only", and displayed the radiation symbol. (See Item 13 of report details).

(f) (1) "Containers" - in that cardboard tags attached to each of three neutron source handles did not bear the words,

(Continued)

AUG 20 1958

"Caution, Radioactive Material". However, these tags did bear the words, "Caution, Radiation, Po-Be Neutron Source". (See Item 13 of report details).

(f) (1) "Containers" - in that a neutron source contained within a critical assembly was not labeled or tagged in any way. (See Item 13 of report details).

40.10 "Restrictions on transfers"

- in that the licensee received from the Fuller Brush Company and currently possesses 15 drums of thorium-magnesium alloy scrap, although not authorized by a license to do so. (See Item 19 of report details).

Inasmuch as no hazard is involved from these items of noncompliance, no follow-up inspection is recommended.

It is suggested that a letter be directed to Mr. Hoover confirming the understanding that corrective action is required.

Enclosure:

Insp. rpt. (2 cys.)

Office Memorandum • UNITED STATES GOVERNMENT

TO : Director,
Division of Licensing and Regulation

DATE: SEP - 3 1958

FROM : Assistant Director for Compliance,
Division of Inspection

Signed
by
M. M. Mann

SUBJECT: **COMBUSTION ENGINEERING, INC., LICENSE NOS. 6-217-2, THROUGH 6, 10 CFR 30**

SYMBOL: INS: **CCP**

Information gathered during inspection of the subject licensee shows noncompliance with AEC regulations (or license provisions) as set out in the enclosures.

It is suggested that a letter be addressed to the licensee to inform him of the noncompliance items and request that appropriate action be taken to correct or overcome these deficiencies. When corrective action has been completed on this matter, please furnish **NY Inspection Division** with copies of pertinent correspondence (to and from the licensee) and these items will be reviewed during **the next regular** inspection.

A summary of this case will be included in the **September** report to the Office of the General Manager.

A copy of this memorandum and the enclosure have been furnished the Office of the General Counsel.

Enclosure:

Cpy rpt dtd **8-20-58**
Cpy trans memo fr P.B.Klevin, NY to
M.M.Mann, dtd **8-25-58**

cc: P.B.Klevin, NY w/o encl.

INS
CCPALMITER:sd
9-2-58

INS
MMANN

ITEM # 3 A/B

DEC 28 1958

*MA
Adams
V.O.
SRA*

Lic. 6-217-2 thru 6
40-3487

Combustion Engineering, Inc.
Nuclear Division
Prospect Hill Road
Windsor, Connecticut

Attention: Mr. R. L. Hoover

Gentlemen:

This refers to the inspection conducted on August 7, 1958 of your activities authorized under Byproduct Material License No. 6-217-2, -3, -4, -5, and -6.

It appears that certain of your activities were not conducted in full compliance with the requirements of the AEC's "Standards for Protection Against Radiation", Part 20, and "Control of Source Material", Part 40, Title 10, Code of Federal Regulations, in that:

1. The door to the water-cooled critical facility was not posted with a sign meeting the wording requirement of Section 20.203(e)(1).
2. The labels on the three neutron source handles did not meet the wording requirements of Section 20.203(f)(1).
3. The neutron source N-415 used in the critical assembly was not labeled as required by Section 20.203(f)(1).
4. 15 drums, each containing up to 93 lbs. of scrap thorium-magnesium alloy, were received from the Fuller Brush Company without a license to receive such material, in violation of Section 40.10.

It is noted that items 1, 2, and 3 were called to your attention and that you agreed to take immediate corrective action. These items will be reviewed during the next inspection of your facilities. In regard to item 4 above, it is noted you applied for and were issued a source

RECEIVED
DEC 28 1958

INS

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ITEM # 4

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DEC 29 1957

material license (C-4451) authorizing the receipt of thorium-magnesium alloy scrap.

We appreciate the cooperation given to the AEC representative.

Very truly yours,

Lyall Johnson, Chief
Licensing Branch
Division of Licensing
and Regulation

Enclosures:
10 CFR 20 and 40

CC: Inspection, Hdqts
Inspection, NYOO
RECunningham, DLR

RECEIVED

DEC 29 1957

DEC 29 1957

DEC 29 1957
U.S. ATOM. ENERGY COM. BUREAU



COMBUSTION ENGINEERING, INC.

NUCLEAR DIVISION

WINDSOR, CONNECTICUT • TEL. MURDOCK 8-1911

November 13, 1959

U.S. Atomic Energy Commission
New York Operations Office
70 Columbus Avenue
New York 23, New York

Attention: Mr. Robert W. Kirkman, Director
Inspection Division

Dear Sir:

Please send the writer, at the above address, a copy of
10 CFR 20 "Standards for Protection Against Radiation."
If this report is not available through your office,
please let me know by return mail where I could obtain a
copy.

Very truly yours,

W. E. Schortmann

W. E. Schortmann
Adv.Rea.Dsgn. & Dev. Dept.

WES:cma

TNS

B/5

ITEM # 5

INS:RWE

November 16, 1959

Combustion Engineering, Inc.
Nuclear Division
Windsor, Connecticut

Attention: W. E. Schortmann, Adv. Res. Dsgn. & Dev. Dept.

Gentlemen:

According to request in your letter dated November 13, 1959, enclosed herewith is a copy of 10 CFR 20, Standards for Protection Against Radiation.

Very truly yours,

Robert W. Kirkman, Director
Inspection Division

Encl.
1 cy 10 CFR 20

ITEM # 6

B/6

OFFICE ▶	Inspection					
SURNAME ▶	Kirkman, R. W.					
DATE ▶	11/16/59					



COMBUSTION ENGINEERING, INC.

NUCLEAR DIVISION

WINDSOR, CONNECTICUT

TEL. MURDOCK 8-1911

January 23, 1961

U. S. Atomic Energy Commission
Division of Licensing & Regulation
Isotopes Branch
1717 H Street, N.W.
Washington 25, D.C.

Attention: Mr. James Mason, Chief
Licensing Branch

Subject: By Product Material License
6-217-7

Gentlemen:

Please be advised that the three (3) curie NBS calibrated Cobalt 60 Source received under By Product Material License 6-217-7 has been transferred to:

Combustion Engineering, Inc.
Naval Reactors Division
Windsor, Connecticut

Attn: Mr. John E. Phelps
Manager, Administration

This source was received from Tracer Lab. Inc., Boston, Massachusetts, on December 12, 1958. The expiration date of the license was August 31, 1960. The source was originally purchased for use by the Prototype Facility (now the Naval Reactors Division) to be used for the calibration of instruments. The preliminary tests were conducted at our facility and then the source was stored by us until the Naval Reactor facilities were available.

The Naval Reactors Division is operated by Combustion for the Government under Contract AT(30-3)-519.

Please be assured that the transfer was directed by our Radiation Protection Officer and completed in all regulatory procedures.

Very truly yours,
COMBUSTION ENGINEERING, INC.

A. F. Miller, Jr.
Business Manager

ITEM # 7

AFMJr:lmw



JUL 24 1961

Harold L. Price, Director, Division
of Licensing and Regulation, HQ

Robert W. Kirkman, Director
Compliance Division, NYOO

TRANSMITTAL OF LICENSE COMPLIANCE INSPECTION REPORT -10 CFR 30
- 40

CMP:WRL

Transmitted herewith is the following inspection
report involving noncompliance:

COMBUSTION ENGINEERING, INC.
Nuclear Division
Prospect Hill Road
Windsor, Connecticut

License Nos. 6-217-2, w/amend. 3, 4 & 5 (clear)
-4 w/amends. 1 & 2 (clear)
-6 w/amend. 4 (clear)
C-4451

The following items of noncompliance were noted
during the course of this inspection:

30.3 "License requirements"

- in that the licensee possesses a nominal
3 c Co-60 sealed source without a valid
license. The license (License -7) covering
this source expired in August 1960. (See
item 17 of report details.)

40.10 "Restriction on transfers"

- in that the licensee received thorium-
magnesium alloy scrap after the expiration
date of their license (expiration date,
November 30, 1959). (See item 21 of report
details.)

B/8

COMPLIANCE

LORENZ:bm KLEVIN KIRKMAN

1/17/61

ITEM # 8

15

JAN 24 1961

The above items of noncompliance were brought to the attention of the licensee, who has agreed to take the necessary corrective action. With regard to the nominal 3 c Co-60 sealed source, Hoover stated that he will either transfer the source to a prime AEC contractor or transfer the source for disposal. With reference to the 40.10 citation, the licensee was under the impression that the license was issued on a 3 year basis rather than a one year basis, and has stated that since the license has expired they will immediately apply for a renewal of their Part 40 license.

No hazard is involved in the above items of noncompliance and a follow-up inspection will not be made. We recommend that a letter be sent to the licensee setting forth the items of noncompliance and confirming the corrective action taken.

Enclosure:

1 cy of Rpt.

cc: Div of Cmp, HQ
w/orig of Rpt.

COMPLIANCE INSPECTION REPORT

1. Name and address of licensee	2. Date of inspection
COMBUSTION ENGINEERING, INCORPORATED Nuclear Division Prospect Hill Road Windsor, Connecticut	December 13, 14, 19
	3. Type of inspection Reinsp. & Initial
	4. 10 CFR Part(s) applicable
	20 - 30 - 40

5. License number(s), issue and expiration dates, scope and conditions (including amendments)

License No.	Date	Exp. Date
6-217-2 amend. 3	8/25/58	8/31/63 (amended in its entirety)

SCOPE: A. 2 sources of 45 c each. Total 90 c of Po-210 as Mound Laboratories Po-Be sealed neutron sources for use in critical experiments and in checking neutron sensitive instruments.

CONDITIONS: #11-Compliance with Part 20. #12-Byproduct material shall be used by, or under the direct supervision of, Joseph S. Crudele. #13-Byproduct material as sealed sources shall not be opened. #14-Sealed sources containing byproduct material (except solid metal Ir-192; Ta-182, Co-60 plated with gold or nickel; and gases) shall be tested for leakage and contamination at intervals of not more than six (6) months and records of test results shall be maintained by the licensee. Leak testing shall be performed by Health Physics Department, (CONT'D)

6. Inspection findings (and items of noncompliance)

Combustion Engineering is primarily a boiler manufacturing company supplying large boilers for industrial uses. In addition, they have a Nuclear Division which designs and experiments in reactor techniques and manufactures fuel rod assemblies. The licensee also has a prime contract for the Navy in relation to its nuclear submarines. The licensee has a Health and Safety Department managed by Mr. R. L. Hoover, who also does health physics consulting work. The Health and Safety Department has approximately 20 persons. There is an active radioisotope committee which is indicated in item 10 of the report details. The only items of noncompliance observed or noted during the course of this inspection are as set out below:

30.3 "License requirements"

- in that the licensee possesses a nominal 3 c Co-60 sealed source without a valid license. The license (License -7) covering this source expired in August, 1960. (See item 17 of report details.)

(CONT'D)

7. Date of last previous inspection	8. Is "Company Confidential" information contained in this report? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Licenses -2, -4 and -6 August 7, 1958	(Specify page(s) and paragraph(s))

DISTRIBUTION:

1 cy - Div of Cmp, HQ
1 cy - D L & R
2 cys - Cmp Div, NYOO

Walter R. Lorenz

(Inspector)

Approved by:

Robert W. Kirkman
New York

(Operations office)

January 19, 1961

(Date report prepared)

If additional space is required for any numbered item above, the continuation may be extended to the reverse of this form using foot to head format, leaving sufficient margin at top for binding, identifying each item by number and noting "Continued" on the face of form under appropriate item.

ITEM 5 CONT'D

<u>License No.</u>	<u>Date</u>	<u>Exp. Date</u>
6-217-2	8/25/58	8/31/63

Amend. 3 amends the license in its entirety:

CONDITIONS - continued:
Combustion Engineering, Inc.

Amend. 4	12/19/58	8/31/63
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SCOPE: Item 8A is revised to read: A total of 90 curies (No one source to exceed 45 curies)

Amend. 5	3/23/59	8/31/63
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SCOPE: B. 5 curies of Po-210 as Po-Be sealed source (Mound Laboratory Model No. 1-1512) for use in calibrating thermal neutron and fast neutron instruments.

CONDITIONS: #12-Byproduct materials shall be used by, or under the direct supervision of, J. P. Davis, A. H. Yolf, or R. F. Dvorak.

6-217-4	8/14/57	8/31/58
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SCOPE: 20 curies total - Each source not to exceed 10 c of Po-210 as sealed Po-Be neutron sources for use in critical experiments and in checking neutron instruments.

CONDITIONS: #11-Byproduct material to be used by, or under the supervision of, J. S. Crudele. #12-Sealed sources licensed above shall not be opened or combined. #13-Leak testing of sealed sources containing alpha-emitting byproduct material shall be carried out at intervals of three months and records of leak test results shall be furnished the AEC upon request.

Amend. 1	8/21/58	8/31/63
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SCOPE: Item 3: The symbol (H63) is added below the License Number.
Item 4: is amended to extend the Expiration Date from August 31, 1958 to August 31, 1963

CONDITIONS: #14-Compliance with Part 20.

ITEM 5 CONT'D

<u>License No.</u>	<u>Date</u>	<u>Exp. Date</u>
6-217-4 Amend. 2	3/23/59	8/31/63

CONDITIONS: #11-In accordance with application dated March 9, 1959, License No. 6-217-4 is amended to delete the name of J. S. Crudele and add the name of R. F. Dvorak as individual user under Condition 11.

6-217-6 Amend. 4	3/18/60	3/31/62
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amends the license in its entirety to read as follows:

SCOPE: A. 750 mc of any byproduct material between Atomic Nos. 3 and 83, inclusive, plus Neptunium-237 in any form to be used for neutron flux measurements, activation of wire for quality control purposes and for calibration of instruments.

CONDITIONS: #11-Compliance with Part 20. #12-Byproduct material shall be used by, or under the direct supervision of, Dr. M. Slater or Dr. Gerald S. Golden. #13-Byproduct material shall not be used in products distributed to the public. #14-The licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in his applications dated October 20, 1958; March 9, 1959; and February 16, 1960.

C-4451	11/28/58	11/30/59
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SCOPE: Licensed to receive possession of and title to, at Windsor, Connecticut, up to twenty-five (25) tons of thorium magnesium alloy scrap containing up to 7% thorium for reduction to an oxide by burning, in accordance with the procedures outlined in your letter of October 21, 1958.

CONDITIONS: Required to maintain records of inventories, receipts and transfers of refined source material. Compliance with Part 20.

ITEM 6 CONT'D

40.10 "Restriction on transfers"

- in that the licensee received thorium-magnesium alloy scrap after the expiration date of their license (expiration date, November 30, 1959). (See item 21 of report details.)

PART 30 - 40 INSPECTION

COMBUSTION ENGINEERING, INC.
Nuclear Division
Prospect Hill Road
Windsor, Connecticut

Dates of Inspection: December 13, 14, 1960 (Announced)

Persons Accompanying Inspector:

Mr. Arthur Huebner, Connecticut State Health Department

Persons Contacted:

Mr. R. L. Hoover, Manager of the Health and Safety Department
Mr. T. B. Bowie, Accountability and Security Officer

DETAILS

9. Background Information

On August 7, 1958, an initial inspection of License 6-217-2, -3, -4, -5 and -6 was conducted by L. R. Adams of this office and the report was transmitted to Division of Inspection, HQ on August 25, 1958. The report included the following items of noncompliance:

20.203 "Caution signs, labels and signals"
(e) (1) "Additional requirements"
(f) (1) "Containers"

40.10 "Restriction on transfers" - in that the licensee received from the Fuller Brush Company and possessed 15 drums of thorium-magnesium alloy scrap, although not authorized by the license to do so.

On September 3, 1958, the report was transmitted from Division of Inspection, HQ to DL&R. On December 29, 1958 DL&R notified the licensee of the items of noncompliance and noted that the licensee had agreed to take immediate corrective action on the posting and labeling, and that the licensee had applied for a source material license (C-4451) authorizing the receipt of the thorium-magnesium alloy scrap.

10. Organization and Administration

Combustion Engineering Company is primarily a manufacturing company of large industrial boilers and affiliated equipment. In addition, they have an active Nuclear Division participating in research in the associated steam producing industry. This division has a Health and Safety Department managed by Mr. R. L. Hoover. The Health and Safety Department also does health physics consultation on a contract basis in addition to their internal health physics duties.

The licensee is also a prime AEC contractor. Their contracts are as listed below:

AT(11-1)-540
AT(36-1)-60
SCH-60-301
SCH-60-345
AT(10-1)-967
AT(30-1)-2379
AT(11-1)-795

In addition to the above prime contracts, the licensee has additional subcontracts and operates a naval testing reactor in a separate area of their private 500 acres. Their naval testing reactor is under Contract #AT(30-3)-519. Recently the naval test reactor program has become a separate division from the Nuclear Division (an organizational change).

The manager of the Health and Safety Department reports directly to W. H. Zinn, Director of the Nuclear Division and Vice-President of nuclear activities, who in turn reports to J. B. Santre, Chairman and Vice-President of Combustion Engineering. At their Nuclear Division the licensee has an active radio-isotope committee called The Nuclear Safety Committee whose members consist of the following:

Dr. S. Visner, Manager of Physics Department and
Chairman of the Committee

Mr. R. L. Hoover, Manager of the Health and Safety
Department and alternate chairman
of the Committee

Mr. H. B. Ross, Manager of the manufacturing facility

Dr. P. C. Zomala, Manager of Advance Design

Dr. R. Gail, Manager of Materials Development Laboratory

Each member of the Committee has a designated alternate. The Committee meets at regular intervals to discuss safety, hazard evaluations, the establishment of procedures, criticality and also to check on the progress of established procedures. Individuals using byproduct material under Licenses -2, -4, -6, and C-4451 are any one of five prime users who are assisted by any of nine helpers. The five prime users are Dr. M. Slatter, Dr. Golden, Dr. Harding, Mr. Hoover and R. J. Dvorak. These persons have had previous experience using radioisotopes at facilities such as ORNL, KAPL, ANL, etc.

LICENSES 6-217-2, -4, -6

11. Facilities and Use

Combustion Engineering is located on a 500 acre site in a wooded area in Windsor, Connecticut. The surrounding property is owned by the American Sumatra Tobacco Company. On the licensee's facilities there are two ponds and one stream which flow into the Farmington River, then into the Connecticut River. The Naval Test Reactor Prototype Building is located approximately 1-1/2 miles from the Health and Safety Office and from the other manufacturing facilities and is separately administered (security and health physics wise). Byproduct material is used in their Development Lab (Building #5) and in their Advanced Critical Building #2. Their fuel fabrication is done in the Fuel Fabrication Building #3. Their Development Lab and Advanced Critical Buildings are equipped with hoods, benches, and other equipment necessary for their use of isotopes. This equipment is located throughout their many laboratories in these buildings. All laboratories presented a clean and uncluttered appearance. The Po-Be neutron sources licensed under Licenses -2 and -4 are used in their Advanced Critical Building (Building #2). The Po-Be sources are also used for instrument calibration in this building. At the time of the inspection, one critical experiment was being conducted and a second critical facility, within the same building, was under construction.

Under License -6, the licensee also activates indium, gold, tungsten and cadmium to determine the flux density distribution in their critical experiments. Reportedly the last time material was activated in this type of experiment was a year ago.

Na-24 is used as a labeled compound in reactor test loops in homogeneous reactor test studies. Other byproduct materials on hand such as strontium, uranium, cobalt, barium, cesium,

radium, zirconium, cerium, tungsten, etc., are used as standard reference sources to calibrate instruments. In addition to the byproduct material, the licensee also fabricates fuel rods for reactors using all grades of uranium. Byproduct inventory is discussed in item 17 of the report details.

When appropriate, protective clothing and equipment, such as coveralls, lab coats, boots, rubbers, gloves, head gear, respirators, tongs and other remote handling tools and equipment are used. The licensee uses a central air exhaust system in their laboratories and fabrication facilities. This system is ducted to their hoods and other areas, including rooms, hallways, etc., as necessary. This ducted system exhausts through absolute filters and out one exhaust stack. Hoover stated that hood face air velocities are maintained at 100 ft/min. Remote air sampling lines are reportedly located before and after the absolute filters.

12. Instrumentation and Calibration

The licensee has on hand many of the following types of instruments:

End-window portable survey meters, glass tube portable survey meters, high range Cutie Pie and Juno-type portable survey meters, gas air sampler systems, Staplex high volume samplers, 1 continuous Nuclear-Chicago air sampler (alpha-beta-gamma), 1 transistorized 256 channel pulse height analyzer, several non-transistorized pulse height analyzers, Eberline gas flow portable alpha scintillation counters, 3 Eberline remote monitors with GM chambers and 6 additional Eberline remote monitors on order to be used in their critical facility and hooked up to their reactor control consoles.

13. Instructions

Written safety instructions are issued to all personnel involved in radioisotope work. These instructions are entitled "General Handling for Health Physics Monitoring." The contents of this instruction booklet include types of radiation, units and definitions in radiation protection, detection of radiation, weekly permissible dose, radiation safety responsibilities, safe handling of radioactive materials, control of contamination, contamination tolerances, some survey and monitoring instruments in use by health physics, alpha monitoring, beta-gamma monitoring (and similar operations), neutron monitoring, air sampling, transportation of radioactive materials, decontamination, waste

disposal, and emergency procedures. This general handbook is being revised to conform with the new amendment to Part 20. A copy of the Health Physics and Procedures Manual is also on file in the Health and Safety Laboratory in NYOO. The manual number is IDO-19014. In addition to this manual, the licensee has written emergency instructions entitled "Emergency, Disaster And Evacuation Program", which covers all types of disasters at their Windsor location. This manual contains emergency information on organization, responsibilities, types of fires, emergency personnel, etc.

14. Surveys

A. Restricted Areas

Direct radiation, air and wipe surveys are made in all restricted areas on a use basis. These surveys vary from daily to monthly depending on use of material. Records are maintained of all surveys made within their facility. General air surveys are made in and around the manufacturing facilities and other locations where possible air concentrations may exist.

B. Unrestricted Areas

The licensee makes both radiation and air surveys of their unrestricted area, and also conducts an active environmental survey program. Environmental surveys include air samples, service water samples, river samples and soil or vegetable samples. A total of 42 environmental surveys are made annually. The majority of samples taken in their environmental surveys are made utilizing a one square foot gum paper (similar to that paper used in NYOO's world wide fallout study). The average results of these gum paper samples for the years 1957, 1958, 1959 and 1960 are 5×10^{-4} uc, 6×10^{-4} uc, 1×10^{-4} uc and $.2 \times 10^{-4}$ uc, respectively.

Air surveys are made utilizing gast air pumps on the outlet side of the absolute filters. Results of samples collected on H.V. filter papers were noted to contain no activity. Hoover stated that all operations involving any possible air concentrations are done in dry boxes utilizing glove ports.

All neutron survey results in occupied areas within the plant site were noted to be non-detectable.

15. Leak Tests

Leak tests are made of all their Po-Be sources on a maximum 3 month basis when practical. These leak tests are made using a dry filter paper. A review of these results indicated that actual leak tests have been made on a monthly basis unless the sources were in use in the reactor. In such cases, a leak test is not made directly of the source, but indirectly by sampling the water, used as a moderator, for alpha activity. The maximum result noted of their leak test was 10 dpm. The source was decontaminated and the results of another leak test revealed 1.2 dpm.

Leak tests of their Co-60 sources are made on a 3 month basis and the maximum result noted on 8/30/60 was 175,000 dpm. No contamination was found in the area as evidenced by direct radiation, smears and air samples. It should be noted that this source was noted as leaking and had been additionally encapsulated. The source was checked frequently after the additional encapsulation and the last leak test result on 11/22/60 indicated no detectable leakage. Other sealed sources on hand are leak tested on a routine basis and the results of these leak tests indicated no leakage.

16. Procurement Procedures and Control

All isotopes are procured through a purchasing agent and received by the Health Physics Department and transferred to the persons desiring the material. All incoming shipments are checked for radiation and contamination prior to release to the individual requesting the material. Records are maintained of receipt of the material and the results of the radiation and contamination checks of the incoming shipments. The licensee receives material from Radium Chemical Company, U. S. Radium, National Bureau of Standards, Nuclear-Chicago, Tracerlab, New England Nuclear Corp. and many other vendors of radioisotopes. The licensee maintains a yearly physical inventory of all isotopes on hand. A monthly inventory confirmation check is also made by Hoover. A copy of the yearly inventory record is included in the licensee's file. This inventory reflects the following information: type of material, the activity, the vendor, the purchase order number, the assay of the material, the date received, the storage location and the custodian of the isotope. To the best of Hoover's knowledge, the license limits for Licenses -2, -4 and -6 have never been exceeded.

17. Storage, Security and Inventory

The licensee stores material in any of the following locations: Vault #5, Health Physics Laboratory #5, Room 309 - #5, Metallurgical Lab #3, H. V. #3, Room 320 - #5, Vault #2. The

Po-Be sources are stored in cells in slots in the 2' thick concrete wall located in the Critical Facility Building, #2. This building is surrounded by wire fence. Storage locations for these sources are noted as cell-AEC or cell-FCE. The total quantity of radioactive material other than uranium on hand at the time of the inspection is as follows:

radium - 909.1 mc
isotopes between Atomic #3 to 83 - 33.805 mc
Po-Be - 3 sources totaling 3.627 c, assayed on 1/31/59
 1 source of 12.5 c, assayed on 11/23/60
 1 source of 20 c, assayed on 3/28/60

The licensee also had on hand a nominal 3 c Co-60 sealed source used for industrial radiography assayed on 12/12/58. This source was procured under License No.-7 which has since expired. This source was purchased for use by the Nuclear Division for use in the Naval Test Reactor Prototype Building and the licensee has no further use for this source. Hoover expressed his intention to transfer this source to the Naval Test Reactor Prototype Division presently under Contract #AT(30-3)-519 or if those people do not want the source, the source will be returned to the supplier.

The licensee also possesses much uranium for their fuel processing facilities under contract. All storage locations are locked and access to these storage locations is by a three tumbler combination vault door. In addition, the individual plant buildings are under a 24 hour guard service.

18. Waste Disposal

Waste disposal is by transfer or by release to the Farmington River which in turn flows into the Connecticut River. All liquid wastes from their fuel processing building, radioisotope labs and their experiment labs are piped into hold-up and dilution vaults which are sampled and diluted if necessary. This waste is then piped to a waste treatment plant prior to discharge to a weir which flows into the Farmington River. The licensee has ten 2,000 gallon hold-up tanks, eight 5,000 gallon hold-up tanks and four 10,000 gallon hold-up tanks. These tanks are primarily for the detection of uranium.

No waste is disposed of from the Critical Facility Building. The licensee has a huge tank located under the reactor such that the water used as a moderator can be pumped into this tank, if no activity is noted in the water, the water is pumped back up into the reactor for reuse. Hoover stated that if the moderator water in the Critical Facility ever becomes contaminated, the contaminated water would be trucked to ORNL. No such incident has occurred to date.

Byproduct waste effluents are passed into ion exchange columns, and then released into the waste treatment plant system. Hoover stated that the average water flow from the plant is 20,000 gallons per day. The range is 4,000 to 60,000 gallons a day. Prior to release from the treatment plant, liquid effluent samples are taken to determine whether or not to release the effluent. Hold-up and dilution tanks are available if necessary. Records are maintained of all samples taken from the waste discharge into the Farmington River.

Three Po-Be sources were transferred to ORNL on 9/1/60.

19. Posting and Labeling

A. Posting

All storage locations are posted with "Caution - Radioactive Materials" and "Caution Radiation Area" signs where necessary. The licensee uses the standard sample signs issued by the Commission, and similar signs. The entrance to the Critical Facility was also posted with "Caution Radiation Area", "Caution High Radiation Area", "Caution Exclusive Area - Authorized Personnel Only" and "Caution - Radioactive Materials" signs all bearing the standard radiation symbols.

B. Labeling

All licensed isotopes in their Health Physics Lab #5 storage location were noted to be labeled with the standard "Caution - Radioactive Material" sign and all indicated the kind, quantity and assay date. Hoover stated that all other locations where radioisotopes are stored are labeled with the same required label.

The inspector was unable to view the labeling of the Po-Be sources at the time of the inspection because a critical experiment was being conducted. The licensee showed the inspector a sample label which was reported to be on all the Po-Be sources in storage and in use in the Critical Facility Room. This label indicated "Caution - Radioactive Material", the standard radiation symbol, the kind, quantity and assay of the material, and indicated the radiation measurements at various distances.

20. Personnel Monitoring

A. Pocket Dosimeters

The licensee uses Landsverk and Beckman self-reading type 0 to 200 mr pocket dosimeters. These dosimeters are used daily in the Critical Facility. The maximum weekly exposure was noted to be 323 mr and the average readings were noted to be 150 mr.

B. Film Badges

A Film badge service is supplied by the Nuclear Service Laboratory, Inc., in Knoxville, Tennessee on a monthly basis. Film badge results are also checked for neutron radiation. The licensee uses both personnel and area type badges, in addition to indium foil in the event of an unexpected critical excursion. The maximum reading noted for area badges was 345 mr per month. This reading was a result of storage of isotopes in one of the vaults. Personnel badges were noted to be less than 100 mr/month and neutron exposures were noted to be less than 50 mrem/mo. The licensee maintains records of all film badge and pocket dosimeter results.

C. Bioassays

All personnel at the licensee's Nuclear Division receive pre-employment urine analysis, termination analysis and annual urine analysis for natural uranium and enriched uranium (contract work) and a gross beta count (eliminating K-40). Personnel receive additional bioassays varying from a biweekly to a semiannual frequency for uranium depending upon the particular operation being performed. Urine analysis on personnel using byproduct material is done on a use basis. All personnel employed in the Nuclear Division receive annual complete blood counts and urine analyses for sugar and albumin. Fecal analyses are performed on persons suspected of being involved in an incident or overexposures. Natural uranium urine samples concentrations submitted by personnel are analyzed fluorometrically. U-235 urine samples are analysed by electro deposition analysis methods. Byproduct material limits on urine are reportedly 200 dpm per liter. Any employee having a concentration of 50 dpm per liter is investigated.

LICENSE C-4451

21. The licensee as a service to the State of Connecticut receives thorium-magnesium alloy scrap from various licensees in the State of Connecticut for burning and further disposal. An isolated area on Combustion's property is used for storage and burning of this thorium-magnesium alloy scrap. The licensee has received thorium-magnesium alloy scrap on the following dates from the following companies after the expiration date of their license (expiration date November 30, 1959).

A. LYCOMING DIVISION, ANSCO CORPORATION

February 1960	-	6 drums
July 1960	-	7 drums

B. KOMAN COMPANY

December 1959	-	5 drums
February 1960	-	2 drums
March 1960	-	2 drums
April 1960	-	1 drum

C. TURCOTTE MANUFACTURING COMPANY

January 1960	-	1 drum
February 1960	-	2 drums
April 1960	-	1 drum
May 1960	-	2 drums
June 1960	-	2 drums
July 1960	-	6 drums
August 1960	-	5 drums
September 1960	-	1 drum
December 1960	-	2 drums

The total amount of thorium on hand is reportedly 191 lbs. The licensee stores this thorium-magnesium alloy scrap in 55 gallon steel drums in a remote area under the supervision of the health physics personnel. Air samples utilizing gum paper are taken before, during and after burning operations. The licensee was unaware that their license had expired. Hoover and Bowie thought that the license was issued for a 3 year period rather than a one year period. Bowie stated that immediate application would be made for renewal of their license.

ITEM # 9

RECEIVED

FEB 15 1961

NYCO COMPLIANCE DIVISION

B/19

Post Inspection (MIO)
a/copy of letter

CO: Mr. John E. Thayer
Construction Engineering, Inc.
Naval Weapons Division
Director, Compliance

NYCO
TO CIV 30

James L. Hanson
Chief, Inspection Branch
Division of Licensing and Regulation

Sincerely yours,

Your further clarification of this report as above is requested.

It is noted that no material previously possessed under the license
number source besides the one reported and you have not
indicated a full and complete inventory for the possession of
license, Part 30, "Inventory of Hazardous Material."

1. Your letter does not clarify, nor can we ascertain, the
authority of the Naval Weapons Division to accept the source.
Note that the existence of a contract is not, in itself,
sufficient to establish an exemption from hazardous material
licensing under the terms of Title 10, Code of Federal Regu-
lations, Part 30, "Inventory of Hazardous Material."

This is to acknowledge receipt of your letter of January 23, 1961,
concerning the transfer of one thousand units of source pro-
cessed by pyrolytic treatment (6-11)-7 to your
Naval Weapons Division. Your request is not complete in that

Very truly yours,

Mr. A. E. Miller, Jr.
Director, Compliance
Naval Weapons Division
Construction Engineering, Inc.

FEB 9 - 1961

100-10-100

Isotopes Branch Files

February 23, 1961

Robert E. Brinkman, Isotopes Branch
Division of Licensing and Regulation

COMBUSTION ENGINEERING, INC., LICENSE NO. 6-217-7

The writer was informed, by J. R. Mason, that Combustion Engineering, Inc. had confirmed to him by telephone on February 21, 1961, that both sources covered by License No. 6-217-7 had been transferred and that the transfer had been to an exempt program. This will conclude follow-up action on expired license 6-217-7.

cc: Inspection (NYO) ✓

NYOO COMPLIANCE DIVISION

FEB 27 1961

RECEIVED

B/10

ITEM # 10

6-217-2,4, and -6
40-3457

MAY 3 1957

Myco
AK
sd
AWC

Combustion Engineering, Inc.
Prospect Hill Road
Windsor, Connecticut

Attention: Mr. James B. Kelly, Assistant Secretary

Gentlemen:

This refers to the inspection conducted on December 13, and 14, 1960 of your activities authorized under AEC Byproduct Material License Nos. 6-217-2, -4, and -6 and Source Material License No. C-4451.

It appears that certain of your activities were not conducted in full compliance with the requirements of the AEC's "Licensing of Byproduct Material," Part 30, and "Licensing of Source Material," Part 40, Title 10, Code of Federal Regulations, in that:

1. In violation of 10 CFR 30, Section 30.3, "Licensing requirements," your byproduct material inventory included a three-curie Cobalt 60 sealed source without a valid AEC license.
2. In violation of 10 CFR 40, Section 40.10, "Restriction on transfers," a total of 45 drums of scrap thorium-magnesium alloy were received from December, 1959, to the date of the inspection from the Ameco Corporation, the Kewan Company and the Turcotte Manufacturing Company without a license to receive such material.

Please note the citation described in item 2 is made under 10 CFR 40 prior to its revision on February 13, 1961. Enclosed is a copy of the former 10 CFR 40 under which you were inspected and a copy of the amended Part 40 which is currently effective.

These requirements were brought to the attention of R. L. Hoover, by the inspector, and he stated that the deficiencies would be corrected.

ITEM #

11

B/11

Combustion Engineering, Inc.

- 2 -

MAY 3 1961

We were informed by telephone on February 21, 1961 that the three-course Cobalt 60 source was transferred to an AEC License exempt program. License No. FEB-50 was issued on January 16, 1961, authorizing Combustion Engineering to receive possession of up to 25 tons of thorium-uranium alloy scrap. Steps should be instituted by you at this time to assure that you will not in the future receive possession of byproduct material or source material without a valid AEC license. Should you have any questions about these matters, please feel free to write us.

Sincerely yours,

(signed concurrence cy in Byproduct Files)

Eber R. Price
Assistant Director
Division of Licensing
and Regulation

Enclosures:

10 CFR 40

10 CFR 40 amended

cc: Compliance Div., HQ

Compliance Div., NYOO

AEC Public Document Room

LAR:EB LAR

RE:bmj:REC

ERPrice

4/ /61

4/ /61

L. R. Rogers, L&R

COMBUSTION ENGINEERING, INC., WINDSOR, CONNECTICUT;
LICENSE NO. 6-217-7 - EXPIRED LICENSE

Records of this office indicate that subject licensee has not answered your letter dated September 13, 1960, concerning expiration of the license on August 31, 1961.

Attached is a report of inquiry dated January 31, 1961, from the NY Compliance Division which indicates NY forwarded its findings to L&R in a memorandum dated January 24, 1961 and an inspection report dated January 19, 1961.

This office agrees with the NY recommendation set forth in the attachment.

Attachment:
Inv of Exp. Lic dtd 1/31/61

CC: R. W. Kirkman, NY, w/o attach.

Original Signed by
D. E. Warner

Donald E. Warner, CO

MAR 1 1961

CO

CO

CAVANAUGH:sd
2/27/61

WARNER



"of Compliance"

COMBUSTION ENGINEERING, INC.

NUCLEAR DIVISION

WINDSOR, CONNECTICUT • TEL. MURDOCK 8-1911

June 22, 1962

U. S. Atomic Energy Commission
Division of Licensing & Regulation
Isotopes Branch
1717 H Street, NW
Washington 25, D. C.

Attn: Mr. James R. Mason, Chief

Gentlemen:

Combustion Engineering, Inc., Nuclear Division submits Amendment #10 to License 6-217-6. This amendment would authorize the Nuclear Division to perform the duties, described in the subject license, for other Combustion Engineering Facilities located at 1000 Prospect Hill Road, Windsor, Connecticut.

Combustion's Kreisinger Development Laboratory (KDL) has transferred from our Chattanooga area to Windsor and currently occupies the Nuclear Division's former fuel fabrication facility. This laboratory is currently engaged in research and development work for Combustion's non-nuclear activities.

The Nuclear Division proposes to perform some trace analysis for KDL under the supervision of Messrs. G. S. Golden, R. H. Hancock, and R. L. Hoover who are the authorized users for License 6-217-6. Trace amounts of by-product material will be injected into a KDL boiler system and as it goes through the boiler system will be measured with gamma detection equipment to determine whether or not there is any particular buildup or difference in the amount of radioactivity through the system.

The chemical preparation of the by-product material and any samples taken from the system would be transferred to the Nuclear Division Laboratories for analyses. All material transferred would be in lead pigs large enough to reduce the surface radiation to < 2.5 mr/hr. The facilities and equipment used have been reviewed and approved by your office in our previous amendments to License 6-217-6.

ITEM # 12

B/12
2

We do not anticipate a liquid waste disposal problem from the KDL boiler system as the isotope to be used will be either Cu^{64} , half life 12.8 hrs. and/or Na^{24} with a half life of 15.6 hrs. The tracer once injected into the system will remain there for the entire life of the isotope.

The remaining items described in our License 6-217-6 remain unchanged.

Please forward Combustion's file copy to the writer.

Very truly yours,

COMBUSTION ENGINEERING, INC.



S. H. Shippenberg
Business Manager

SHS:sar



COMBUSTION ENGINEERING, INC.

1000 PROSPECT HILL ROAD
WINDSOR, CONNECTICUT

July 6, 1962

U. S. Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Attention: Mr. James R. Mason
Chief, Isotopes Branch

Subject: Byproduct Material
License No. 6-217-8

Gentlemen:

We request that the subject license be amended to provide that the Iridium 192 source and Cobalt 60 source be stored in our Nuclear Division vault under the supervision of the Health Physics Department when not in use.

Very truly yours,

COMBUSTION ENGINEERING, INC.

Joseph M. Lawler
Joseph M. Lawler
Assistant Secretary

JMl:pmw

ITEM # 13

B/13
44625

L&R:IB:WSC (6-217-4)

JUL 10 1962

Combustion Engineering, Inc.
Nuclear Division
Prospect Hill Road
Windsor, Connecticut

Attention: S. H. Shippenberg
Business Manager

Gentlemen:

Transmitted herewith is Amendment No. 3 to License No. 6-217-4 issued in response to your letter dated June 19, 1962.

Due to the similarity of the programs covered by License Nos. 6-217-2 and 6-217-4, we have included in Amendment No. 3 of License No. 6-217-4 all of the materials, uses and conditions previously licensed to Combustion Engineering, Inc. under License No. 6-217-2. Concurrently we have issued Amendment No. 6 to License No. 6-217-2 terminating that license.

Sincerely yours,

Robert E. Brinkman
Isotopes Branch
Division of Licensing
and Regulation

Enclosures:

Am. # 6, Lic. # 6-217-2
Am. # 3, Lic. # 6-217-4
Form AEC-313

COMPLIANCE DIVISION

bcc: Compliance (Region I)

JUL 13 1962

RECEIVED

L&R:IB

L&R:IB

WSCool:dc

REBrinkman

7/9/62

7/ /62

ITEM #

14

B/14

L&R:IB:REB (6-217-6)

JUL 10 1962

Combustion Engineering, Inc.
Nuclear Division
Windsor, Connecticut

Attention: Mr. S. H. Shippenberg

Gentlemen:

This is in response to your letter of June 22, 1962, concerning the use of byproduct material in tracer studies in closed boiler systems at your facilities.

In reviewing License No. 6-217-6, we have determined that your company is already licensed to perform these tracer studies with Copper 64 or Sodium 24 at the Prospect Hill Road facilities under the supervision of the persons designated in your letter. The fact that an additional sub-division of your company will become involved will not require license amendment, so long as conditions of the license are satisfied.

Very truly yours,

Robert E. Brinkman
Isotopes Branch
Division of Licensing
and Regulation

bcc: Compliance (Region I)
w/cy ltr dtd 6/22/62

NYCO COMPLIANCE DIVISION

JUL 13 1962

L&R:IB

Brinkman/lam

7/9/62

RECEIVED

ITEM #

15

B/15

L&R:IB:REB (6-217-8)

JUL 11 1962

Combustion Engineering, Inc.
1000 Prospect Hill Road
Windsor, Connecticut

Attention: Mr. Joseph M. Lawler

Gentlemen:

This is in response to your request of July 6, 1962, that byproduct material License No. 6-217-8 be amended to provide for storage of "the Iridium 192 source and Cobalt 60 source" in the Nuclear Division vault.

The license covers only one Cobalt 60 source and no Iridium 192 sources. Provision for storage of the Cobalt 60 source was made in Amendment No. 2 of License No. 6-217-8 by Condition No. 18 on July 3, 1962. Since the license does not include Iridium 192, a condition referring to storage of Iridium 192 would not be appropriate.

Very truly yours,

Robert E. Brinkman
Isotopes Branch
Division of Licensing
and Regulation

bcc: Compliance (Region I)
w/cy ltr dtd 7/6/62

NYOO COMPLIANCE DIVISION

JUL 16 1962

RECEIVED

B/16

L&R:IB

Brinkman/lam

7/10/62

ITEM # 16

MAR 20 1963

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT
Reinspection

1. LICENSEE COMBUSTION ENGINEERING, INC. Nuclear Division Prospect Hill Road Windsor, Connecticut	2. REGIONAL OFFICE DIVISION OF COMPLIANCE U. S. ATOMIC ENERGY COMMISSION 376 HUDSON STREET NEW YORK 14, NEW YORK
3. LICENSE NUMBER(S) 6-217-6	

4. INSPECTION FINDINGS Date of Inspection 3/14/63

- A. No item of noncompliance was found.
- B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b)
- C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c)(1)
- D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d)
- E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e)
- F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f)(1) or (f)(2)
- G. Storage containers were not properly labeled to show the quantity, date of measurement, or kind of radioactive material in the containers. 10 CFR 20.203(f)(4)
- H. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)
- I. Form AEC-3 was not properly posted. 10 CFR 20.206(c)
- J. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a)
- K. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b)
- L. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.41, 40.61 or 70.51
- M. Records of leak tests were not maintained as prescribed in your license.

Richard G. Gilbert

Mailed to licensee: 3/19/63 AEC Representative

5. LICENSEE'S ACKNOWLEDGMENT

The AEC representative has explained and I understand the items of noncompliance listed above, if any. The items of noncompliance will be corrected within the next 30 days.

 Date Licensee Representative

B/17

COPIES: LICENSEE; COMPLIANCE AREA; DIV. OF LIC. & REG.; DIV. OF COMPLIANCE (2)

ITEM # 117

Back-up for a Clear Form AEC-591

COMBUSTION ENGINEERING, INC.
Nuclear Division
Prospect Hill Road
Windsor, Connecticut

License No.: 6-217-6

Announced Reinspection

Inspected by Richard G. Gilbert
on March 14, 1963

Applicable Parts: 20 and 30

Previous Inspection was
conducted 12/13 and 14/60
by Walter R. Lorenz. (a
clear report)

Persons Accompanying Inspector:

Mr. F. Brandkamp, Radiation Specialist,
Region I, Division of Compliance
Mr. Huebner, Connecticut Department of Health

Persons Contacted and Titles:

Mr. Borawaski, Supervisor, Industrial Hygiene and Safety Division
Mr. Thomas Bowie, Nuclear Materials Management

DETAILS

Scope and Conditions

Pursuant to this license the licensee ~~was~~^{is} authorized to possess
the following:

- A. Byproduct material between 3 and 83 in any form up to a total of 750 mc.
- B. Ag-110 in ingot or plate form up to 40 mc
- C. In-114 in ingot or plate form up to 17 mc
- D. Cd-113 and Cd-115 in ingot or plate form up to 9 uc
- E. Byproduct material between 3 and 83 as irradiated fuel plates and control rods up to 1 c.
- F. Kp-237 in any form up to 6 mc
- G. Am-241 in any form up to 1 uc
- H. Byproduct material between 3 and 83 as irradiated or contaminated reactor components up to a total of 1 c.

A, F. and G. are authorized for neutron flux measurements..., and calibration sources; B, C. and D. in the fabrication of Ag In and Cd plates; E., inspection ~~and~~ servicing of irradiated fuel plates and control rods; and H. maintenance, repair, etc. of reactor components.

Condition 12 lists five individuals under whose supervision material may be used and Condition 14, the various procedures and applications material must be used in accordance with.

Organization and Administration

According to Borawaski, all ^{matters relating to} radiation hazards and control of the material has been exercised by the Health and Safety Division. If byproduct material should enter the fabrication area of the Nuclear Division, it would then come under the control of the shop safety committee. Of the six individuals listed as authorized users, two Golden and Harding, have left the company. Of the four remaining users, Lichtenberger, ^{manager of the} Core Manufacturing Department and Sheeran, ^{engineer of the} Manufacturing Department, because of their positions, would not become involved in the byproduct material program. The only persons, according to Borawaski, ^{who} would be using byproduct material would be Hancock and Hoover. Borawaski stated that the Core Manufacturing Department has not to date become involved in this byproduct material program. Byproduct material possessed under this license have been used mainly by Hancock in the standardization of counting techniques for health physics purposes or by Hoover to some extent as reference ^{calibration} sources ^{for} ^{the} ^{work} performed with contract material. Byproduct material, in irradiated liquid form, ^{only} has been received from outside suppliers.

Mr. Bowie stated that all requests for byproduct material would be processed through him. He possessed a copy of the license, and was familiar with the isotopes authorized for use and ^{the various} license limits. Byproduct material would be shipped to him and, after ^{being} properly logged in, it would be transferred, ^{via} interoffice memos, to persons maintaining physical custody. Bowie stated that to date material received under this license was ^{only} not in the physical custody of Hoover or some member of the Industrial Hygiene and Safety Division working under his supervision. Bowie stated that a complete record of all material received has been maintained by him. ^{this was reviewed during the inspection.} He would mail a copy of this inventory complete as of 1/3/63 to this office with ^{the} next few days. ^{This was accomplished on 3/10/63. See attached inventory listing, which also reflects receipts.}

Facilities and Uses of Byproduct Material

According to Borawaski the Health Physics Staff on an informal basis would periodically check up on all health physics procedures required in conjunction with the use of byproduct material and would review ^{programs} to determine the compliance with company and AEC regulations. He added that all incoming shipments would be monitored with an appropriate survey instrument and, in addition, packages containing other than laboratory standards would be smear tested.

Survey instruments possessed by the health physics group include Thyac II's, Oberline gas proportional counters, Cutie Pies, and Samsons. Survey instruments, according to Borawaski were both serviced and calibrated on a quarterly schedule by the Health Physics Department.

Borawaski stated that most of the material obtained by this department ^{Industrial Hygiene} was still on hand and still in a form suitable for use as counting standards. Very little byproduct material had been disposed of. Some material which had decayed to background levels and some microcurie quantities no longer suitable for standardization purposes had been disposed of through the company's hot liquid waste disposal system. ^{In} all instances, prior to disposal of wastes into this

* Very exact and detailed use and disposal (with situations were kept and reviewed). Good control had been exercised over the byproduct material from the time it entered the plant. All could be accounted for - except possibly minute amounts lost in sensing, etc.

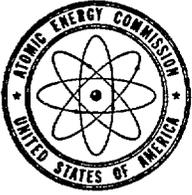
special drain, the user ^{would be} required to notify the Health Physics Department. In some instances, the Health Physicists would recommend such wastes be stored ⁱⁿ carboys, to be disposed of in another manner. Written procedures promulgated by C.E. cover all types of disposals, and in all instances would be in accordance with the attachments to the application dated 4/7/62. Borawski stated ^{that} on a daily basis, the water in the 10 retention tanks located in the hot waste vault and designated A 1 - 5 and B 1 - 5 would be sampled for alpha and beta activity. The liquid sample would be evaporated onto a planchet and counted in a gemotry with an alpha efficiency of 49% and a beta-gamma efficiency of 10%. A review of the waste disposal records kept in conjunction with the emptying of the tanks, which incidentally include some wastes from the fuel element fabrication area revealed that between 95% and 99% of the time no detectable contamination, i.e., no levels above background were noted. A random sample of the records also showed the highest alpha contamination to be 8 dpm. The highest beta activity to be 3 dpm per representative sample. Gross counts have been converted to uc/ml showing activities to be considerably less than those stated in 10 CFR 20. Provisions were available to provide dilution should it be required prior to emptying the tanks into an adjoining river. Environmental sampling of the river water and banks had been periodically performed, and results indicated background counts. All drains leading from building #5 had been periodically monitored, with no detectable radiation noted.

Surveys and Personnel Monitoring and Posting and Labeling

C.E.'s standard operation instructions require that all areas be smear tested prior to any operations involving source, special nuclear material or byproduct material. Alpha contamination or loose contaminants must be completely removed from the work area. For unrestricted areas no fixed contamination is allowed. Areas must be cleaned to no detectable levels. For work areas, considered as restricted areas, fixed contamination on floors to 100 dpm is allowed and all other areas must be cleaned to no detectable radiation levels. Beta-gamma probe measurements, ^{must be} no detectable levels ⁱⁿ restricted areas and no more than 1 mr/hr at 1" from all surfaces of restricted areas. Complete monitoring of personnel clothing must show no levels of contamination.

Film badges have not been used in this program. Annual bioassays have been taken as part of the annual personnel physicals. Such bioassays consist of blood tests and an urinalysis. Records of same were maintained and reviewed. No indications of exposure to radiation or ingestion of material was noted.

A review of the laboratory areas and storage areas at the time of the inspection showed these areas to be properly posted with "Caution - Radioactive Material" and "Caution - Radiation Area" signs and Form AEC-3 was posted. Labeling on all containers include the "Caution - Radioactive Material" statement, type of material, assay and date of assay. A section of laboratory 101 had been positioned up with lead bricks and had been used as the storage area. Monitoring of the surfaces of the bricks indicated radiation levels of less than 1 mr/hr. Background in the lab ranged from 0.2 to 0.3 mr/hr.



UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION I
376 HUDSON STREET
NEW YORK 14, NEW YORK

TELEPHONE: YUKON 9-1000

Ext. 386

IN REPLY REFER TO:
CO:1:RGG

March 19, 1963

EDMBUSTION ENGINEERING, INC.
Nuclear Division
Windsor, Connecticut

Re-Lic.: 6-217-6 &
STB-50

Attention: Messrs. Shippenberg & Hoover

Dear Sir:

Enclosed is your copy of Form AEC-591, Inspection Findings and Licensee Acknowledgment, issued pursuant to our inspection conducted on March 14, 1963. Item 4A, indicating that no item of noncompliance was found, has been checked. No further action is required on your part.

Your cooperation is appreciated.

Very truly yours,

Robert W. Kirkman, Director
Region I, Div of Compliance

Enclosure:
AEC-591

ITEM # 18

B/18



COMBUSTION ENGINEERING, INC.

NUCLEAR DIVISION

WINDSOR, CONNECTICUT • TEL. MURDOCK 8-1911

March 20, 1963

U. S. Atomic Energy Commission
Division of Compliance
376 Hudson Street
New York 14, New York

Attn: R. G. Gilbert

Dear Sir:

In accordance with your request of March 14, 1963 a copy of the Radioactive Sources held under our By-Product Material License c-217-6 is herewith submitted.

Very truly yours,

COMBUSTION ENGINEERING, INC.



S. H. Shippenberg
Business Manager

SHS:sar

ITEM # 19

B/19

MAR 27 1964

IAIRIB:MG (6-217-6)

Combustion Engineering, Inc.
Nuclear Division
Prospect Hill Road
Windsor, Connecticut

Attention: Mr. S. H. Sulzpenburg

Gentlemen:

Enclosed is Amendment No. 21 to Byproduct Material License No. 6-217-6 issued in response to your application dated February 29, 1964.

Prior to continuing review of your request for the use of sealed sources containing Cobalt 60, we shall need the name of the manufacturer and the model numbers of the sources. If the source is to be custom-designed to your specifications, please submit an annotated drawing or sketch of the source containing which precise information concerning the material of construction, physical dimensions, and method of sealing the source.

It is required that sealed sources containing Cobalt 60 be tested for leakage and/or contamination at intervals not to exceed six months. Please describe your arrangements for conforming with this requirement. If you plan to perform the test yourself, submit the procedures to be followed and the instrumentation to be used which is capable of detecting 0.005 microcurie on the test sample.

Sincerely yours,

Robert E. Brinkman
Isotopes Branch
Division of Licensing
and Regulation

FORMAL REPLY TO 44

Enclosures:
1. Amend. #11
✓ 2. Form AEC-313
cc: Compliance, Region I

IAIRIB

IAIRIB

Churchill/Jam Brinkman

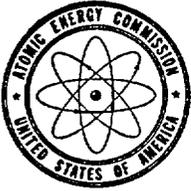
3/26/64

3/ /64

ITEM #

20

B/S



UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION I
376 HUDSON STREET
NEW YORK 14, NEW YORK

TELEPHONE: YUKON 9-1000

Ext. 388

IN REPLY REFER TO:
CO:I:JFB

October 6, 1964

Combustion Engineering
Prospect Hill Road
Windsor, Connecticut

Attention: R. L. Hoover

Gentlemen:

License Nos. 6-217-4, -8
6-4154-1
STB-50, SNM-551

The Division of Compliance, Region I, is charged with the responsibility of assuring compliance by the holders of licenses with the Atomic Energy Act of 1954, the applicable rules and regulations of the Atomic Energy Commission, and the terms and conditions of the licenses themselves.

Our representative, Mr. James F. Bresson plans to visit you at about 10:30 a.m. on October 13 and 14, 1964 for the purpose of making an inspection of your facilities.

This inspection will be directed primarily to the status of your compliance with 10 CFR 30, "Licensing of Byproduct Material," and/or 10 CFR 40, "Control of Source Material," and 10 CFR 20, "Standards for Protection Against Radiation."

We request that you have available at the time of inspection the various records called for by the foregoing regulations, particularly those contained in 10 CFR 20.401(a) and (b).

Very truly yours,

Robert W. Kirkman, Director
Region I, Division of Compliance

ITEM # 21

B/21

Radioactive Sources
12-6-62

Type	Level	Vendor	P.O. #	Date	Location	Custodian
C ¹⁴ 4924	10 ³ dps/ml	Natl. Bureau of the	58W05905	11-25-58	R312	A. J. Goldberg
Sr-90 (Calibrated)	0.1 mc	T-Over Lab.	58 WL4541	8-20-58	"	"
Sr 90 (non calibrated)	0.1 mc	"	58 W03742	9-2-58	R309-5	R. L. Hoover
Co ⁶⁰ (B) RI	3.66 x 10 ⁻⁵ mc	"	562008	3-16-56	"	"
Co ⁶⁰ (B) RI	3.83 x 10 ⁻⁵ mc	"	"	"	"	"
C ¹⁴ (B) R10	Un calibrated	"	"	"	"	"
C ¹⁴ (B) R10	"	"	"	"	"	"
Na #4922	64.3 x 10 ⁴	"	"	"	R312	"
Co ⁵⁷ A12	< 1 mc	New Eng. Anal. Co.	58W03339	7-2-58	Counter	"
Na ²² 1681	< 1 mc	"	"	"	R309-5	"
Co ⁶⁰ 874	< 1 mc	"	"	"	"	"
Pa ¹³³ 351	< 1 mc	"	"	"	"	"
Cs-137 A26	< 1 mc	"	"	"	"	"
Co ⁶⁰ 5/22/61	< 1 mc	T-Over Lab.	58 WL4541	12-12-58	"	"
Sr ¹³³ Lab 9-4-58	< 1 mc	"	"	"	"	"
Sr-90 @A38, 39, 41, 42, 45, 46	1 mc each	Nuclear Chicago	58WS 6251	2-16-59	V. Bldg, #2	S. Vianer
Silver-110	1 milliecurie	Cape Ridge Natl. Lab.	Reg. 428-527	7-27-62	"	R. L. Hoover
Hafnium-181-P	0.25 mc	"	N/9300223	3-5-63	"	R. L. Hancock
Nickel-63-P	0.1 mc	"	N/9300224	"	"	"
Tungsten-185-P	0.1 mc	"	"	"	"	"
Antimony-124-P	0.1 mc	"	"	"	"	"
Radium-226 HG 203	1 mc	"	OH 3689	"	Reed Lab	R. L. Hoover
Strontium SR 85	0.2 mc	"	"	"	"	"
Th-232 SN113	0.2 mc	"	"	9-27-61	"	"
Zinc 265	0.2	"	PR1509142A	"	"	"
Caesium 7 Sol. 12/6/62	0.2 mc	Nuclear Science & Eng.	OH 5064N	3-7-62	Bldg #5	"
UO-10	1 gm.	"	OH 423	9-20-60	"	W. Mordaschi
UO-15	1 gm.	"	"	"	"	"
UO-20	1 gm.	"	"	"	"	"
UO-30	1 gm.	"	"	"	"	"
UO-50	1 gm.	"	"	"	"	"
Y88	79300 DPs	"	"	10/61	Bin 311	R. L. Hoover

RECEIVED
 REG. DIVISION
 DIV. OF COMPLIANCE
 N. Y.
 APR 25 11 50 AM '63

ITEM # 22

A/22

I-L(2)

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

<p>1. LICENSEE</p> <p>Combustion Engineering, Inc. Nuclear Division Prospect Hill Road Windsor, Connecticut 06095</p>	<p>2. REGIONAL OFFICE</p> <p>USABC - DIVISION OF COMPLIANCE 376 HUDSON STREET NEW YORK, 14, NEW YORK</p>
<p>3. LICENSE NUMBER(S)</p> <p>6-217-4, 6 <i>I-E I-C(2)</i></p>	<p>4. DATE OF INSPECTION</p> <p>October 13-14, 1964 (Reinspection)</p>
<p>5. INSPECTION FINDINGS</p> <p><input checked="" type="checkbox"/> A. No Item of noncompliance was found.</p> <p><input type="checkbox"/> B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 31.302</p> <p><input type="checkbox"/> C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c)(1) or 31.302</p> <p><input type="checkbox"/> D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d)</p> <p><input type="checkbox"/> E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e)</p> <p><input type="checkbox"/> F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f)(1) or (f)(2)</p> <p><input type="checkbox"/> G. Storage containers were not properly labeled to show the quantity, date of measurement, or kind of radioactive material in the containers. 10 CFR 20.203(f)(4)</p> <p><input type="checkbox"/> H. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)</p> <p><input type="checkbox"/> I. Form AEC-3 was not properly posted. 10 CFR 20.206(c)</p> <p><input type="checkbox"/> J. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 31.203(b)</p> <p><input type="checkbox"/> K. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 31.303(d)</p> <p><input type="checkbox"/> L. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.41, 40.61 or 70.51</p> <p><input type="checkbox"/> M. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 31.105(c).</p> <p><input type="checkbox"/> N. Records of inventories were not maintained. 10 CFR 31.106</p> <p><input type="checkbox"/> O. Utilization logs were not maintained. 10 CFR 31.107</p> <p style="text-align: right;"><i>James F. Brannon</i> (AEC Compliance Inspector)</p>	
<p>6. LICENSEE'S ACKNOWLEDGMENT</p> <p>The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.</p> <p style="text-align: center;">ITEM # <u>22</u></p> <p style="text-align: right;">B/23</p> <p style="text-align: center;">(Date) _____ (Licensee Representative - Title or Position)</p>	

DRAFT
BRESSION:cap
10/20/64

BACK-UP FOR AEG-592

PART 30 INSPECTION

Inspector: James F. Bresson

COMBUSTION ENGINEERING, INC.
Kreisinger Development Laboratory
100~~0~~ Prospect Hill Road
Windsor, Connecticut

License No.: 6-217-8

Date of Inspection: October 14, 1964 (Announced Initial)

Persons Accompanying Inspector:

None State of Connecticut Department of Public Health notified

Persons Contacted:

R. L. Hoover, Manager Industrial Hygiene and Safety, RSO for license
Ernest Borawski, Chief, Health Physics and Safety Section
W. A. Scheerer, Engineering Specialist, Principal User
R. C. Patterson, Manager, Kreisinger Development Laboratory

DETAILS

Organization and Administration

1. Hoover stated that he is the Manager of the Industrial Hygiene and Safety Division for Combustion Engineering and that he functions as RSO on all licenses. He stated that the majority of licensed activity is contained in the Nuclear Division whose Director is W. H. Zinn. He said that Zinn is a Vice-President. In the Nuclear Division are the following Sections: Physics, Engineering, Business, Manufacturing, Reactor Development and Health and Safety Projects and Industrial Hygiene. He stated that advising these groups is a Nuclear Safety Committee comprised of the Department Managers of all the above sections. He said that the 20 mc Co-60 sealed source authorized in License -8 is used in the Kreisinger Development

Laboratory whose Manager is R. C. Patterson. The principal user was to have been W. A. Scheerer, and Hoover stated that he has been listed as the RSO on this license. Scheerer and Hoover stated ~~that~~, and records of receipt confirmed, ^{that} a 20 mc sealed Co-60 source was obtained from ORNL on June 20, 1962. They stated that since its receipt it has not been used at all. Ernest Borawski, the Chief Health Physicist, stated that he has conducted leak tests on this sealed source at various times. Leak test records were examined and it was noted that the source was tested for leakage at ORNL on 6/13/62 prior to its shipment to Combustion. Further leak tests were conducted on 12/19/62, 4/5/63, 5/9/63, 12/19/63 and 9/16/64. The inspector noted that there were periods between leak tests of greater than six months. It was noted that records were maintained in units of microcuries and that all records showed contamination of ~~much~~ less than .005 uc. Borawski stated that these tests are evaluated on a flow proportional counter which is calibrated daily.

Personnel Monitoring

2. Hoover stated that because the source has never been used that Scheerer has never been issued a film badge. He stated that any exposure received by Borawski while conducting a leak test is incorporated into his overall exposure record. These will be discussed when discussing activities conducted under other licenses for which 591's were issued. In general the inspector noted while reviewing exposure records that badges are supplied by Nuclear Service Laboratories in Knoxville, Tennessee and are changed on a monthly basis. He noted that none of the personnel have received more than 50 mr in any month.

Surveys

3. Borawski stated that all sealed sources, ^{including the 3.52 mc Co⁶⁰ source} are stored in a vault located in a waste disposal building. He stated that monthly surveys are conducted in this area to determine the dose rate at the exterior of the vault and at the roped off area surrounding the vault. Records were maintained of these surveys and it was noted that the general dose rate at the roped off area limit is 5 mr/hr. Borawski stated that also stored in this vault are the following radium sources: two 10 mg sources, one 100 mg source, one 250 mg source and one RaBe source of 300 mg. Also stored there is a nominal 3.52 mc Co-60 source authorized under License -6. It noted that the general dose rate at the exterior of the vault is approximately 10 mr/hr.

Posting and Labeling

4. The inspector noted that the Co-60 source is kept in its original shipping container. It was noted that the shipping container is labeled with the standard "Caution - Radioactive Material" sign and symbol and information as to kind and quantity of material contained therein and date of assay. It was further noted that the vault was also posted with the standard "Caution - Radioactive Material" sign and symbol as is the door leading to the building itself. The inspector noted that the vault is kept locked with Borawski retaining the key as is the building.
5. The inspector performed a survey using an NMC GS-2 geiger survey meter Serial No. 5588 calibrated at HASL on August 25, 1964. The inspector obtained approximately the same dose rate readings or measurements as were indicated in the survey records.

Item of Noncompliance

6. One item of noncompliance was noted during the inspection of License -8 as follows:
- License Condition 15A - the licensee failed to leak test a nominal 20 mc sealed Co-60 source for leakage and/or contamination at six month intervals. (See paragraph _____ of report details.)

Management Discussion

7. The results of the inspection were discussed with Mr. R. L. Hoover, Manager Industrial Hygiene and Safety Division and Mr. R. C. Patterson, Manager, Kreisinger Laboratory. They indicated that because the source is not being used that it will either be returned to ORNL or transferred to the Health Physics Section. They stated they were not sure which course of action they would take. Mr. Hoover assured the inspector that as long as the source was retained by Combustion Engineering it would be leak tested at six month intervals in the future.

10/17/64

PARTS 20, 30, 40 AND 70 INSPECTION

COMBUSTION ENGINEERING, INC.
100 Prospect Hill Road
Windsor, Connecticut

INSPECTOR: James F. Bresson

License Nos.: STB-50 - rein.
SNM-551- initial
✓ 6-217-4- rein.
✓ 6- rein.

Dates of Inspection: October 13 and 14, 1964 (Announced)

Persons Accompanying Inspector:

No One. State of Connecticut Department of Public Health notified.

Persons Contacted:

R. L. Hoover, Manager, Industrial Hygiene and Safety Department and
RSO on all licenses.
Ernest Borawski, Chief Health Physicist
Thomas Bowie, Nuclear Materials Manager
Robert Losee, Manager, Quality Control, Erection Department
S. H. Shippenberg, Business Manager

REPORT DETAILS

Background Information

1. Previous Inspection History: License 6-217-6 was last inspected 3/14/63. A clear 591 was issued. License No. 6-217-4 was last inspected 12/60. A clear inspection report was issued. STB-50 last inspected 3/14/63, and a clear 591 was issued. SNM-551 was an initial inspection.

Organization and Administration

2. Hoover stated that he is the Manager, Industrial Hygiene and Safety Division for Combustion Engineering. He stated that with the exception of the Radiography License, 6-4154-1, all other licensed material is used in the Nuclear Division. The Director is W. H. Zinn. The Business Manager is S. H. Shippenberg. Manager of Nuclear Materials is Thomas Bowie. In the Erection Department, Chief of Quality Control, the section in which radiography is performed, is Robert Losee. Hoover stated that he reports to W. H. Zinn.

3. Hoover stated that there are eleven people in the Health Safety Organization, four of whom are full-time health physicists. He stated that because there is very little licensed material on hand, approximately 75 per cent of the Health Safety Department's activities ~~are~~ ^{is} concerned with contract work for other people. Ernest Borawski is the Chief Health Physicist.

Use of Material

4. License -4

This license authorizes sealed sources of Po-210, no single source to exceed 45 c with a maximum limit of 115 c. Hoover stated that none of these sources were on hand at the time of inspection and that they had all been returned to ORNL for burial. Records were examined and it was noted that since the previous inspection of this license in 1961, no sources have been procured, but the following transfers had been effected: a nominal 20 c source transferred to ORNL on 9/11/62, a 10 c source transferred to ORNL on 9/11/62, a ^{nominal} 20 c source transferred to ORNL on 9/11/62, a nominal 28.5 c source returned to ORNL 9/11/62, a nominal 14.7 c source to ORNL on 7/19/63. Since 7/19/63 there have been $P\bar{O}^{210}$ sources present, according to Hoover and records.

5. Leak tests records of the sources were examined and it was noted that since the previous inspection all sources have been leak tested at intervals of six months or less, that the leak tests were performed by Borawski, ~~and~~ that results were maintained in units of uc, and that all results were less than .005 uc. Hoover stated that while these sources were on hand they had been used as start-up sources for the reactor and occasionally for calibration of neutron survey instruments.

License -6

6. Hoover stated that of all the material authorized under License -6, only irradiated material from reactors authorized under Item A has been received. He stated that work in this program is still being carried out. ~~Various~~ reactor crud is being analyzed in the Radio-Chemical Laboratory. All materials come from Westinghouse. Hoover said the packages contain ~~varies~~ ^{varies}

of approximately 20 ml, four in each sealed can, which is in turn sealed in a cardboard container. Health Physics is notified on receipt of material and a Health Physics representative surveys the incoming shipment for contamination and dose rate. The Health Physics representative then brings the shipment to the Radio-Chemistry Laboratory where analyses are performed. He stated and records confirmed that the program began in March 1963, and it was noted that in 1963 ten shipments from Westinghouse were received. So far in 1964, it was noted that there have been 17 shipments received from Westinghouse. The highest ^{amt} received has been approximately 20 mc. It has been noted that the dose rate at contact with the shipment was approximately 200 mr/hr. Most shipments are much less than 1 mc. Records of surveys performed, both contamination and dose rate are maintained. The reactor crud is analyzed for Co-58 and Co-60, Ni-63, Fe-55, Fe-59, Mn-54, and Cr-51. Hoover said work is done in hoods or on bench tops, depending on the type of separation involved. Hoover stated that the viles and cans and residue are returned to Westinghouse after analysis is completed.

Facilities and Uses of Byproduct Material

7. The Radio-Chemistry Laboratory is supplied with hoods and various working benches covered with kraft paper. Some of the hoods are equipped with absolute filters, according to Hoover, and some are not. It was noted that all hoods are sampled for air particulate release by means of copper tubes inserted into the hood before and after filters where they exist. The sample is pulled from the sampling line by means of a ^{best} gas $\frac{1}{4}$ horse power pump. Returned air for the pump is recirculated into the hood exhaust. Records are maintained of these surveys. It was noted that air concentrations released to the environment have all been evaluated as less than 10^{-13} uc/cc. Hoover stated that all laboratories in which radioactive material is handled ^{are equipped with} ~~in~~ a hood which is ventilated to the outside are sampled in the same way. He stated that because of lack of work, they have not had to conduct air samples of very many areas recently.

8. Hoover stated, and records confirmed that contamination surveys are performed in the laboratory periodically. They are performed by Health Physics. Dose rate measurements are also performed. The laboratory was examined and it was noted that the doorway to the laboratory is posted with the standard "Caution - Radioactive Material" sign and symbol as is a storage cabinet containing small amounts of radioactive samples. Each sample container is also labeled with the standard "Caution - Radioactive Material" sign and symbol and contains information as to the kind and quantity of material contained and date of assay. The inspector noted that the dose rate in the laboratory was less than .2 mr/hr in all areas except ^{at contact} with one of the samples which read 5 mr/hr. *All labs are posted with*

From AEC form 3

9. Hoover stated that other items authorized in the license have not been received. He stated they were put into the license in order to have authorization to use the material in case a contract should come through.

STB-50

10. STB-50 supersedes License C-4451 issued November 28, 1958. STB-50 was issued on January 18, 1961. It was last inspected on March 14, 1963. Hoover stated that since the previous inspection some Th-Mg had been received for burning. The operation was described in the previous inspection report. It was noted that between 3/9/62 and 8/6/63, approximately 1570 lbs. of 3 per cent enriched Th-Mg was received. 930 lbs. had been retained as Th oxide already burned previous to this date, so that at the time of this inspection approximately 2500 lbs. of Th oxide was on hand. Hoover stated that they are trying to find someone to take the material. Burning was accomplished in an open pit area described in the drawing attached to a letter from S. H. Shippenberg, Business Manager, dated January 23, 1963. The procedure is also described in this letter. Hoover stated that several air samples were taken during burning as well as gum paper fallout samples. Records are maintained of these surveys. It was noted that in no case was any activity above natural background activity detected on any air sample.

11. The Th oxide is stored in 55 gallon drums. The inspector noted that the majority of these drums did not bear the standard "Caution - Radioactive Material" sign and symbol, nor did they contain information as to the kind and quantity of material contained. It was estimated that each drum contained approximately 9 to 10 lbs. Th or slightly more than 500 uc. Hoover agreed that the drums could conceivably contain more material than this. He stated that they would be posted as necessary.

12. It was noted that the drums are stored within a restricted area, entrance to which is blocked off by a gate stretched across a dirt road. This gate is kept locked and Hoover retains the key. This area is also posted as a restricted area. It was noted that the area is also posted with the standard "Caution - Radioactive Material" sign and symbol. Dose rate measurements were taken at contact with several of the drums and it was noted that the resulting dose rate was less than 1 mr/hr in all cases.

SNM-551

13. Hoover stated that there is no licensed material at present on hand at the facility. Therefore, no manufacturing projects are being carried out under this license. Thomas Bowie, the Special Nuclear Material and Security Manager, submitted the following information on receipt and transfer of special nuclear material: July 1, 1962 to December 30, 1962 - 3 kg received from Westinghouse, License SNM-38, enriched U-235. During the same period, the 3 kg was shipped back to Westinghouse. These were in the form of fuel elements of 2 per cent enrichment. They were inspected, vapor blasted and pickle cleaned at Combustion and returned. Also July 1 to December 31, 1962, 49 kg of 2.5 enriched special nuclear material received from United Nuclear, License SNM-33. January 1, 1963 to June 30, 1963 76.6 kg, transfer of which 70.1 kg transferred to accountability station run by United Nuclear. The other 6.5 kg were also returned to United Nuclear. January 1963 to June 1963, .5 kg were returned to United Nuclear. July 1963 to December 1963, 9.9 kg received from United Nuclear transferred to accountability such that as of 12/31/63

there is a 0 balance of licensed material at the facility. Bowie stated the main operation consisted of loading Uranium oxide pellets, 5 per cent enriched, to boiler and super heater elements for shipment to Puerto Rico. These two shipments occurred in 1963 and are classified as station-to-station transfers. Lastly, 35 g U-235 was transferred late in 1963 to accountability records.

14. Bowie and Hoover stated that only one other operation has been conducted under this license, this also in 1963 which involved loading Uranium oxide powder into fuel rods and encapsulating the rods. He stated that this was done in an area pictured in a diagram, Amendment No. 5, dated 6/19/64, attached to UNC's latest application for license renewal.

More detailed descriptions of Combustion's operations, facilities, and special nuclear material control are described in a report written by Willis Browne, Criticality Inspector. The report is a result of his inspection trip of June 18, 1964.

Surveys

15. Hoover described the surveys performed during operations. He stated that the operation in which UO_2 powder was loaded into tubes was a somewhat dusty operation and that although it was performed in an enclosure, area air samples were performed as well as exhaust air samples. Records of these surveys are maintained and it was noted that all were below the AEC limits for U-235.

Personnel Monitoring

16. Film badges for all personnel involved in work under the above licenses are supplied by Nuclear Service Laboratories in Knoxville, Tennessee and are changed on a monthly basis. Records were examined and it was noted that since the previous inspection all exposures have been recorded as less than 50 mr/qtr.

17. Hoover said that personnel who had been involved in handling of enriched uranium were put on a quarterly urinalysis program. He stated that urinalyses were conducted at Combustion Engineering laboratory facilities. Samples were collected quarterly. Other people, at various times when working with natural uranium, have been put on a six month or annual urinalysis program. Records were examined and it was noted that urine samples are analyzed fluorometrically. It was noted that the highest urine sample was evaluated as .009 ug/ml enriched uranium.
18. In addition to film badges, Hoover stated that self reading dosimeters and pocket chambers might be handed out for such jobs as instrument calibration. He stated that these are issued for the use of the person wearing, and these readings are not maintained.

Instrumentation

19. Combustion Engineering possesses several flow proportional counters which are calibrated daily with appropriate beta and alpha sources, according to Hoover. Also possessed are several portable instruments, including geiger survey meters and ion survey meters. These are (portable instruments) calibrated approximately semi-annually, according to Hoover.

Waste Disposal

20. Hoover stated that the only solid waste disposal ^{was} ~~were~~ the Po-210 sources authorized under License -4. He then described the procedure for the disposing of liquid waste.
21. He stated that in the waste disposal building are ten 2,000 gallon tanks, five to a bank. All possibly radioactive liquid wastes from laboratories, etc., is drained to these tanks. Water in the tanks is agitated ^{for} approximately 15 minutes, and a sample is taken and analyzed for gross alpha and gross beta gamma. If limits are low enough, water is released from the tanks directly to the sewerage line through a treatment plant and into a creek leading to the Farmington River. If the water is above the limits, according to Hoover, it can be diverted ~~through~~ ^{to} any of five 1,000 gallon tanks for dilution. He stated that at the sewerage treatment plant, a

composite sample of the effluent is taken continuously. In addition to this, the Farmington River is also sampled above and below the discharge point at least quarterly. Hoover stated that the concentration limits for alpha emitters is 7×10^{-6} uc/cc or 15.5 dpm/ml sample. He said that the beta concentration limits are approximately 3×10^{-6} uc/cc or approximately 6.6 dpm/ml. Records of releases were examined and it was noted that for U-235 release average counts are from 1 to 3 dpm/ml alpha and less than 1 dpm/ml beta gamma. It was noted that on April 21, 1964 the tank samples were evaluated as 22.4 and 22 dpm/ml alpha at the tank. It was noted that this water was diluted such that the sample taken at the sewerage plant discharge was approximately 3 dpm/ml. Hoover stated that a monthly sample report for uranium release is sent to Bowie to determine uranium lost in sewage. It was noted that the highest total of uranium released in any month was 3.75 grams.

Posting and Labeling

22. It was noted that all areas where radioactive material is or has been used were posted with the standard "Caution - Radioactive Material" signs and symbols. Individual containers, in general, contained information as to kind and quantity of material contained therein and date of assay, with the one notable exception being the thorium oxide containers, as described in paragraph 11 .

Training and Instruction

23. Hoover stated that presently, all personnel involved in handling radioactive material have been with the company for several years. He stated that new employees are given the procedures manual which includes a copy of Parts 20 and 30 of the Code of Federal Regulations. He stated that he or one of the health physicists also instructs new personnel as well as old ones periodically in the handling of radioactive material.

License No. 6-4154-1

24. ~~This license was last inspected on 3/14/63. It is a radiography license issued to the Erection Department. Robert Losee is the Manager of the Quality Control Section of the Erection Department. He furnished the~~

22 OCT 1964

Ext. 388

CO:1:JFB

Combustion Engineering, Inc.
Kreisinger Development Laboratory
100 Prospect Hill Road
Windsor, Connecticut

Attention: Mr. H. C. Patterson, Laboratory Manager

Gentlemen:

This letter relates to the discussion Mr. Bresson of this office held with Mr. H. L. Hoover following the inspection conducted on October 14, 1964 of activities authorized under AEC Byproduct Material License No. 6-217-8.

As noted during the discussion, it appears that certain of your activities were not conducted in full compliance with AEC requirements and conditions of the license. The item and reference to the pertinent requirement is listed in Item 5 of the attached Form AEC-592.

The purpose of this letter is to give you an opportunity to advise us in writing of your position concerning this item and of any corrective steps you have taken or plan to take with respect to the item listed on the attached form and the date all corrective action was or will be completed. Your reply should be sent to us within 20 days of the date of this letter to ensure that it will receive proper attention in our further evaluation of this matter.

ITEM # 24

B/24

OFFICE ▶	COMPLIANCE					
SURNAME ▶	BRESSON: nm	CLEVELAND	KIRKMAN			
DATE ▶	10/22/64					

bcc: CO:HQ
SIR w/back-up notes

cc: Mr. R. L. Hower, Industrial Hygiene and Safety Manager,
w/o enclosure.
Mr. Joseph M. Lawler, Assistant Secretary, w/o enclosure.

Enclosure:
Form ABC-592

Robert W. Kirkman, Director
Region I, Division of Compliance

Very truly yours,

Should you have any question concerning this matter, you
may communicate directly with this office.

UNITED STATES ATOMIC ENERGY COMMISSION

DIVISION OF COMPLIANCE

1. LICENSEE COMBUSTION ENGINEERING, INC. Kreisinger Development Laboratory 100 Prospect Hill Road Windsor, Connecticut	2. REGIONAL OFFICE U. S. Atomic Energy Commission Region I, Division of Compliance 376 Hudson Street New York, New York 10014
3. LICENSE NUMBER 6-217-8	4. DATE(S) OF INSPECTION (Initial) October 14, 1964
<p>5. The following activities under your license (identified in Item No. 3 above) appear to be in noncompliance with AEC regulations or license requirements, as indicated.</p> <p style="text-align: center;">One nominal 20 millicurie cobalt 60 sealed source was not always tested for leakage and/or contamination at intervals of six months or less, contrary to License Condition 15A.</p> <p>Supplementary page <u>None</u> attached. <u>James F. Bresson</u> <u>10/22/64</u> <i>AEC Compliance Inspector</i> <i>Date</i></p>	

ORIGINAL: LICENSEE. COPIES: CO REGION CO HEADQUARTERS L&R HEADQUARTERS.

COMBUSTION ENGINEERING, INC.1000 PROSPECT HILL ROAD
WINDSOR, CONNECTICUT

November 4, 1964

Mr. Robert W. Kirkman, Director
Region I, Division of Compliance
United States Atomic Energy Commission
370 Hudson Street
New York 14, New York

Byproduct Material License
#6-217-8
(Reference: AEC Letter dated
October 22, 1964)

Dear Mr. Kirkman:

We have noted Item 5 on Form AEC-592 and we are requesting an amendment to our license, excluding six month leak tests. We are writing to the Division of Licensing and Regulations in Washington, D.C. Our justification for this request is based on the fact that the Cobalt-60 source is only used once or twice for short periods every four years or so and we would leak test the source prior to its use and prior to placing it back in storage.

It is our hope that the above request, if granted, will be considered by you as assurance that we are complying with AEC requirements.

Very truly yours,



R. C. Patterson
Manager, Kreisinger Development
Laboratory

RCP:AS

cc: Mr. R.L. Hoover - C.E.
cc: Mr. J. M. Lawler C.E.

ITEM # 25

B/25

Ext. 388

CO:I:JFB

10 NOV 1964

Combustion Engineering, Inc.
1000 Prospect Hill Road
Windsor, Connecticut

Attention: R. C. Patterson, Manager
Kreisinger Development Lab.

Gentlemen:

Thank you for your letter dated 11/4/64 informing us of the steps you have taken to correct the item of apparent noncompliance which we brought to your attention in our letter dated 10/22/64 and the Form AEC-592 attached thereto.

While your letter states that you have filed an application for an appropriate amendment to achieve corrective action for item 5 on the Form AEC-592, it should be understood that the requirement to conduct leak tests at six month intervals stipulated in License Condition 15A will remain in effect until the exemption from leak testing for which you are applying is approved by the Commission.

Very truly yours,

Robert W. Kirkman, Director
Region I, Division of Compliance

bcc: CO:HQ
SLR, HQ
CO:I

ITEM # 26 B/26

COMPLIANCE			
OFFICE ▶	BRESSON:maz	KIRKMAN	
SURNAME ▶	<i>JB</i>	<i>R. W. Kirkman</i>	
DATE ▶	11/10/64		

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT E(1)

1. LICENSEE COMBUSTION ENGINEERING Windsor, Connecticut	2. REGIONAL OFFICE U. S. ATOMIC ENERGY COMMISSION Region I, Division of Compliance 970 Broad Street Newark, N. J. 07102
3. LICENSE NUMBER(S) 06-00217-06	4. DATE OF INSPECTION Reinspection January 9, 1969

5. INSPECTION FINDINGS

A. No item of noncompliance was found. *J. L. ...*

B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 34.42 *...*

C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c) (1) or 34.42

D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d)

E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e)

F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f) (1) or (f) (2)

G. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)

H. Form AEC-3 was not properly posted. 10 CFR 20.206(c)

I. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b)

J. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d)

K. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.51, 40.61 or 70.51

L. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c)

M. Records of inventories were not maintained. 10 CFR 34.26

N. Utilization logs were not maintained. 10 CFR 34.27

W. G. Browne *W. G. Browne*
(AEC Compliance Inspector)

6. LICENSEE'S ACKNOWLEDGMENT

The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.

(Date)

(Licensee Representative - Title or Position) *B/27*

ORIGINAL: LICENSEE. COPIES: CO REGION CO HEADQUARTERS CO ENFORCEMENT

ITEM # 27

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

1. LICENSEE Combustion Engineering, Incorporated Windsor, Connecticut 06502	2. REGIONAL OFFICE REGION 1, DIV. OF COMPLIANCE U.S. ATOMIC ENERGY COMM. 975 BROAD STREET NEWARK, NEW JERSEY 07102
3. LICENSE NUMBER(S) 06-00217-06	4. DATE OF INSPECTION September 29 - October 1, 1970

5. INSPECTION FINDINGS

- A. No item of noncompliance was found.
- B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 34.42
- C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c) (1) or 34.42
- D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d)
- E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e)
- F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f) (1) or (f) (2)
- G. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)
- H. Form AEC-3 was not properly posted. 10 CFR 20.206(c)
- I. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b)
- J. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d)
- K. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.51, 40.61 or 70.51
- L. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c)
- M. Records of inventories were not maintained. 10 CFR 34.26
- N. Utilization logs were not maintained. 10 CFR 34.27

For work up notes see 06-00217-06

R. H. Smith
R. H. Smith, Fuel Facilities Inspector
(AEC Compliance Inspector)

6. LICENSEE'S ACKNOWLEDGMENT

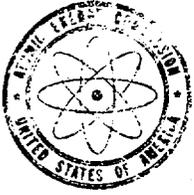
The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.

_____ (Date) _____ (Licensee Representative — Title or Position)

ORIGINAL: LICENSEE. COPIES: CO REGION CO HEADQUARTERS CO ENFORCEMENT

ITEM # 28

B/28



UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION I

201 645-

~~NEWARK, NEW JERSEY, 07102~~
~~NEWARK, NEW JERSEY, 07102~~
631 Park Avenue
King of Prussia, Pennsylvania 19406

August 27, 1973

Combustion Engineering, Inc.
Combustion Division
ATTN: Warren P. Chernock
Director of Nuclear Laboratories
Windsor, Connecticut 06095

License No. 06-00217-06

Date of Inspection: August 10, 1973

Gentlemen:

Enclosed with this letter is Form AEC-591, "Inspection Findings and Licensee's Acknowledgment", showing that no items of non-compliance were found during our inspection of your licensed activities conducted on the date shown above. Please retain the form in your files. No acknowledgment of this letter is required.

Your cooperation is appreciated.

Very truly yours,

James P. O'Reilly
James P. O'Reilly
Director

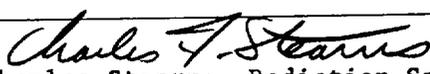
Enclosure:
Form AEC-591

ITEM # 29

18
B/29

UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

1. LICENSEE Combustion Engineering, Inc. Combustion Division ATN: Warren P. Chernock Director of Nuclear Laboratories Windsor, Connecticut 06095		2. REGIONAL OFFICE U. S. Atomic Energy Commission Directorate of Regulatory Operations Region I 631 Park Avenue King of Prussia, Pennsylvania 19406	
3. DOCKET NUMBER(S)		4. LICENSE NUMBER(S) 06-00217-06	
		5. DATE OF INSPECTION August 10, 1973	
6. INSPECTION FINDINGS The inspection was an examination of the activities conducted under your license as they relate to radiation safety and to compliance with the Commission's rules and regulations and the conditions of your license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The findings as a result of this inspection are as follows:			
<input checked="" type="checkbox"/> No items of noncompliance or unsafe conditions were found.			
The following items of noncompliance related to records, signs, and labels were found:			
<input type="checkbox"/> A. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 34.42			
<input type="checkbox"/> B. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c) (1) or 34.42			
<input type="checkbox"/> C. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d)			
<input type="checkbox"/> D. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e)			
<input type="checkbox"/> E. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f) (1) or (f) (2)			
<input type="checkbox"/> F. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)			
<input type="checkbox"/> G. Form AEC-3 was not properly posted. 10 CFR 20.206(c)			
<input type="checkbox"/> H. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b)			
<input type="checkbox"/> I. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d)			
<input type="checkbox"/> J. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.51, 40.61 or 70.51			
<input type="checkbox"/> K. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c)			
<input type="checkbox"/> L. Records of inventories were not maintained. 10 CFR 34.26			
<input type="checkbox"/> M. Utilization logs were not maintained. 10 CFR 34.27			
<input type="checkbox"/> N. Records of radiation survey instrument calibration were not maintained. 10 CFR 34.24			
<input type="checkbox"/> O. Records of teletherapy electrical interlock tests were not maintained as prescribed in your license.			
<input type="checkbox"/> P. Other _____			
 Charles Stearns, Radiation Specialist (AEC Compliance Inspector)			
7. The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.			
_____ (Date)		_____ (Licensee Representative - Title or Position)	

U.S. ATOMIC ENERGY COMMISSION
REGULATORY OPERATIONS, REGION 1
Inspection Field Notes

Rev. 11/15/77

A. Docket Number	B. Report Number 7301	C. Priority/ Category E (1-A) II	D. Inspection Dates 8/10/73
E. Licensee Combustion Engineering		F. Facility Windsor, Conn.	G. License No. 06-00217-06
H. Type of Inspection unannounced/re-insp.	I. No. and date of last Amendment 20 3/14/73	J. Dates of Last Inspection 9/29-10/1/70	
K. Principal Inspector and Date of Report C. F. Stearns	L. Accompanying Inspector none	M. Other Accompanying Personnel Joe Smolen, Representative, Connecticut	
N. Proprietary Info. none	O. Reviewer <i>[Signature]</i>	P. Date of Review 9/26/73	
Q. Individuals Interviewed* and Titles * a. James M. Lambert, Radiological Control Eng'n * b. Philip R. Rosenthal, f. * c. Warren P. Chernock, Director Nuclear Laboratories c. h.		R. Date of Interview 8/10/73	S. Place of Interview c's office
T. Enforcement Action none		U. Previous Outstanding Items none	
V. Unresolved Items none		W. Previously Reported Unresolved Items none	
X. Recom. Reinspection	Y. Name & Tele. # of RSO Philip R. Rosenthal 203-688-1911 EXT 600	Z. RMS Code Number	

ZZ. Scope of Inspection: () complete, () partial, () special _____

*Identify individuals who attended Management Interview by asterisks.

DETAILS

Scope of the Program

- Number of individuals occupationally exposed ~155 issued film badges
- Number of individuals subject to significant* risk ~35 with >500*mem/year.
- Potential for external exposure

	Negligible	Slight	Moderate	High
Whole body		X	35*	
Skin		X		
Extremities		X		

-Potential for internal exposure () negligible () slight () moderate
() high

-Effluents

	Negligible	Slight	Moderate	High
Airborne		X		
Liquids			X	

-Unusual aspects

** according to "a", all exposures of this magnitude were
~~not~~ received by personnel while ~~at~~ visiting
General some other site — such as reactors.*

All records examined and all inquiries made by the inspector related to records and events made or experienced in the time interval from the date of the last inspection, or the date of license issuance in the case of initial inspections, until the date of this inspection, unless otherwise noted.

Unless otherwise specified, radiation level measurements, shown in these notes as having been made by the inspector, were made using a radiation survey meter type GM, model E-120, calibrated _____ by BNL.

The findings reported here were based on: (1) observations made by the inspector during his physical inspection of the licensee's facilities (2) a selective examination of procedures and representative records and documents, (3) Information furnished by Individuals Interviewed and (4) Measurements made by the inspector. S

*Reasonable probability of incurring 25% or more of MPC or MPE.

Items of Noncompliance and Safety Found in the Last Inspection

The licensee's action to correct and prevent recurrence of items of noncompliance and/or safety, found in the last inspection, were given particular attention during this inspection. Unless these items are shown under the section below, entitled "Findings Indicating Noncompliance or Conditions Prejudicial to Health and Safety", the inspector found that the licensee's corrective and preventive action was adequate. *(none)* *n/a*

Findings Indicating Compliance

Annex A identifies the specific procedures followed by the inspector in determining compliance with each relevant section of Title 10. The inspector also made such inquiries, examined such records and made such observations as were necessary for him to determine that the licensee had complied with the requirements of each license condition. *S*

When a section of Annex A is notated "N/I", this means that compliance with this section was not determined during this inspection. During the next inspection this area will be covered. *S*

When a section of Annex A is notated "N/A", this means that it is readily apparent that the section is not applicable to the licensee's program (e.g. the requirements of 10 CFR 20.103 or 106 are not applicable if the licensee possesses only sealed sources).

The paragraphs in Annex A that are initialed by the inspector indicate how the inspector determined compliance. Let "S" represent the initials "S".

Status of Previously Reported Unresolved Items

none

Additional Information Relating to Incidents Reported Since Last Inspection

Attached as Annex B, or referenced on identified pages of these notes. *n/a*

Findings Indicating Noncompliance or Conditions Prejudicial to Health and Safety

Attached as Annex C, or referenced on identified pages of these notes. *n/a*

Principals

Persons	Radionuclides	Locations of Use	Rate of Use
		<i>Most use in Nuclear Lab - (Bldg 5)</i>	
		1. Analysis of Reactor coolants in Radiochemistry Lab.	
		2. Co-137 as tracer in testing of ion exchange resins, contained in columns <i>(has been Pu until currently switching to Am-241)</i>	
		3. Am-241, vent sources - tested in boronometers and then stored until shipped with boronometers to customer.	
		4. Tools, reactor components etc. returned from reactors.	
		5. Co-60, etc. in density gauges. Stored and/or repaired, etc. in Bldg. 2 etc.	
		6. etc.	

Line of Authority (from user to Management)

(RSO reports directly
to Chernock on radiation
safety problems)
Facilities

~~Chernock~~ Chernock, Director Nuclear Lab

Phil Rosenthal, RSO

- Use: Radiochemistry labs used exclusively for licensed material; Conventional labs used exclusively for licensed material; Conventional labs with shared use; Room or area used exclusively for preparation and application of licensed material, and storage; Mfg or processing areas designated for radiologic operations only; Entire building used exclusively for radiologic operations Other:

(for development work only, however.)

Storage:

- Ample space, Adequate lighting, Uncluttered, Shielding adequate
 Material identified
 Refrigerator, cabinet, fume hood, cave, separate rooms separate building

Access Control:

large vaults, etc.

- locked, posted and administratively controlled
 locked when unattended, custodial personnel instructed

Control Devices and Alarms: 20.203(c)(2), Other

Comments:

Equipment

Monitoring, portable: alpha, beta, gamma, neutron
 adequate no., accessible, calibrated, appropriate sensitivity

(all instruments listed in Item 10 of license Application dated 2/23/73 were possessed according to a

Monitoring, area: alpha, beta, gamma, air sampling, adequate no.

properly located, calibrated, tested, appropriate sensitivity.

area film badges
 continuous exhaust monitor
 air sampling

(Bldg 2 only)

Special Equipment:

- BZ samplers: adequate no., properly used, accessible
- fume hoods, glove boxes, hot cells-large, hot cells-small
- local exhaust ventilation, remote tongs, shields,
- protective handwear, protective footwear, protective clothing,
- absorbent paper, working trays, designated radioactive waste disposal sinks,
- respirators, eye wash fountains, DOP filter testing equipment, disposable pipettes,
- disposable syringes, Other:

S

absolute filters. Filters changed when hood face velocity drops below 0.5 ft/min also Δp meters across filters.

Management Interview

The inspector(s) met with _____, _____ and _____ in _____'s office, on _____, at the conclusion of the inspection. The inspector(s) gave date

_____ a Form AEC-591 indicating (that no items of) noncompliance had been found during the inspection.

The inspector(s) met with a, b, and c in c's office, on 8/10/73, at the conclusion of the inspection. The inspector(s) informed date

_____ that no items of noncompliance had been found during this inspection. He informed c that he would receive a letter enclosing a Form AEC-591 confirming these findings (Inspector: No Form AEC-591 may be issued if there were Outstanding Items reviewed during this inspection except, if our acknowledgement letter, written following the issuance of an AEC Form 591, predated July 1, 1971.)

S

No form AEC-591 was issued because Outstanding Items had been reviewed during this inspection.

The inspector(s) met with _____, _____, and _____ in _____'s office, on _____, at the conclusion of the inspection. The inspector(s) explained the purpose of the inspection. With respect to the item(s) of noncompliance, the inspector(s) explained the relevant requirements of the AEC regulations and described the inspection findings that indicated noncompliance with these requirements. _____ acknowledged the validity of the citation(s) and stated that prompt action would be taken to correct them. He also described procedures whereby he would assure that these and similar item(s) of noncompliance would not recur. He signed and dated the Form AEC-591

The inspector(s) met with _____, _____ and _____ in _____'s office, on _____, at the conclusion of the inspection. The inspector(s) ex-
date:

plained the purpose of the inspection. With respect to the items of non-compliance, the inspector(s) explained the relevant requirements of the AEC regulations and/or the conditions of the license and described the inspection findings that indicated noncompliance with these requirements.

_____ acknowledged the validity of the citations and stated that prompt action would be taken to correct them. He also described procedures whereby he would assure that these and similar items of noncompliance would not recur.

Other:

ANNEX A

1. urine (as appropriate)
2. whole body counting routinely, (amion)

1.0 10 CFR 20

1.1 20.101, "EXPOSURE OF INDIVIDUAL TO RADIATION IN RESTRICTED AREAS"

1.1.1 By examination of records of (X) receipts, () inventories, (X) surveys, (X) personnel dosimetry, (X) bioassay, and () disposal transfers, and/or (X) by questioning the RSO and/or () these users _____, () and by my physical inspection of the restricted areas, I IDENTIFIED those INDIVIDUALS WHOSE external EXPOSURES MIGHT reasonably be expected to EXCEED 25% OF THE LIMITS of 20.101(a). S

1.1.1.1 I asked the RSO and/or the principal users HOW the EXPOSURES to these individuals had been EVALUATED and what magnitudes of exposure had been found S

1.1.2 I found that the licensee's METHODS of evaluating exposures was in each case APPROPRIATE to the type and energy of the radiation and the area of the individuals body that was at risk. S

1.1.3 I found that the licensee's evaluations of exposures showed that NO INDIVIDUAL had been EXPOSED IN EXCESS of the limits of 20.101. S

1.1.4 _____ stated that the licensee did not avail himself of the provisions of 10 CFR 20.101(b) and therefore NO FORMS AEC-4 WERE MAINTAINED. S
(all over 1250/quarter received off-site pursuant to a)

1.1.5 (X) I observed a CORRECTLY COMPLETED FORM AEC-4 for each individual whose quarterly whole body exposure exceeded 1.25 rems; or S

(X) I identified approximately 52% of the individuals whose quarterly whole body exposure had exceeded 1.25 rems and examined each individual's Form AEC-4 and found each to be correctly completed. S

1.2 20.103, "EXPOSURE OF INDIVIDUALS TO CONCENTRATIONS OF RADIOACTIVE MATERIAL IN RESTRICTED AREAS"

1.2.1 By examination of records of (X) receipts, () inventories, (X) surveys, (X) personnel dosimetry, () effluent monitoring, and () disposals/transfers, by questioning the RSO and these users _____, and by my physical inspection of the restricted areas, I IDENTIFIED those INDIVIDUALS WHOSE internal EXPOSURES MIGHT reasonably be expected to EXCEED 25% OF THE LIMITS of 20.103. S

1.2.1.1 I asked the RSO and/or the principal users HOW the EXPOSURES to these individuals had been EVALUATED and what magnitude of exposure had been found S

* In fact, according to "a", virtually all exposure readings greater than ~ 50 mrem were received off-site.

- 1.2.2 I found that the licensee's METHODS of evaluating compliance with 20.103 was APPROPRIATE to the circumstances of exposure in each case. S
- 1.2.3 I found that the licensee's evaluations of exposures showed that in NO instance had an INDIVIDUAL been EXPOSED IN EXCESS of the limits of 20.103. *(Evaluations include bioassays for particular material handled.)* S
- 1.3 20.104, "EXPOSURE OF MINORS" - *Also BZ samples & other air sampling*
- 1.3.1 I determined by questioning () the RSO, and/or () *a*, and/or () examining Forms AEC-5 or their equivalents and/or () observing individuals in the restricted areas that NO INDIVIDUALS under 18 years of age had been EXPOSED in the restricted areas, or S
- 1.3.2 In the manner indicated above, I IDENTIFIED those INDIVIDUALS under 18 years of age who had been exposed in the restricted areas by questioning () the RSO, () the minors, () the minor's supervisors. I determined the circumstances of exposure and the licensee's method of evaluating the minor's exposures. I determined that the METHOD OF EVALUATION had been ADEQUATE. I found that the evaluations showed that the exposures had NOT EXCEEDED 10% of the limits of 10 CFR 20.101(a). *n/a*
- 1.4 20.105, "PERMISSIBLE LEVELS OF RADIATION IN UNRESTRICTED AREAS"
- 1.4.1 By questioning the RSO and/or the principal users, and () by examining records of () receipts, () inventories, () disposals/transfers, and () surveys, and by a physical inspection of the restricted areas, I DETERMINED the TIMES AND CIRCUMSTANCES under WHICH the licensee's use and/or storage of materials would have resulted in the generation of exposure levels in the unrestricted area of a magnitude of WARRANTED CALCULATION OR MEASUREMENT to assure compliance with 20.105. S
- 1.4.2 I questioned the RSO and/or the involved principal users to determine if these calculations or MEASUREMENTS had been MADE; HOW they had been MADE; and what CONCLUSIONS had been DRAWN. I found that adequate surveys had been made indicating that the levels of radiation in the unrestricted area had not exceeded the limits of 20.105. S
- 1.4.3 I MEASURED THE EXPOSURE RATES IN THE UNRESTRICTED AREAS and found that at the time of inspection none exceeded the allowed levels. S

(all < 0.1 m/hr)

1.4.4 Following the procedures described in paragraph 1.4.1 above, I determined that there had been NO circumstances under which there was any REASONABLE PROBABILITY OF the levels HAVING EXCEEDED the limits of 20.105. S

1.5 20.106, "CONCENTRATION IN EFFLUENTS TO UNRESTRICTED AREAS"

1.5.1 By questioning the RSO and these principal users a _____, by examination of records of (X) receipts, () inventories, (X) effluent monitoring, and (X) surveys, (X) and by observations made during my physical inspection of the restricted areas, I IDENTIFIED those OPERATIONS WHERE there was a REASONABLE PROBABILITY of generation OF CONCENTRATIONS of radioactive material in effluents to the unrestricted area S

1.5.2 I asked the RSO or the principal user to describe the evaluation that had been made to ASSURE that the CONCENTRATION of radioactive material in these effluents DID NOT EXCEED THE LIMITS of 20.106. S

1.5.3 I determined that the licensee's () calculations, (X) location of samplers, (X) collection methods, and (X) assay methods were SUITABLE for EVALUATION of the concentrations of the types of radioactive material that were discharged (i.e. considering its identity, physical and chemical form, particle size, the presence of dust loading or moisture, etc.). I noted that the licensee's evaluations showed compliance with 20.106. S

1.5.4 Having assured myself, from the findings of previous AEC inspectors, that the licensee's procedures for calculating, sampling and assaying the samples were in accord with accepted practices I ONLY EXAMINED the RECORDS of his measured concentrations. I found that these showed him to be in compliance with 20.106. n/a

1.5.5 Following the procedures described in paragraph 1.5.1 above, I determined the quantities and forms of the material, and the circumstances under which it was handled were such that THERE WAS NO SIGNIFICANT PROBABILITY OF VIOLATION OF THE SECTION. S

1.6 20.201, "SURVEYS" *absolute filters - continuous effluent monitoring, etc.*

1.6.1 In the course of determining the licensee's status of compliance with all sections of Part 20, I found that ADEQUATE SURVEYS had been CONDUCTED. S

*Comprehensive, frequent surveys.
Primarily swipes**

- also air sampling, including BZ, area, and effluent.

** Conservative action points - e.g. officially ≥ 100 dpm & in unrestricted area, investigated, but administratively, anything detectable (≥ 10 dpm) is investigated.*

1.7 20.202, "PERSONNEL MONITORING"

1.7.1 As stated in paragraph 1.1.1 above, I identified those individuals whose external exposure might reasonably be expected to exceed 25% of the 20.101(a) limits. I ascertained that a FORM AEC-5 or its equivalent was maintained FOR EACH of these INDIVIDUALS. S

1.7.1.1 I concurred in the licensee's evaluation that personnel monitoring was not required for any individual using material under this license. m/a

1.7.1.2 a stated that each of these individuals had been INSTRUCTED TO WEAR his personnel DOSIMETER while he was in the restricted areas. S

1.7.1.3 I noted that the licensee's written OPERATING PROCEDURES directed occupants of the restricted areas to wear their personnel dosimeters. — (also ~~found~~ as a ^{present} list of 8 rules ^{on use of} film badge) S

1.7.1.4 During my inspection of the restricted areas I OBSERVED that all individuals who I encountered, and who were required to wear PERSONNEL DOSIMETERS, were wearing them. S

1.7.2 _____ identified those individuals under 18 YEARS OF AGE who entered the restricted areas. He DESCRIBED the PROCEDURES followed by each of these individuals and the duration of times spent in the restricted areas. I noted that for each individual whose exposures could reasonably be expected to EXCEED 5% of the LIMITS of 20.101(a) there was on file a Form AEC-5 or its equivalent. n/a

1.7.3 a stated that NO individuals UNDER 18 YEARS OF AGE entered the restricted areas. S

1.7.4 By questioning the following individuals _____, _____, and _____ who were responsible for controlling access to High Radiation Areas or who entered these areas, I determined that all INDIVIDUALS WHO ENTERED the HIGH RADIATION AREAS were PROVIDED with PERSONNEL MONITORING equipment. — none

1.7.5 a stated, and my findings verified the fact, that there were NO HIGH RADIATION AREAS under the licensee's control. S

1.8 20.203, "CAUTION SIGNS, LABELS, SIGNALS, AND CONTROLS"

1.8.1 In my physical inspection of the operational areas I observed that EACH ROOM OR AREA I visited was POSTED with the appropriate sign reading (X) CRM, (X) CRA, () CHRA, or () CARA, as applicable, and showing the radiation caution symbol.

only in room where Co-137 used, and in Bldg A.

1.8.2 In my physical inspection of the operational area I observed that EACH CONTAINER that required a label was in fact LABELED CRM, showing the radiation caution symbol, the identity of its contents and sufficient information to permit individuals handling or using the containers, or working in the vicinity thereof, to take precautions to avoid or minimize exposures.

1.9 20.206, "INSTRUCTION OF PERSONNEL; POSTING OF NOTICES TO EMPLOYEES"

1.9.1 a stated that all INDIVIDUALS working in or frequenting the restricted areas were ORALLY INSTRUCTED to a degree commensurate with the radiation hazards encountered.

1.9.2 I examined the licensee's OPERATING PROCEDURES and found that they PROVIDED individuals working in or frequenting the restricted areas with INSTRUCTIONS for the safe handling of material that were commensurate with the radiation hazards encountered.

1.9.3 I observed that the licensee had POSTED a current COPY of 10 CFR 20 a copy of the LICENSE and a copy of OPERATING PROCEDURES applicable to work under the license in a sufficient number of places to permit occupants of the restricted areas to observe them on the way to or from their place of employment.

1.9.3.1 a stated that these DOCUMENTS were AVAILABLE for employee's examination upon request. I saw these documents.

- Procedures distributed to appropriate supervisors, and available to anyone.

1.9.4 I observed that FORMS AEC-3 were conspicuously POSTED in a sufficient number of places to permit employees working in or frequenting any portion of the restricted areas to observe a copy on the way to or from their place of employment.

1.10 20.207, "STORAGE OF LICENSED MATERIALS"

1.10.1 In my inspection of the licensee's facilities, I observed that NO MATERIAL was STORED IN an UNRESTRICTED AREA.

1.10.1 always stated that all areas in which MATERIAL was stored were SECURED WHEN UNATTENDED by individuals who had been instructed in the safe use of the material.

Inspector observed this.

1.10.2 I ASCERTAINED by physical inspection that all MATERIAL stored in unrestricted areas was SECURED against unauthorized removal from the place of storage. *n/a*

1.11 20.301, "WASTE DISPOSAL - GENERAL REQUIREMENTS"

1.11.1 By questioning the RSO and these principal users _____, by examination of records of receipts, surveys, effluent monitoring, inventories, disposal, transfer, and by my physical inspection of the licensee facilities, I IDENTIFIED the PROCEDURES used by the licensee to dispose of waste material. *S*

(After evaporation, in the case of large vol, transfer, liquids to hold-up tanks)
1.11.1.1 I determined that no material had been disposed of as waste. *n/a*

1.11.2 I determined that these procedures INVOLVED either one or a combination of the FOLLOWING METHODS: Transfer to an authorized recipient, In accordance with a license condition, Release into sanitary sewage system, Burial in soil, or As allowed by 20.106. *S*

1.12 20.303, "DISPOSAL BY RELEASE INTO SANITARY SEWAGE SYSTEMS"

1.12.1 _____ stated that no licensed material had been released into the sanitary sewage system. *n/a*

1.12.2 In the manner indicated in Paragraph 1.11.1, I IDENTIFIED those OPERATIONS from which waste was discharged to the sanitary sewage system. *S*

1.12.3 By questioning the RSO and these principal users _____ regarding the details of the procedures being followed, I determined that the effluent was READILY SOLUBLE or DISPOSABLE in water. *S*

1.12.4 By questioning the RSO and these principal users _____, and by my examination of records of receipts, disposals/transfers, survey of sewage release rates, calculations of concentrations of material per unit volume of sewage, or measurements of concentration of material per unit volume of sewage, *X* I determined that:

1. The QUANTITY of radioactive material RELEASED in any one DAY did not exceed the larger of the following limits: (a) Appendix B, Table I, Col. 2 concentrations averaged over any one day or (b) Ten times the quantity of such material specified in Appendix C. *S*

Liquids go first to a hold-up tank, where they are sampled before release. If found to be > 10% MPC, then they are ~~retained~~ diluted before release.

2. The MONTHLY average did not exceed Appendix B, Table I, Col. 2 CONCENTRATIONS. S

3. The GROSS quantity of radioactive MATERIAL did not exceed 1 curie/year. S

1.13 20.304, "DISPOSAL BY BURIAL IN SOIL"

1.13.1 By questioning the RSO and these principal users _____ and by examination of records of burials I DETERMINED that the LICENSEE had MET the requirements of this section. m/a

1.13.2 a stated that no licensed material was disposed of by burial in soil. S

1.13 20.305, "TREATMENT OR DISPOSAL BY INCINERATION"

1.13.1 Having noted that incineration was AUTHORIZED BY THE LICENSE, I questioned the RSO and these principal users who utilized this method of disposal, I EXAMINED the RECORDS, which showed the identity of the material, its quantity, and the date of incineration. I also determined that the QUANTITY LIMITATIONS (if any) given in the license had NOT been EXCEEDED. I determined that the licensee had made valid surveys to ensure that the EFFLUENT AND ASH limits given in the license had not been exceeded. I did this by examining his sample collection techniques and his assay procedures. m/a

1.13.2 By examination of waste disposal records, by questioning the principal users and the RSO, and by physical inspection of the licensee's facilities, I determined that he had NOT UTILIZED INCINERATION as a means of treatment or disposal of material. S

1.14 20.401 "RECORDS OF SURVEYS, RADIATION MONITORING, AND DISPOSAL"

1.14.1 I examined (✓) all, () approximately ___% of, the RECORDS OF RADIATION EXPOSURE of all individuals for whom monitoring was required under 20.202. I found that these records were maintained on FORMS AEC-5 or on clear and legible forms containing all the information required by Form AEC-5. I found they were kept in accordance with the INSTRUCTIONS contained ON THE REVERSE SIDE of Form AEC-5. S

1.14.2 As indicated in paragraph 1.7.1.1 of these notes no individuals were required to wear personnel monitoring equipment. m/a

1.14.3 I examined () all records; (4) a representative number of records, of surveys conducted in accordance with (4) 20.201(b), disposals made under () 20.302 (As allowed by License Amendment), (4) 20.303 (Release to Sanitary Sewers) and () 20.304 (Burial in Soil) and found that the records contained the essential elements for adequate evaluation of compliance. S

1.15 20.402, "REPORTS OF THEFT OR LOSS OF LICENSED MATERIAL"

1.15.1 _____ STATED that there had been NO LOSS OR THEFT of licensed material in such quantities and under such circumstances that a substantial hazard might result to persons in unrestricted areas. S

1.15.1.1 I VERIFIED this fact by comparison of records of () receipts, () inventories, and () disposal/transfer, taking into consideration the decay rates of the various radionuclides. n/a

1.16 20.403, "NOTIFICATION OF INCIDENTS"

1.16.1 In the course of my inspection of all sections of Part 20 I found that there had been NO CIRCUMSTANCES that WARRANTED the submission of NOTIFICATION under 20.403. S

1.16.2 In the course of my inspection of all sections of Part 20 I found that in each instance where NOTIFICATION had been required such notification HAD BEEN MADE in accordance with the specifications of this section. n/a

1.17 20.404, "REPORT TO FORMER EMPLOYEES OF EXPOSURE TO RADIATION"

1.17.1 _____ stated that NO FORMER EMPLOYEE HAD REQUESTED A REPORT of his exposure. n/a

1.17.2 a stated that one or more FORMER EMPLOYEES HAD REQUESTED REPORTS of their exposures. _____ ~~showed me copies~~ of the licensee's response to these requests. I examined the copies and noted that they furnished all the information required by this section. "a" stated issuance of reports handled through Division office.

1.18 20.405, "REPORTS OF OVEREXPOSURES AND EXCESSIVE LEVELS AND CONCENTRATIONS"

1.18.1 In the course of my inspection of all sections of Part 20, I found that there had been NO CIRCUMSTANCES that WARRANTED the SUBMISSION of reports under 20.405. S

1.18.2 In the course of my inspection of all sections of Part 20, I found that in each instance where a 20.405 REPORT had been required the report HAD BEEN SUBMITTED in accordance with the specifications of the section. *n/a*

1.19 20.406, "NOTICE TO EMPLOYEES OF EXPOSURE TO RADIATION"

1.19.1 _____ stated that NO EMPLOYEE had REQUESTED an annual REPORT of his exposure. *n/a*

1.19.2 a stated that each employee who had requested an annual REPORT of his exposure HAD BEEN FURNISHED with such report. *(handled through Division office)*

1.20 20.407, "PERSONNEL EXPOSURE AND MONITORING REPORTS"

1.20.1 By comparing the licensee's program with the specifications of this section I determined that the provisions of THIS SECTION DID NOT APPLY to the licensee. *5*

1.20.2 I compared the licensee's copies of REPORTS with the specifications of this section and determined that they MET THE REQUIREMENTS. *n/a*

1.21 20.408, "REPORTS OF PERSONNEL EXPOSURE ON TERMINATION OF EMPLOYMENT OR WORK"

1.21.1 As indicated above, I determined that the requirements of 20.407, and hence 20.408, were NOT APPLICABLE to this licensee. *5*

1.21.2 By questioning _____ and by examining all records that gave evidence of the presence or absence of individuals who were using licensed materials (e.g. Forms AEC-5, B.2 sampling, bioassay isotope committee authorizations, etc.) I IDENTIFIED those INDIVIDUALS who had TERMINATED employment or work. I examined the licensee's copies of reports of their exposures which he had submitted to the individuals and to the AEC. I found that they had been completed in accordance with the requirements of this section. *n/a*

2.1 30.3, 40.3 and 70.3 "ACTIVITIES REQUIRING LICENSE"

2.1.1 By questioning the RSO and/or the following individuals, _____, and/or by examination of records of receipts and transfer/disposal, I determined that the licensee had neither manufactured, produced, transferred, received, acquired, owned, possessed, used imported or exported licensed material except as authorized in a specific or general license issued pursuant to the regulations of Title 10. *5*

2.2 30.51, 40.61 and 70.51, "RECORDS"

2.2.1 I inspected the licensee's records of receipt, transfer, ~~export~~ and disposal and found them to be complete; indicating the identities of the materials and the dates of change of status. 5

CE COMBUSTION DIVISION

September 17, 1973

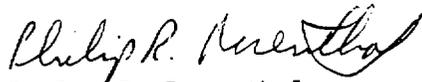
Director
U. S. Atomic Energy Commission
Division of Compliance, Region 1
631 Park Avenue
King of Prussia, Pennsylvania 19406

Subject: Request for copies of Form AEC-3 "Notice to Employees"

Dear Sir:

Combustion Engineering, Inc. desires about four additional copies of form AEC-3 "Notice to Employees" for use with its byproduct material license 06-00217-06. Copies may be forwarded to the address below. Your cooperation is appreciated.

Very truly yours,



Philip R. Rosenthal
Radiation Protection Officer

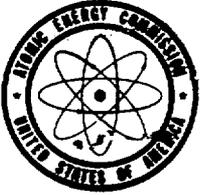
PRR/mjr

Combustion Engineering, Inc.
Combustion Division
1000 Prospect Hill Road
Windsor, Connecticut 06095

Attn: P. R. Rosenthal, Dept. 450-5

ITEM # 30

B/30



UNITED STATES
ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

September 27, 1973

Combustion Engineering, Inc.
Combustion Division
1000 Prospect Hill Road
Windsor, Connecticut 06095

Attention: F. E. Bessenthal, Dept. 458, 3

Dear Mr. Bessenthal:

Reference is made to your letter of September 17, 1973.

AEC Form 3 is being revised, however, to date a supply has not been received.

We are, however, attaching corrected copies of the AEC Form 3 indicating the new addresses for Regions I and V.

Sincerely,

Joseph E. Smith
Administrative Officer

Enclosure:
AEC 3 - (4 copies)

GRESS

SURNAME

Smith: pdb

DATE

9-27-73

Form AEC-518 (Rev. 9-55) AECM 0240

ITEM # 31

DETAILS

Scope of the Program

-Number of individuals occupationally exposed 9.

-Number of individuals subject to significant* risk 9.

-Potential for external exposure

Negligible Slight Moderate High

Whole body
Skin
Extremities

✓
✓
✓

-Potential for internal exposure () negligible (✓) slight () moderate
() high

-Effluents

Negligible Slight Moderate High

Airborne
Liquids

✓
✓

-Unusual aspects

Licensee has a repair group which also works at O.E. in Windsor and at Nuclear Power Plants doing repair to nuclear components. Boroscope studies. Bring back contaminated tools and performs decontamination.

All records examined and all inquiries made by the inspector related to records and events made or experienced in the time interval from the date of the last inspection, or the date of license issuance in the case of initial inspections, until the date of this inspection, unless otherwise noted.

EE

Unless otherwise specified, radiation level measurements, shown in these notes as having been made by the inspector, were made using a radiation survey meter type GE, model E-120, calibrated 11/5/75 by BNL.

EE

The findings reported here were based on: (1) observations made by the inspector during his physical inspection of the licensee's facilities (2) a selective examination of procedures and representative records and documents, (3) Information furnished by individuals interviewed and (4) Measurements made by the inspector.

EE

*Reasonable probability of incurring 25% or more of MPC or MPE.

Items of Noncompliance and Safety Found in the Last Inspection

The licensee's action to correct and prevent recurrence of items of noncompliance and/or safety, found in the last inspection, were given particular attention during this inspection. Unless these items are shown under the section below, entitled "Findings Indicating Noncompliance or Conditions Prejudicial to Health and Safety", the inspector found that the licensee's corrective and preventive action was adequate.

Findings Indicating Compliance

Annex A identifies the specific procedures followed by the inspector in determining compliance with each relevant section of Title 10. The inspector also made such inquiries, examined such records and made such observations as were necessary for him to determine that the licensee had complied with the requirements of each license condition.

When a section of Annex A is notated "N/I", this means that compliance with this section was not determined during this inspection. During the next inspection this area will be covered.

When a section of Annex A is notated "N/A", this means that it is readily apparent that the section is not applicable to the licensee's program (e.g. the requirements of 10 CFR 20.103 or 106 are not applicable if the licensee possesses only sealed sources).

The paragraphs in Annex A that are initialed by the inspector indicate how the inspector determined compliance.

Status of Previously Reported Unresolved Items

Additional Information Relating to Incidents Reported Since Last Inspection

Attached as Annex B, or referenced on identified pages of these notes.

Findings Indicating Noncompliance or Conditions Prejudicial to Health and Safety

Attached as Annex C, or referenced on identified pages of these notes.

Principals

Persons	Radionuclides	Locations of Use	Rate of Use
9	2-83 fission Products	throughout U.S.	fairly constant

Line of Authority (from user to Management)

*users report to Rosenthal who reports to
W P Chernok, Director Nuclear
Laboratories & Chairman Rad Safety Group*

Facilities

Use: () Radiochemistry labs used exclusively for licensed material; ()
Conventional labs used exclusively for licensed material; () Conventional
labs with shared use; () Room or area used exclusively for
preparation and application of licensed material, and storage; ()
Mfg or processing areas designated for radiologic operations only; ()
() Entire building used exclusively for radiologic operations ()
Other:

Storage:

() Ample space, () Adequate lighting, () Uncluttered, () Shielding
adequate
() Material identified
() Refrigerator, () cabinet, () fume hood, () cave, () separate
room, () separate building

Access Control:

() locked, () posted and administratively controlled
() locked when unattended, () custodial personnel instructed

Control Devices and Alarms: () 20.203(c)(2), () Other

Comments:

Equipment

Monitoring, portable: () alpha, () beta, () gamma, () neutron
() adequate no., () accessible, () calibrated, () appropriate sensitivity

Monitoring, area: () alpha, () beta, () gamma, () air sampling, () adequate no.
() properly located, () calibrated, () tested, () appropriate sensitivity.

BZ sampling OK

See

Special Equipment:

- (x) BZ samplers: (x) adequate no., (x) properly used, () accessible
- () fume hoods, (x) glove boxes, () hot cells-large, () hot cells-small
- (x) local exhaust ventilation, () remote tongs, () shields,
- (x) protective handwear, () protective footwear, (x) protective clothing,
- () absorbent paper, () working trays, (x) designated radioactive waste disposal sinks,
- () respirators, (x) eye wash fountains, () DOP filter testing equipment,
- () disposable pipettes, () disposable syringes, () Other:

Management Interview

The inspector(s) met with _____, _____ and _____ in _____'s office, on _____, at the conclusion of the inspection. The inspector(s) gave _____ date _____ a Form AEC-591 indicating (that no items of) noncompliance had been found during the inspection.

The inspector(s) met with _____, _____, and _____ in _____'s office, on _____, at the conclusion of the inspection. The inspector(s) informed _____ date _____ that no items of noncompliance had been found during this inspection. He informed _____ that he would receive a letter enclosing a Form AEC-591 confirming these findings (Inspector: No Form AEC-591 may be issued if there were Outstanding Items reviewed during this inspection except, if our acknowledgment letter, written following the issuance of an AEC Form 592, predated July 1, 1971.)

No form AEC-591 was issued because Outstanding Items had been reviewed during this inspection.

The inspector(s) met with _____, ~~a, and b~~ in ~~a~~'s office, on _____ ~~a~~, at the conclusion of the inspection. The inspector(s) explained the purpose of the inspection. With respect to the item(s) of noncompliance, the inspector(s) explained the relevant requirements of the AEC regulations and described the inspection findings that indicated noncompliance with these requirements. _____ acknowledged the validity of the citation(s) and stated that prompt action would be taken to correct them. He also described procedures whereby he would assure that these and similar item(s) of noncompliance would not recur. He signed and dated the Form AEC-591

(a) did not acknowledge validity of citations
He stated safety was the responsibility of Pauline &
 The inspector(s) met with _____, a and b in a's office, on 3/25/75 date _____ at the conclusion of the inspection. The inspector(s) explained _____ *which personnel paid by CT were sent. He stated they would not have their personnel sign form equivalent to Form AEC-4. He stated this was his responsibility of other*

plained the purpose of the inspection. With respect to the items of non-compliance, the inspector(s) explained the relevant requirements of the AEC regulations and/or the conditions of the license and described the inspection findings that indicated noncompliance with these requirements. *a did not* He also described procedures where prompt action would be taken to correct them. He also described procedures where by he would assure that these and similar items of noncompliance would not recur.

Other:

Plant facilities even though some exposure was gotten of CE's. Also acknowledge all personnel are ~~the~~ responsible employees of CE.

1.18.2 In the course of my inspection of all sections of Part 20, I found that in each instance where a 20.405 REPORT had been required the report HAD BEEN SUBMITTED in accordance with the specifications of the section.

1.19 20.406, "NOTICE TO EMPLOYEES OF EXPOSURE TO RADIATION"

1.19.1 stated that NO EMPLOYEE had REQUESTED an annual REPORT of his exposure.

1.19.2 stated that each employee who had requested an annual REPORT of his exposure HAD BEEN FURNISHED with such report.

1.20 20.407, "PERSONNEL EXPOSURE AND MONITORING REPORTS"

1.20.1 By comparing the licensee's program with the specifications of this section I determined that the provisions of THIS SECTION DID NOT APPLY to the licensee.

1.20.2 I compared the licensee's copies of REPORTS with the specifications of this section and determined that they MET THE REQUIREMENTS.

1.21 20.408, "REPORTS OF PERSONNEL EXPOSURE ON TERMINATION OF EMPLOYMENT OR WORK"

1.21.1 As indicated above, I determined that the requirements of 20.407, and hence 20.408, were NOT APPLICABLE to this licensee.

1.21.2 By questioning and by examining all records that gave evidence of the presence or absence of individuals who were using licensed materials (e.g. Forms AEC-5, B.2 sampling, bioassay isotope committee authorizations, etc.) I IDENTIFIED those INDIVIDUALS who had TERMINATED employment or work. I examined the licensee's copies of reports of their exposures which he had submitted to the individuals and to the AEC. I found that they had been completed in accordance with the requirements of this section.

2.1 30.3, 40.3 and 70.3 "ACTIVITIES REQUIRING LICENSE"

2.1.1 By questioning () the RSO and/or () the following individuals, , and/or () by examination of records of () receipts and () transfer/disposal, I determined that the licensee had neither manufactured, produced, transferred, received, acquired, owned, possessed, used imported or exported licensed material except as authorized in a specific or general license issued pursuant to the regulations of Title 10.

ANNEX A

1.0 10 CFR 20

1.1 20.101, "EXPOSURE OF INDIVIDUAL TO RADIATION IN RESTRICTED AREAS"

1.1.1 By examination of records of () receipts, () inventories, () surveys, () personal dosimetry, () bioassay, and () disposal transfers, and/or () by questioning the RSO and/or () these users Quines, () and by my physical inspection of the restricted areas, I IDENTIFIED those INDIVIDUALS WHOSE external EXPOSURES MIGHT reasonably be expected to EXCEED 25% OF THE LIMITS of 20.101(a).

1.1.1.1 I asked the RSO and/or the principal users HOW the EXPOSURES to these individuals had been EVALUATED and what magnitudes of exposure had been found.

1.1.2 I found that the licensee's METHODS of evaluating exposures was in each case APPROPRIATE to the type and energy of the radiation and the area of the individuals body that was at risk.

1.1.3 I found that the licensee's evaluations of exposures showed that ~~NO~~ INDIVIDUAL had been EXPOSED IN EXCESS of the limits of 20.101.

may see opposite page 57

1.1.4 stated that the licensee did not avail himself of the provisions of 10 CFR 20.101(b) and therefore NO FORMS AEC-4 WERE MAINTAINED.

1.1.5 () I observed a CORRECTLY COMPLETED FORM AEC-4 for each individual whose quarterly whole body exposure exceeded 1.25 rems; or

NO AEC 4 signed by individuals making

() I identified approximately 50 % of the individuals whose quarterly whole body exposure had exceeded 1.25 rems and examined each individual's Form AEC-4 and found each to be correctly completed.

NO AEC 4 (4)

1.2 20.103, "EXPOSURE OF INDIVIDUALS TO CONCENTRATIONS OF RADIOACTIVE MATERIAL IN RESTRICTED AREAS"

1.2.1 By examination of records of () receipts, () inventories, () surveys, () personal dosimetry, () effluent monitoring, and () disposals/transfers, by questioning the RSO and these users , and by my physical inspection of the restricted areas, I IDENTIFIED those INDIVIDUALS WHOSE internal EXPOSURES MIGHT reasonably be expected to EXCEED 25% OF THE LIMITS of 20.103.

1.2.1.1 I asked the RSO and/or the principal users HOW the EXPOSURES to these individuals had been EVALUATED and what magnitude of exposure had been found.

*whole body counting and bioassay
show little or no body burden
other than trace amounts*

1.2.2 I found that the licensee's METHODS of evaluating compliance with 20.103 was APPROPRIATE to the circumstances of exposure in each case. ✓

1.2.3 I found that the licensee's evaluations of exposures showed that in NO instance had an INDIVIDUAL been EXPOSED IN EXCESS of the limits of 20.103. ✓

1.3 20.104, "EXPOSURE OF MINORS"

1.3.1 I determined by questioning (✓) the RSO, and/or () and/or () examining Forms ALC-5 or their equivalents and/or () observing individuals in the restricted areas that NO INDIVIDUALS under 18 years of age had been EXPOSED in the restricted areas, or ✓

1.3.2 In the manner indicated above, I IDENTIFIED those INDIVIDUALS under 18 years of age who had been exposed in the restricted areas by questioning () the RSO, () the minor's supervisors. I determined the circumstances of exposure and the licensee's method of evaluating the minor's exposures. I determined that the METHOD OF EVALUATION had been ADEQUATE. I found that the evaluations showed that the exposures had NOT EXCEEDED 10% of the limits of 10 CFR 20.101(a). ✓

1.4 20.105, "PERMISSIBLE LEVELS OF RADIATION IN UNRESTRICTED AREAS"

1.4.1 By questioning the RSO and/or the principal users, and () by examining records of () receipts, () inventories, () disposals/transfers, and () surveys, and by a physical inspection of the restricted areas, I DETERMINED the TIMES AND CIRCUMSTANCES under WHICH the licensee's use and/or storage of materials would have resulted in the generation of exposure levels in the unrestricted area of a magnitude of WARRANTED CALCULATION OR MEASUREMENT to assure compliance with 20.105. ✓

1.4.2 I questioned the RSO and/or the involved principal users to determine if these calculations or MEASUREMENTS had been MADE; HOW they had been MADE; and what CONCLUSIONS had been DRAWN. I found that adequate surveys had been made indicating that the levels of radiation in the unrestricted area had not exceeded the limits of 20.105. ✓

1.4.3 I MEASURED THE EXPOSURE RATES IN THE UNRESTRICTED AREAS and found that at the time of inspection none exceeded the allowed levels. ✓

at licensee facilities

1.4.4 Following the procedures described in paragraph 1.4.1 above, I determined that there had been NO circumstances under which there was any REASONABLE PROBABILITY OF the levels HAVING EXCEEDED the limits of 20.105. *at licensee facility*

1.5 20.106, "CONCENTRATION IN EFFLUENTS TO UNRESTRICTED AREAS"

1.5.1 By questioning the RSO and these principal users _____, by examination of records of () receipts, () inventories, () effluent monitoring, and () surveys, () and by observations made during my physical inspection of the restricted areas, I IDENTIFIED those OPERATIONS WHERE there was a REASONABLE PROBABILITY of generation OF CONCENTRATIONS of radioactive material in effluents to the unrestricted area. *✓*

1.5.2 I asked the RSO or the principal user to describe the evaluation that had been made to ASSURE that the CONCENTRATION of radioactive material in these effluents DID NOT EXCEED THE LIMITS of 20.106. *✓*

1.5.3 I determined that the licensee's () calculations, () location of samplers, () collection methods, and () assay methods were SUITABLE for EVALUATION of the concentrations of the types of radioactive material that were discharged (i.e. considering its identity, physical and chemical form, particle size, the presence of dust loading or moisture . . . etc). I noted that the licensee's evaluations showed compliance with 20.106. *10⁻¹⁰ x 10⁻¹⁴ uCi/g water*

1.5.4 Having assured myself, from the findings of previous AEC inspectors, that the licensee's procedures for calculating, sampling and assaying the samples were in accord with accepted practices I ONLY EXAMINED the RECORDS of his measured concentrations. I found that these showed him to be in compliance with 20.106. *> 10⁻⁷ uCi/g water*

1.5.5 Following the procedures described in paragraph 1.5.1 above, I determined that quantities and forms of the material, and the circumstances under which it was handled were such that THERE WAS NO SIGNIFICANT PROBABILITY OF VIOLATION OF THE SECTION. *✓*

1.6 20.201, "SURVEYS"

1.6.1 In the course of determining the licensee's status of compliance with all sections of Part 20, I found that ADEQUATE SURVEYS had been CONDUCTED. *✓*

1.7 20.202, "PERSONNEL MONITORING"

1.7.1 As stated in paragraph 1.1.1 above, I identified those individuals whose external exposure might reasonably be expected to exceed 25% of the 20.101(a) limits. I ascertained that a FORM AEC-5 or its equivalent was maintained FOR EACH of these INDIVIDUALS. ✓ ee

1.7.1.1 I concurred in the licensee's evaluation that personnel monitoring was not required for any individual using material under this license. ✓ MH

1.7.1.2 _____ stated that each of these individuals had been INSTRUCTED TO WEAR his personnel DOSIMETER while he was in the restricted areas.

1.7.1.3 I noted that the licensee's written OPERATING PROCEDURES directed occupants of the restricted areas to wear their personnel dosimeters. ✓ ee

1.7.1.4 During my inspection of the restricted areas I OBSERVED that all individuals who I encountered, and who were required to wear PERSONNEL DOSIMETERS, were wearing them. ✓ ee

1.7.2 _____ identified those individuals under 18 YEARS OF AGE who entered the restricted areas. He DESCRIBED the PROCEDURES followed by each of these individuals and the duration of times spent in the restricted areas. I noted that for each individual whose exposures could reasonably be expected to EXCEED 5% of the LIMITS of 20.101(a) there was on file a Form AEC-5 or its equivalent. ✓ ee

1.7.3 h stated that NO individuals UNDER 18 YEARS OF AGE entered the restricted areas.

1.7.4 By questioning the following individuals _____, _____, and _____ who were responsible for controlling access to High Radiation Areas or who entered these areas, I determined that all INDIVIDUALS WHO ENTERED the HIGH RADIATION AREAS were PROVIDED with PERSONNEL MONITORING equipment.

1.7.5 h stated, and my findings verified the fact, that there were NO HIGH RADIATION AREAS under the licensee's control. ✓ ee

1.8 20.203, "CAUTION SIGNS, LABELS, SIGNALS, AND CONTROLS"

1.8.1 In my physical inspection of the operational areas I observed that EACH ROOM OR AREA I visited was POSTED with the appropriate sign reading (X) CRM, () CRA, () CHRA, or () CARA, as applicable, and showing the radiation caution symbol. *19E*

1.8.2 In my physical inspection of the operational area I observed that EACH CONTAINER that required a label was in fact LABELED CRM, showing the radiation caution symbol, the identity of its contents and sufficient information to permit individuals handling or using the containers, or working in the vicinity thereof, to take precautions to avoid or minimize exposures. *14E*

1.9 20.206, "INSTRUCTION OF PERSONNEL; POSTING OF NOTICES TO EMPLOYEES" *19E*

1.9.1 1 stated that all INDIVIDUALS working in or frequenting the restricted areas were ORALLY INSTRUCTED to a degree commensurate with the radiation hazards encountered. *19E*

1.9.2 I examined the licensee's OPERATING PROCEDURES and found that they PROVIDED individuals working in or frequenting the restricted areas with INSTRUCTIONS for the safe handling of material that were commensurate with the radiation hazards encountered. *19E*

1.9.3 I observed that the licensee had POSTED a current COPY of 10 CFR 20 a copy of the LICENSE and a copy of OPERATING PROCEDURES applicable to work under the license in a sufficient number of places to permit occupants of the restricted areas to observe them on the way to or from their place of employment. *19E*

1.9.3.1 1 stated that these DOCUMENTS were AVAILABLE for employee's examination upon request. I saw these documents. *19E*

1.9.4 I observed that FORMS AEC-3 were conspicuously POSTED in a sufficient number of places to permit employees working in or frequenting any portion of the restricted areas to observe a copy on the way to or from their place of employment. *19E*

1.10 20.207, "STORAGE OF LICENSED MATERIALS" *19E*

1.10.1 In my inspection of the licensee's facilities, I observed that NO MATERIAL was STORED IN an UNRESTRICTED AREA. *19E*

1.10.1.1 1 stated that all areas in which MATERIAL was stored were SECURED WHEN UNATTENDED by individuals who had been instructed in the safe use of the material. *19E*

1.10.2 I ASCERTAINED by physical inspection that all MATERIAL stored in un restricted areas was SECURED against unauthorized removal from the place of storage. E

1.11 20.301, "WASTE DISPOSAL - GENERAL REQUIREMENTS"

1.11.1 By questioning the RSO and these principal users b c, by examination of records of () receipts, () surveys, () effluent monitoring, () inventories, () disposal/transfer, and by my physical inspection of the licensee facilities, I IDENTIFIED PROCEDURES used by the licensee to dispose of waste material. E

1.11.1.1 I determined that no material had been disposed of as waste.

1.11.2 I determined that these procedures INVOLVED either one or a combination of the FOLLOWING METHODS: () Transfer to an authorized recipient, () In accordance with a license condition, () Release into sanitary sewage system, () Burial in soil, or () As allowed by 20.106. E

1.12 20.303, "DISPOSAL BY RELEASE INTO SANITARY SEWAGE SYSTEMS"

1.12.1 stated that no licensed material had been released into the sanitary sewage system.

1.12.2 In the manner indicated in Paragraph 1.11.1, I IDENTIFIED those OPERATIONS from which waste was discharged to the sanitary sewage system. E

1.12.3 By questioning the RSO and these principal users b c regarding the details of the procedures being followed, I determined that the effluent was READILY SOLUBLE or DISPOSABLE in water. E

1.12.4 By questioning the RSO and these principal users b c, and by my examination of records of () receipts, () disposals/transfers, () survey of sewage release rates, () calculations of concentrations of material per unit volume of sewage, or () measurements of concentration of material per unit volume of sewage, I determined that: E

1. The QUANTITY of radioactive material RELEASED in any one DAY did not exceed the larger of the following limits: (a) Appendix B, Table I, Col. 2 concentrations averaged over any one day or (b) Ten times the quantity of such material specified in Appendix C. E

2. The MONTHLY average did not exceed Appendix B, Table I, Col. 2 CONCENTRATIONS. VE
3. The GROSS quantity of radioactive MATERIAL did not exceed 1 curie/year. EE

1.13 20.304, "DISPOSAL BY BURIAL IN SOIL"

1.13.1 By questioning the RSO and these principal users _____ and by examination of records of burials I DETERMINED that the LICENSEE had MET the requirements of this section. E

1.13.2 N stated that no licensed material was disposed of by burial in soil.

1.13 20.305, "TREATMENT OR DISPOSAL BY INCINERATION"

1.13.1 Having noted that incineration was AUTHORIZED BY THE LICENSE, I questioned the RSO and these principal users who utilized this method of disposal, I EXAMINED the RECORDS, which showed the identity of the material, its quantity, and the date of incineration. I also determined that the QUANTITY LIMITATIONS (if any) given in the license had NOT been EXCEEDED. I determined that the licensee had made valid surveys to ensure that the EFFLUENT AND ASH limits given in the license had not been exceeded. I did this by examining his sample collection techniques and his assay procedures.

1.13.2 By examination of waste disposal records, by questioning the principal users and the RSO, and by physical inspection of the licensee's facilities, I determined that he had NOT UTILIZED INCINERATION as a means of treatment or disposal of material. EE

1.14 20.401 "RECORDS OF SURVEYS, RADIATION MONITORING, AND DISPOSAL"

1.14.1 I examined () all, () approximately 10% of, the RECORDS OF RADIATION EXPOSURE of all individuals for whom monitoring was required under 20.202. I found that these records were maintained on FORMS AEC-5 or on clear and legible forms containing all the information required by Form AEC-5. I found they were kept in accordance with the INSTRUCTIONS contained ON THE REVERSE SIDE of Form AEC-5. VE
AEC-5 only

1.14.2 As indicated in paragraph 1.7.1.1 of these notes no individuals were required to wear personnel monitoring equipment. N/A

1.14.3 I examined () all records; () a representative number of records, of surveys conducted in accordance with () 20.201(b), disposals made under () 20.302 (As allowed by License Amendment), (X) 20.303 (Release to Sanitary Sewers) and () 20.304 (Burial in Soil) and found that the records contained the essential elements for adequate evaluation of compliance. *see*

1.15 20.402, "REPORTS OF THEFT OR LOSS OF LICENSED MATERIAL"

1.15.1 7 STATED that there had been NO LOSS OR THEFT of licensed material in such quantities and under such circumstances that a substantial hazard might result to persons in unrestricted areas. *JE*

1.15.1.1 I VERIFIED this fact by comparison of records of () receipts, (X) inventories, and (X) disposal/transfer, taking into consideration the decay rates of the various radionuclides.

1.16 20.403, "NOTIFICATION OF INCIDENTS"

1.16.1 In the course of my inspection of all sections of Part 20 I found that there had been NO CIRCUMSTANCES that WARRANTED the submission of NOTIFICATION under 20.403.

1.16.2 In the course of my inspection of all sections of Part 20 I found that in each instance where NOTIFICATION had been required such notification HAD BEEN MADE in accordance with the specifications of this section.

1.17 20.404, "REPORT TO FORMER EMPLOYEES OF EXPOSURE TO RADIATION"

1.17.1 15 stated that NO FORMER EMPLOYEE HAD REQUESTED A REPORT of his exposure. *see*

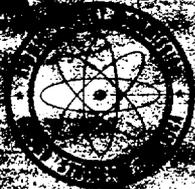
1.17.2 stated that one or more FORMER EMPLOYEES HAD REQUESTED REPORTS of their exposures. showed me copies of the licensee's response to these requests. I examined the copies and noted that they furnished all the information required by this section.

1.18 20.405, "REPORTS OF OVEREXPOSURES AND EXCESSIVE LEVELS AND CONCENTRATIONS"

1.18.1 In the course of my inspection of all sections of Part 20, I found that there had been NO CIRCUMSTANCES that WARRANTED the SUBMISSION of reports under 20.405. *MC*

*Reports required
and not sent*

*No report to Individuals by licensee
No report to AEC*



ATOMIC ENERGY COMMISSION
 DIRECTORATE OF REGULATORY OPERATIONS
 REGION I
 631 PARK AVENUE
 BERG OF PRUSSIA, PENNSYLVANIA

APR 17 1975

Combustion Engineering, Inc.
 Attention: Mr. Raymond Hoover
 Corporate Director
 Health and Safety
 1000 Prospect Hill Road
 Storrs, Connecticut 06268

License Nos. 06-00217-06
 06-04154-01

Re: **Combustion**

This refers to the inspection conducted by Mr. Epstein of this office on March 25, 1975 of activities authorized by AEC License Nos. 06-00217-06 and 06-04154-01 and to the discussions of our findings held by Mr. Epstein with yourself and Messrs. Borawski, Selig and Rosenthal of your staff at the conclusion of the inspection, and to a subsequent telephone discussion between Mr. McClintock of this office and Mr. Rosenthal on April 11, 1975.

The inspection was an examination of activities conducted under your licenses as they relate to radiation safety and to compliance with the Commission's rules and regulations and the conditions of your licenses. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, measurements made by the inspector, and observations by the inspector.

During this inspection, it was found that certain of your activities appeared to be in violation of AEC requirements. The items and references to the pertinent requirements are listed in the enclosure to this letter. This letter constitutes a notice sent to you pursuant to the provisions of Section 2.201 of the AEC's "Rules of Practice", Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you to submit to this office within 30 days of your receipt of this notice, a written statement of explanation in reply, including: (1) corrective steps which have been or will be taken by you, and the results achieved; (2) corrective steps which will be taken to avoid further violations; and (3) the date when full compliance will be achieved.

From the April 11, 1975 telephone conversation, it is our understanding that your radiation safety program is structured so as to minimize the potential of any employee exceeding an exposure of 4.5 rem/year or 2.5 rem/quarter. We also understand that Combustion Engineering management

ITEM # 33

B/33

OFFICE	GRESS				
SURNAME	Epstein/mjd	McClintock	Nelson		
DATE	4/16/75	4/16/75			

Combustion Engineering, Inc.

-2-

supports a program that strives to keep exposures to personnel as low as practicable. If our understanding is incorrect, please inform us immediately.

In accordance with Section 2.790 of the NRC's "Rules of Practice", Part 2, Title 10, Code of Federal Regulations, a copy of this letter and your reply will be placed in the Public Document Room.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

Paul R. Nelson, Chief
Radiological & Environmental
Protection Branch

Enclosure:
Description of Violations

cc: W. P. Chernock, Vice President
Development Department

bcc (w/encls):
IE Chief, FS&EB
IE:HQ (4)
L:D/D for Fuels and Mat'l
PDR
NSIC
IE Files
DR Central Files
State of Connecticut

ENCLOSURE

DESCRIPTION OF VIOLATIONS

Combustion Engineering, Inc.
Windsor, Connecticut 06095
License No. 06-04154-01

Based on the results of an NRC inspection conducted on March 25, 1975, it appears that certain of your activities were not conducted in full compliance with NRC regulations and the conditions of your license as indicated below:

- A) Contrary to 10 CFR 20.101, a radiographer in your employ received a whole body exposure of 3.06 rem during the first quarter of 1974.

This infraction constituted an occurrence related to health and safety.

- B) Contrary to 10 CFR 20.405 and 10 CFR 19.13, you failed to report the exposure described in Item A.

This item is an infraction.

- C) Contrary to 10 CFR 20.201(b), you failed to make such surveys as were necessary to evaluate the exposure to the extremities and to the lens of the eyes for a radiographer in your employ who was involved in two exposure incidents during 1974 and 1975.

This infraction had the potential for causing or contributing to an occurrence related to health and safety.

REGION I COPY

STATISTICAL DATA CONTROL FORM

Report No.: 7601

Inspector/Investigator: Epstein

Date/s: March 10, 1976

Licensee: Combustion Engine eng

City Windsor State Conn

License No.: CG-00217-06

Category B F Priority III

Inspection: Routine Announced Unannounced

Special Investigation Other

Findings: 591 Letter Other

Clear Noncompliance

Item Identified by: Inspector Licensee Other
L/C OR CFR COMPUTER CODE NO.

Violations (1):

Infractions (2):

Deficiencies (3):

Recommended Reinspection Date: 3/77 Epstein R/W
INSPECTOR SEC. CHIEF

SPECIAL Yes No

ADD TO SPECIAL LIST

REMOVE FROM SPECIAL LIST

RETAIN OR SPECIAL LIST

Posted on SPECIAL list card by _____, date _____

Control card: Tabs changed
n/c entered
new due date shown
Cat/Pri verified by _____, date _____

ADP change list: License number entered
CAT/PRI entered
Last insp. date entered
Next insp. date entered by _____, date _____

copy sent

ITEM # 34

B/34

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

1. LICENSEE Combustion Engineering, Inc. Power Systems Group 1000 Prospect Hill Road Windsor Connecticut, 06095		2. REGIONAL OFFICE U.S. Nuclear Regulatory Commission Office of Inspection & Enforcement Region I 631 Park Avenue King of Prussia, Pennsylvania 19406	
3. DOCKET NUMBER(S)	4. LICENSE NUMBER(S) 06-00217-06	5. DATE OF INSPECTION March 10, 1976	
6. INSPECTION FINDINGS The inspection was an examination of the activities conducted under your license as they relate to radiation safety and to compliance with the Commission's rules and regulations and the conditions of your license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The findings as a result of this inspection are as follows:			
<input checked="" type="checkbox"/> No items of noncompliance or unsafe conditions were found.			
The following items of noncompliance related to records, signs, and labels were found:			
<input type="checkbox"/> A. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 34.42			
<input type="checkbox"/> B. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c) (1) or 34.42			
<input type="checkbox"/> C. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d)			
<input type="checkbox"/> D. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e)			
<input type="checkbox"/> E. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f) (1) or (f) (2)			
<input type="checkbox"/> F. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)			
<input type="checkbox"/> G. Form AEC-3 was not properly posted. 10 CFR 20.206(c)			
<input type="checkbox"/> H. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b)			
<input type="checkbox"/> I. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d)			
<input type="checkbox"/> J. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.51, 40.61 or 70.51			
<input type="checkbox"/> K. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c)			
<input type="checkbox"/> L. Records of inventories were not maintained. 10 CFR 34.26			
<input type="checkbox"/> M. Utilization logs were not maintained. 10 CFR 34.27			
<input type="checkbox"/> N. Records of radiation survey instrument calibration were not maintained. 10 CFR 34.24			
<input type="checkbox"/> O. Records of teletherapy electrical interlock tests were not maintained as prescribed in your license.			
<input type="checkbox"/> P. Other _____			
_____ <i>Eugene Epstein</i> B/36 (AEC Compliance Inspector)			
* The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.			
ITEM # <u>36</u>			
_____ (Date)		_____ (Licensee Representative - Title or Position)	

DATA SHEET

Attached N/A

Appendix A [] []
Appendix B [] []
Appendix C [] []

DOCKET NO. _____

FACILITY Combustion Engineering INSPECTION NO. 7601

CITY, STATE Windsor Connecticut DATE/S March 10, 1976

SUBJECT - RADIATION SAFETY LICENSE NO/S. 06-00217-06

PHONE # FTS _____ LOCAL 203-688-1911

INSPECTOR E. Epstein REVIEWER _____

TYPE OF INSPECTION: [] INITIAL [] SPECIAL [] ANNOUNCED
[] REINSPECTION [] ROUTINE [] UNANNOUNCED

DATE OF LAST INSPECTION: 3/25/75

RECOMMENDED DATE, NEXT INSPECTION: 8/77 [] SPECIAL [] ROUTINE

TYPE OPERATION: Nuclear Service - services are used at Reactor site and at Windsor

SCOPE OF OPERATION [] SMALL [] MEDIUM [] LARGE

PRESENTLY CLASSIFIED CAT/PRI _____; AS OF AMENDMENT NO. B-II
[] NO CHANGE REQUIRED [] CHANGES TO CAT/PRI
[] PER ATTACHED MEMO DATED _____

SUMMARY OF FINDINGS

[] NO NONCOMPLIANCE NOTED [] SEE APPENDIX A FOR NONCOMPLIANCE ITEMS
[] 591 [] ROL [] OTHER [] SEE APPENDIX B FOR PROBLEM AREAS
[] NO SPECIAL PROBLEMS RELATIVE TO _____

PERSONS CONTACTED*

Table with columns: NAME, TITLE, ORG, NAME, TITLE, ORG. Contains 10 entries of contact information.

* MANAGEMENT MEETING ATTENDEES

INSPECPLANSubmitted 3/6/8 Da _____

Approved _____ Date _____

INSPECTION ITEMS	SCHEDULED INSPECTION	MC-28 PROCEDURE NO.	POST INSPECTION STATUS
*Management Meeting-Entrance and Exit Interviews	✓	30703B	C.
Initial Management Meeting	✓		
*Inspection Group - _____			N/A
Licensee Event Followup		92700B	N/A
Followup on Inspector-identified Problems	<i>Reduction of Exposure to Nuclear Source Group</i>	92701B	C. <i>Exposure Controlled</i>
Followup on Noncompliance and Deviations		92702B	N/A
IE Bulletin/Immediate Action Letter Followup		92703B	N/A
Followup on Headquarters Requests		92704B	N/A
Followup on Regional Requests		92705B	N/A
*Independent Inspection Effort		92706B	✓ C.
Inspector Dispatched to Site		93700B	N/A
Followup on Significant Event Occurring During an Inspection		93701B	N/A

*Required Inspection Items

FACILITY Combustion Engineering INSPECTION N° 7601
 License No. 06-00217-06 DATE 3/10/76
 Inspection Group MEDICAL MODULE entire inspection

MC 2850 - 78/10B
 PAGE 1 OF _____
 INSPECTOR Epstein

INSPECTION ITEM	SOURCE OF INFORMATION	ACCEPTANCE CRITERIA	FINDING
1. ORGANIZATION Management and Radiation Protection Organization Requirements	<i>Presented & tested</i>	L/C <u>14</u>	C O
2. LICENSEE AUDITS Internal Inspection System, Management Controls	<i>Presented with power sites to ensure space ADAP.</i>	L/C <u>14</u> which references license application	C
3. TRAINING AND INSTRUCTIONS a. Training Program b. Instructions to Workers c. Required Tests Administered; Scores Satisfactory	<i>✓ ✓ ✓</i>	L/C <u>14</u> which references license application 19.12 L/C _____	C <i>constant retraining 110 people</i>
4. RAD. PROTECTION PROCEDURES Operating and Emergency Procedures Implemented	<i>Presented no exceptions</i>	L/C <u>14</u>	C
5. MATERIAL, FACILITIES, & INSTRUMENTS a. Authorized Uses and Quantities b. Restricted Areas, Posting Requirements c. Survey Instruments & Dosimeters Operable, Calibrated d. Sealed Source Inventory	<i>yes sealed source only</i>	L/C <u>678</u> ; 35.14, 35.100 20.203 L/C <u>14</u> which references license application 35.14(b)(5)(v), (f)(2)	C

* Code NA = Not Applicable V = Violation X = Deviation
 C = Compliance I = Infraction II = Unresolved

APPENDIX A

NONCOMPLIANCE BACKUP

Facility _____ Insp. No. _____

License No. _____

BASIS FOR CITATION

Item # _____
10 CFR _____
L/C _____
*Class _____

Item # _____
10 CFR _____
L/C _____
*Class _____

Item # _____
10 CFR _____
L/C _____
*Class _____

Item # _____
10 CFR _____
L/C _____
*Class _____

Item # _____
10 CFR _____
L/C _____
*Class _____

Item # _____
10 CFR _____
L/C _____
*Class _____

* (V) Violations; (In) Infraction; (Def) Deficiency; (C) Commitment;
(Dev) Deviation

- Inspector Comments
- Unresolved Items
- Uncorrected or Repeated n/c
- Unusual Occurrences, Etc.

Facility _____ Inspection No. _____

License No. _____

The next inspector should be aware of the following:

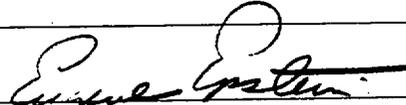
Licensee _____

Lic. No. _____

Insp. No. _____

<u>Inspection Item</u>	<u>Source of Information</u>	<u>Acceptance Criteria</u>	<u>Findings</u>
A) Dose Considerations: (1) Lenses of Eyes (2) Extremity Doses - (Rings) (3) Ancillary personnel (Nurses)		Inspector judgment 20.201(b) ref. 20.101	<i>used</i> <i>C</i>
B) Teletherapy (1) Posting (2) Interlocks (3) 5 year maintenance (4) Malfunctions		Inspector judgment 20.101; 20.105	<i>M</i>
C) Medical (1) Authorized Procedures Authorized Materials Authorized Users Authorized Instruments (a) Mo ⁹⁹ breakthru (b) Calibrated as per L/C _____ (2) Leak Tests (3) Sealed Source Inventory (4) Xe133 & others auth. by L/C _____		35.14, 35.100 L/C 35.14(b)(5)(i) 35.14(e)(1)(i) 35.14(b)(5)(v) 35.14(f)(2) L/C	2876 mil <i>Pessum</i> products in several plastic bottles in side vault from recent sites. 5 Cs ¹³⁷ sealed sources 112 Ci Am-Ba sealed sources 15 for 11.56 Ci total density measurements License has serial # 25 analyzing above

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

1. LICENSEE Combustion Engineering, Incorporated Power Systems Group 1000 Prospect Hill Road Windsor, Connecticut 06095		2. REGIONAL OFFICE US Nuclear Regulatory Commission Office of Inspection & Enforcement Region I 631 Park Avenue King of Prussia, PA 19406	
3. DOCKET NUMBER(S) 030-03754	4. LICENSE NUMBER(S) 06-00217-06	5. DATE OF INSPECTION May 26, 1977	
6. INSPECTION FINDINGS The inspection was an examination of the activities conducted under your license as they relate to radiation safety and to compliance with the Commission's rules and regulations and the conditions of your license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The findings as a result of this inspection are as follows: <input checked="" type="checkbox"/> No items of noncompliance or unsafe conditions were found. The following items of noncompliance related to records, signs, and labels were found: <input type="checkbox"/> A. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 34.42 <input type="checkbox"/> B. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c) (1) or 34.42 <input type="checkbox"/> C. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d) <input type="checkbox"/> D. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e) <input type="checkbox"/> E. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f) (1) or (f) (2) <input type="checkbox"/> F. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b) <input type="checkbox"/> G. Form AEC-3 was not properly posted. 10 CFR 20.206(c) <input type="checkbox"/> H. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b) <input type="checkbox"/> I. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d) <input type="checkbox"/> J. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.51, 40.61 or 70.51 <input type="checkbox"/> K. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c) <input type="checkbox"/> L. Records of inventories were not maintained. 10 CFR 34.26 <input type="checkbox"/> M. Utilization logs were not maintained. 10 CFR 34.27 <input type="checkbox"/> N. Records of radiation survey instrument calibration were not maintained. 10 CFR 34.24 <input type="checkbox"/> O. Records of teletherapy electrical interlock tests were not maintained as prescribed in your license. <input type="checkbox"/> P. Other _____			
 (AEC Compliance Inspector)			
7. The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days. <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> ITEM # <u>37</u> </div> <div style="text-align: center;"> 10 <u>B/37</u> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%; text-align: center;"> _____ (Date) </div> <div style="width: 45%; text-align: center;"> _____ (Licensee Representative - Title or Position) </div> </div>			

0300-3754

INSPECTION REPORT NO. 7701

Attached

Appendix A

Appendix B

Appendix C

Memo

Combustion Engineering Incorporated
Power Systems Group
1000 Prospect Hill Road
Windsor Conn 06095

Licensee contact: J Lambert Telephone no. 203-688-1911

License no. 06-00217-06 Last amendment and date: 26 9/27/76

Category: F, and Priority: IV, as of last amendment.

Inspection date(s): May 26 1977 Type of inspection: Unannounced - special

SUMMARY OF FINDINGS AND ACTION

- No noncompliance, clear 591 issued
- Noncompliance, Appendix A
- Action on previous noncompliance, Appendix B
- Noncompliance, 591 issued
- Regional action Hq action
- Supplemental info, Appendix C

RECOMMENDATIONS

See basis in Appendix C or attached memo.

- Change Category to: _____
- Change Priority to: _____
- Next inspection date: May 80

PERSONS CONTACTED

- X. B. Selig, Director Engineering T. Brown, Nuclear Unit Insp
- Development & Services
- J. Lambert, Radiation Safety Engineer
- J. Smolin, State of Connecticut
- R. Clark, Asst RSC

Inspector: E. Epstein

Approved: D. McManis

6/1/77

AREAS INSPECTED AND FINDINGS

Licensee: Construction Engineering License no: 06-00217-06 Amendment no: 20

INSPECTION ITEMS	CRITERIA	FINDING
<p>1. Organization</p> <p>Management organization.</p> <p>Radiation protection organization.</p> <p><i>Notes & Remarks:</i></p>	<p>Lic Cond <u>14</u></p> <p><i>Survey + assist closely monitors 40 persons attached to Nuclear Service Group which services several reactors and trump tracks contaminated tools & equipment.</i></p>	<p><u>C</u></p>
<p>2. Licensee internal audits</p> <p>Scope and frequency.</p> <p>Management controls.</p> <p><i>Notes & Remarks:</i></p>	<p>Lic Cond <u>14</u></p> <p><i>Essential Activities involvement of Nuclear Service Group closely oversees all operators</i></p>	<p><u>C</u></p>
<p>3. Training and instructions to employees</p> <p>Training program, scope and frequency, retraining.</p> <p>Required tests administered; scores satisfactory.</p> <p>Instructions to workers.</p> <p><i>Notes & Remarks:</i></p>	<p>Lic C</p> <p>Lic Cond <u>14</u></p> <p>19.12</p>	<p><u>C</u></p>
<p>4. Radiation protection procedures</p> <p>Operating & emergency procedures implemented.</p> <p>Security.</p> <p><i>Notes & Remarks:</i></p>	<p><input checked="" type="checkbox"/> Lic Cond <u>14</u></p> <p>20.207</p> <p><i>In lecture backup closely followed</i></p>	<p><u>C</u></p>

AREAS INSPECTED AND FINDINGS

Licensee: _____ License no: _____ Amendment no: _____

INSPECTION ITEM	CRITERIA	FINDING
-----------------	----------	---------

5. Materials, facilities and instruments

Authorized uses and quantities. ✓	Lic Cond <u>6, 7, 8 & 9</u>	
Restricted areas, posting requirements. ✓	20.203	
Survey instruments & dosimeters; operable, properly calibrated. ✓	Lic Cond <u>14 quarterly</u>	

NOTES & REMARKS:

licensee has adopted a former fuels manufacturing facility for decontamination now called (Cell 2) active facility, as one huge cell with excellent air containment and monitoring

6. Receipt and transfer of materials

Procedures implemented, adequate. <u>yes</u>	20.205, 71.51 ✓	
Transfer of byproduct material. <u>yes</u>	30.41 ✓	
Labeling and packaging. <u>yes</u>	71.5, 49CFR 170-189 ✓	
Records of receipt, transfer, storage, survey, and monitoring <u>yes</u>	30.51 ✓	

NOTES & REMARKS:

large packages in DOT approved transfer casks and equipment

7. Personnel protection - external

Personnel monitoring control; minimize exposures, control of accumulated dose. ✓	20.101, 20.102, 20.202	
Surveys conducted, adequate.	20.201	
Records of monitoring, surveys, disposals.	20.401, Lic Cond _____	
Levels in unrestricted areas.	20.1, 20.105	

NOTES & REMARKS:

has dose now 2.7 Rem/quarter
 reduced through engineering controls from 3-4 Rem per quarter
 as before

8. Personnel protection - internal

Airborne concentrations in restricted areas. ✓	20.103 ✓	
Exposure of minors.	20.104	10 - specific for 10 hrs only BZ samples used
Posting of airborne radioactivity areas.	20.203	None → not 1x10 ⁻⁴ → 2 assumed
Survey, monitoring requirements; records.	20.201, 20.401	yes
Leak tests of sealed sources.	Lic Cond <u>13</u>	yes

NOTES & REMARKS:

Good records good that Prof Count
 18 Acc - 9 per 10 hrs direct
 13 Ann - BC 10 hrs assumed
 10 Acc - 9 per 10 hrs direct
 6.5137 - major concern not needed

AREAS INSPECTED AND FINDINGS

Licensee: _____ License no: _____ Amendment no: _____

INSPECTION ITEM	CRITERIA	FINDING
-----------------	----------	---------

9. Effluent control, waste disposal C

Release of effluents.	20.106	<i>10-13.</i>
Waste disposal.	20.301, 20.303, 20.304, 20.305	<i>Good feedback</i>
Procedures, records.	20.401, Lic Cond	<i>14 ✓</i>

NOTES & REMARKS:

10. Shipping, shipping incidents C

Procedures for pickup, receipt, monitoring of packages.	20.205(b) & (c)	<i>✓ internet</i>
Transportation of licensed material.	71.5	
Incidents, reports, corrective actions.	49CFR 170-189	<i>none</i>

NOTES & REMARKS:

54 mch Co 60 65 '37 cont present

11. Notifications and reports C

To individuals.	19.13	
Overexposures, excessive levels & concentrations, incidents.	20.403, 20.405	<i>Not app - NRC-4 used</i>
Personnel exposures and monitoring, termination reports.	20.407, 20.408	<i>No overexposures</i>
Theft or loss of licensed material.	20.402	

NOTES & REMARKS:

12. Posting of notices C

Part 20, license & documents, procedures, notice of violations.	19.11(a)	<i>✓</i>
NRC-3.	19.11(c)	<i>✓</i>

NOTES & REMARKS:

AREAS INSPECTED AND FINDINGS

Licensee: _____ License no: _____ Amendment no: _____

INSPECTION ITEM	CRITERIA	FINDING
<p>13. <u>Environmental monitoring program</u></p> <p>Implementation of program, scope and frequency as required.</p> <p>Records maintained, reviewed by management.</p> <p>NOTES & REMARKS:</p>	<p>Lic Cond <u>14</u></p> <p>10-13 10-14 outside con- stant for cell 2 constantly monitored</p>	<u>C</u>
<p>14. <u>Emergency preparedness</u></p> <p>Procedures available for incidents and accidents.</p> <p>Training for personnel; coordination with supporting groups and agencies.</p> <p>NOTES & REMARKS:</p>	<p>Lic Cond <u>14</u></p> <p>✓</p>	<u>C</u>
<p>15. <u>Other license conditions</u></p> <p>NOTES & REMARKS:</p>	<p>Lic</p> <p>12. 13 -</p>	<u>C</u>
<p>16. <u>Confirmatory measurements</u></p> <p>Licensee's surveys verified on sampling basis.</p> <p>NOTES & REMARKS:</p>	<p>20.105, 20.201</p> <p>Daily means all 2 building max 200 dpm/100cm² β</p>	<u>C</u>
<p>17. <u>Independent inspection effort:</u></p> <p>NOTES & REMARKS:</p>	<p>monitored all packages. rad levels upto 50 msv/hr or more</p> <p>packages in cell 2</p> <p>monitored & swept yard counted max 150 dpm/100cm²</p>	<u>C</u>

APPENDIX A - DOCUMENTATION OF NONCOMPLIANCE

Licensee: _____

License no: _____

Reference	Basis for noncompliance
Report item _____ 10 CFR _____ Lic Cond _____ Type n/c _____	
Report item _____ 10 CFR _____ Lic Cond _____ Type n/c _____	
Report item _____ 10 CFR _____ Lic Cond _____ Type n/c _____	
Report item _____ 10 CFR _____ Lic Cond _____ Type n/c _____	
Report item _____ 10 CFR _____ Lic Cond _____ Type n/c _____	

Zma

APPENDIX B - LICENSEE ACTION ON PREVIOUS INSPECTION FINDINGS

Licensee: _____

License no: _____

Identification and summary of action taken	Status
--	--------

Report no: _____ Type n/c: _____ Describe: _____

Action taken:	OPEN
	CLOSED

Report no: _____ Type n/c: _____ Describe: _____

Action taken:	OPEN
	CLOSED

Report no: _____ Type n/c: _____ Describe: _____

Action taken:	OPEN
	CLOSED

Report no: Type n/c: _____ Describe: _____

Action taken:	OPEN
	CLOSED

Report no: _____ Type n/c: _____ Describe: _____

Action taken:	OPEN
	CLOSED

APPENDIX C - SUPPLEMENTARY INFO _____

Licensee: _____

License no: _____

- Uncorrected/repeated noncompliance
- Unusual occurrence, conditions, etc
- Basis for change of Category or Priority

- Unresolved items
- Inspector's comments

me

Good Engineering Contract



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

DEC 7 1977

Docket Nos. 70-1100
03003754 ✓

Combustion Engineering, Inc.
ATTN: Mr. H. V. Lichtenberger
Vice President - Nuclear Fuel
Nuclear Power Systems - Manufacturing
P. O. Box 500
Windsor, Connecticut 06095

Gentlemen:

Subject: Inspection 70-1100/77-09

This refers to the inspection conducted by Mr. P. Clemons of this office on November 2-4, 1977, of activities authorized by NRC License Nos. SNM-1067 and 06-00217-02 and to the discussions of our findings held by Mr. Clemons with you and Mr. Pianki of your staff at the conclusion of the inspection.

Areas examined during this inspection are described in the Office of Inspection and Enforcement Inspection Report which is enclosed with this letter. Within these areas, the inspection consisted of selective examinations of procedures and representative records; interviews with personnel; measurements made by the inspector, and observations by the inspector.

Based on the results of this inspection, it appears that certain of your activities were not conducted in full compliance with NRC requirements, as set forth in the Notice of Violation, enclosed herewith as Appendix A. These items of noncompliance have been categorized into the levels as described in our correspondence to you dated December 31, 1974. This notice is sent to you pursuant to the provisions of Section 2.201 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you to submit to this office, within twenty (20) days of your receipt of this notice, a written statement or explanation in reply including: (1) corrective steps which have been taken by you and the results achieved; (2) corrective steps which will be taken to avoid further items of noncompliance; and (3) the date when full compliance will be achieved.

ITEM # 38

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In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosures will be placed in the NRC's Public Document Room. If this report contains any information that you (or your contractor) believe to be proprietary, it is necessary that you make a written application within 20 days to this office to withhold such information from public disclosure. Any such application must be accompanied by an affidavit executed by the owner of the information, which identifies the document or part sought to be withheld, and which contains a statement of reasons which addresses with specificity the items which will be considered by the Commission as listed in subparagraph (b)(4) of Section 2.790. The information sought to be withheld shall be incorporated as far as possible into a separate part of the affidavit. If we do not hear from you in this regard within the specified period, the report will be placed in the Public Document Room.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,



Paul R. Nelson, Chief
Fuel Facility and Materials Safety
Branch

Enclosures:

1. Appendix A, Notice of Violation
2. Office of Inspection and Enforcement Inspection
Report Number 70-1100/77-09

cc w/encl:

W. P. Chernock, Vice President, Development
Combustion Engineering

bcc w/encl:

IE Mail & Files (For Appropriate Distribution)
Central Files
Public Document Room (PDR)
Nuclear Safety Information Center (NSIC)
Technical Information Center (TIC)
REG:I Reading Room
State of Connecticut

APPENDIX A

NOTICE OF VIOLATION

Based on the results of an NRC inspection conducted on November 2-4, 1977, it appears that one of your activities was not conducted in full compliance with conditions of your NRC Facility License No. SNM-1067. Item A is an Infraction.

- A. Section 15.5.1 of the Nuclear Licensing and Safety Procedures, developed pursuant to Section 8.2 of SNM-1067, requires personnel to wear film badges in the Pellet Shop if they spend more than two hours per day in the area.

Contrary to the above, two employees who are in the Pellet Shop more than two hours per day, were not wearing their film badges as required on November 2, 1977, as observed by the inspector.

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 70-1100/77-09
03003754/77-09
Docket No. 70-1100
03003754
License No. SNM-1067 Priority 1 Category A(1)
06-00217-06

Licensee: Combustion Engineering
Windsor, Connecticut

Facility Name: Nuclear Manufacturing Facility

Inspection at: Windsor, Connecticut

Inspection conducted: November 2-4, 1977

Inspectors: *P. Clemons*
P. Clemons, Radiation Specialist

12/6/77
date signed

date signed

P. J. Knapp

date signed

Approved by: *P. J. Knapp*
P. J. Knapp, Chief, Radiation Support
Section, FF&MS Branch

12/6-77
date signed

Inspection Summary:

Inspection on November 2-4, 1977 (Report No. 70-1100/77-09)

Areas Inspected: Radiation protection program including procedures, dosimetry, air samples (general), stack samples, breathing zone samples, liquid effluents, ventilation, posting, training, audits, bioassay, termination reports and smear surveys. Shortly after arrival, areas where work was being conducted were examined to review radiation safety control procedures and practices. The inspection involved 20 inspector-hours onsite by one NRC inspector.

Results: Of the 13 areas inspected, no items of noncompliance were identified in 12 areas; one apparent item of noncompliance was identified in one area (Infraction - failure to follow procedures and wear film badges - Paragraph 3).

DETAILS

1. Persons Contacted

Principal Licensee Employees

- *Mr. H. Lichtenberger, Vice President
- *Mr. F. Pianki, Manager, Manufacturing
- Mr. G. Bakevich, Nuclear Licensing and Safety Supervisor - In Training
- Ms. L. Jones, Radiation Specialist
- Mr. J. Limbert, Laboratory Radiation Engineer
- Mr. P. Rosenthal, Supervisor, Quality Control and Health Physics
- Nuclear Laboratories
- Mr. R. Sheeran, Nuclear Licensing and Safety Supervisor

The inspector also interviewed other licensee employees during the course of the inspection. They included health physics technicians, the Accountability Coordinator, and the Industrial Hygiene and Safety Specialist.

* denotes those present at the exit interview.

2. Licensee's Internal Audits

The inspector questioned licensee representatives regarding the conduct of periodic internal audits as required by Section 8.3 of SNM-1067 for the period of April to October, 1977. The inspector reviewed the reports of several audits conducted for the Manufacturing Facility and the Nuclear Laboratories. All audits were concerned with the radiation protection program. The reports did not indicate any items requiring corrective action.

No items of noncompliance were identified.

3. Procedures

The licensee's Nuclear Licensing and Safety Procedures, Section 15.5.1, developed pursuant to Section 8.2 of SNM-1067 requires all personnel who spend more than two hours per day in the Pellet Shop to wear film badges that are provided. On November 2, 1977, the inspector asked several employees who were assigned to the Pellet Shop more than two

hours a day if they were wearing the film badge as required. Two employees did not have film badges on their persons when questioned by a licensee representative at the inspector's request. The licensee representative stated that the two employees spend more than two hours per day in the Pellet Shop and they should have been wearing the film badges.

Failure to wear the film badge in the Pellet Shop represents non-compliance with license requirements (77-09-01).

4. Materials License (06-00217-06)

During Inspection 70-1100/77-02, the inspector was informed that a marked increase in activity was anticipated in Building #2 of the licensee's facilities under Materials License 06-00217-06. The increased activity in Building #2 was anticipated because of the return of contaminated components to the Windsor site that had been utilized in inspection activities at various nuclear sites and the expected increase in such inspection activities. The inspector toured the facility to determine if a radiation protection program was in effect at the facility.

The inspector observed that a full time health physics technician was monitoring the program, Radiation Work Permits (RWP) were in effect, contamination control procedures were established, and personnel monitoring was required as appropriate.

No items of noncompliance were identified.

5. Modifications and Changes

The licensee submitted a request to modify the Powder Prep Station operations in the Pellet Shop. Amendment #24 was recently received by the licensee approving the requested modification. The new facility change has been installed but the system is not being used at this time because the appropriate internal review has not been completed by the licensee.

No items of noncompliance were identified.

6. Facilities and Equipment

The inspector toured the facilities and examined the equipment and instruments to verify that the items were available for use and maintained in an operable state. The inspection included the operation of a beta-gamma portable survey instrument, located in Building #2, to determine that it was operable.

No items of noncompliance were identified.

7. Ventilation

The inspector reviewed hood velocity data for the period of April - October, 1977. The results of the survey indicated that all hood velocities were in excess of 150 linear feet per minute. A licensee representative made measurements at the inspector's request during the inspection, and the results of the measurements indicated that all hood velocities exceeded 150 linear feet per minute.

No items of noncompliance were identified.

8. Posting

The inspector reviewed the facility posting against the regulatory requirements.

No items of noncompliance were identified.

9. Dosimetry

The inspector reviewed film badge reports for the period April - October, 1977. The records indicated that all personnel monitored were well below the requirements of 10 CFR 20.

No items of noncompliance were identified.

10. Records

The inspector reviewed the following records for the periods indicated to verify that the required program had been adhered to.

Source Leak Test Records	January - October 1977
Training Records	June 1976 - October 1977
Film Badge Records	April - October 1977
Internal Audit Records	April - October 1977
Ventilation Records	April - October 1977
Bioassay Records	
Urine	June 1977
Whole Body	November 1976
Termination Report Records	April - October 1977
Fixed (Stack) Air Sample	
Records	April - October 1977
General Air Sample Records	April - October 1977
Breathing Zone Sample Records	April - October 1977
Smear Survey Records	April - October 1977
Liquid Waste Records	April - October 1977

11. Exit Interview

The inspector met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on November 4, 1977. The inspector summarized the purpose and the scope of the inspection and the findings. The Manufacturing Manager stated that the item of noncompliance would be corrected through additional training sessions.



February 24, 1978

U. S. Nuclear Regulatory Commission
Radioisotopes Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

Subject: Byproduct Material License 06-00217-06, Request for Renewal

Enclosure: Form NRC 313, dated February 24, 1978, with Exhibits 1
Through 10

Dear Sir:

Combustion Engineering Inc. desires to renew its byproduct material license 06-00217-06. Enclosed is a current form NRC 313 with supportive exhibits. All prior approved amendments have been incorporated in the application.

There are two categories in the application for which changes from prior approvals are being requested:

1. It is being requested that the 5 curie limit for components, inspection and test equipment be increased to 20 curies. This increase is being requested due to the necessity to store an increasing amount of reactor inspection and test equipment. We anticipate little change in our method of handling or processing the equipment.
2. The application identifies as a separate category authorization to handle irradiated tensile/impact specimens and associated flux/temperature monitors. These specimens are low alloy steel surveillance materials which have been irradiated by power reactors. Our purpose is to perform post-irradiation testing at our mechanical laboratories. While it is our intent to test one or two specimens at a time, the upper limit of 30 curies is required to allow receipt and storage of a full complement of specimens.

If you desire additional information, please contact the undersigned. Your consideration of this request is appreciated.

Very truly yours,

Philip R. Rosenthal
Philip R. Rosenthal
Manager, Health Physics
Development Department
Nuclear Power Systems

COPIES SENT TO OFF. OF
INSPECTION AND ENFORCEMENT

PRR/gyj
Enclosures

ITEM # 39

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Item 4

All work with radioactive materials shall be performed under the supervision and surveillance of:

- J. M. Limbert, Radiological Engineer or
 - T. G. Moreau, Senior Health Physics Technician
 - R. B. Clark, Senior Health Physics Technician
-

Item 6 (a)

- 5) Americium 241
 - 6) Cesium 137
-

Item 6 (b)

- 5) AmBe encapsulated neutron sources, Monsanto Model #3720. Not to exceed 20 sources. Each source not to exceed 1 curie.
 - 6) (a) 2 each 25 curie encapsulated sources, Serial #S-136 and S-137.
(b) 2 each 30 curie encapsulated sources, Serial #S-181 and S-182
(c) 2 curie encapsulated source, Serial #S-171
(d) 25 curie encapsulated source X60
(e) 300 millicurie encapsulated source, Serial #6673 Omart Model HM8-A2102.
-

Item 7

- 5) Receive, store, use and transfer sources contained in Boronmeter (device used to measure boron concentration by neutron absorption).
- 6) (a) Sources S-136 and S-137 used as part of Technical Operations, Inc. gamma densitometer Model #775.
- (b) Sources S-181 and S-182 used as part of Measurements Inc. gamma densitometer Model #FM6.
- (c) Source S-171 used as part of Technical Operations, Inc. gamma densitometer Model #660.
- (d) Source X60 used as part of AECL (Whiteshell Nuclear Research Establishment) 3 beam gamma densitometer.
- (e) Source used for density measurement in Omart Corp. IMS source holder.

Items 8 and 9

All work with radioactive materials is performed under the direction of personnel listed in Item 4. Experience and training resumes for these individuals are included as Exhibits 1, 2, 3 and 4. Prior to working with radioactive materials, each new employee is given an indoctrination lecture presenting the basic principles and characteristics of radiation and its effects. This lecture includes an introduction to company administrative procedures dealing with personnel radiation protection and the control of radioactive materials. An outline of the indoctrination lecture is included as Exhibit 5. A periodic health physics training lecture is given to personnel who frequently work with radioactive materials.

Item 10

<u>Type</u>	<u>Quantity</u>	<u>Radiation Detected</u>	<u>Sensitivity</u>	<u>Use</u>
Nuclear Chicago 1152	2	Alpha Beta	0-9x10 ⁶ counts	Measuring
Victoreen THYAC III	1	Beta Gamma	0-200 mr/hr	Survey
Eberline PNR 4	1	Neutron	0-5 rem/hr	Survey
Eberline PAC 4S	1	Alpha	0-10 ⁶ CPM	Survey
Eberline RM 14	4	Beta Gamma	0-50K CPM	Monitoring
Eberline RM 15	5	Beta Gamma Alpha	0-50K CPM	Monitoring
Eberline RM 16	2	Beta Gamma	.02-200 mr/hr	Monitoring
Eberline E120	2	Beta Gamma	0-50 mr/hr	Survey
Eberline E520	3	Beta Gamma	0-200 mr/hr	Survey
Eberline E530N	2	Gamma	0-20 R/hr	Survey
Victoreen 498	2	Beta Gamma	0-1 R/hr	Survey
Victoreen RO-2	1	X-Ray Beta	0-500 mr/hr	Survey
Eberline MS 1 & 3	4	Beta Gamma Alpha	0-10 ⁷ CPM	Measuring
Nuclear Measurements CRM 51	2	Beta	0-10 ⁶ CPM	Monitoring
Eberline PM-4	1	Beta Gamma	-	Monitoring

1-1-68

Item 12

Beta gamma TLD (thermoluminescent dosimetry) badges are issued on a monthly basis to all personnel who handle radioactive materials. Neutron TLD badges are issued when applicable. TLD badge service is supplied by Teledyne Isotopes of Westwood, New Jersey. Self reading pocket dosimeters are issued to personnel working in areas where radiation levels warrant their use. Breathing zone samples will be taken using lapel samplers whenever personnel are working in restricted areas where airborne radioactivity may be present. Body burden urine samples will be collected and analyzed by either radiochemical or fluorometric means whenever breathing zone air samples indicate exposures greater than 50% MPCa in a seven consecutive day period. Whole body counting will be performed semiannually. This service is provided by Helgeson Nuclear Services of Pleasanton, California.

Item 13

Combustion Engineering's Windsor site is a 556-acre tract of land located in the township 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 cultivated for the production of broad leaf tobacco. The land area within 5 miles of the site is predominantly rural and is characterized by rolling farmlands interspersed among sizeable woodland tracts. Exhibit 7 shows the buildings and facilities presently located on the CE Windsor site.

Radioactive byproduct materials are used primarily in four buildings:

1. Building 5 - Nuclear Laboratories

The nuclear 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 radioactive materials and

Item 13 - continued

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.

All airborne waste exhausts from the building via eight individual stacks. All but two of these stacks are equipped with single banks of absolute filters (99.97 percent efficient for ≥ 0.3 micron particles). The two exceptions are the hydrogen burn-off stack (not used for by-product radioactive material) and the environment test laboratory stack. All stacks used for the exhausting of radioactive effluents are continuously monitored whenever the system is in operation.

All radioactive liquid wastes are collected and sampled prior to release from the building. The liquids are collected in several holding tanks and analyzed for gross activity. Isotopes being discharged must have an activity below MPCw. Radioactive liquid waste effluents exit the building below ground and flow to a common drain line. From the common drain they are carried to the liquid waste building, Building #6, where they are discharged into the radioactive retention and dilution system tanks. This system is described in Item 15.

2. Building 1 - Storage Building

This building is used fundamentally for the storage of packaged radioactive materials. The North-East corner of the building contains a thick concrete walled cell. This cell is used periodically for inspection and repair of radioactive test equipment. The cell is furnished with an absolute filtered exhaust system. This system is continuously monitored whenever it is in operation.

Item 13 - continued

3. Building 2 - Systems Integrity Services (SIS) Facility

This building consists of approximately 15,000 square feet of floor space. The southern half of the building is a two story structure with the second floor devoted entirely to office space, see Exhibit 8. A shielded health physics counting room is located in the South-West corner of the first floor. A 12'x30' vault is located in the center of the building. This vault is under control of health physics personnel and is used for the storage of sealed sources and other radioactive materials. The North-East corner of the facility is comprised of a concrete walled area identified as Cell 2 and an interconnecting wing identified as Building 2A. Cell #2, both the ground level and subterranean level, and Building 2A have been established as one restricted area, see Exhibit 9. The subterranean level of Cell 2 is used primarily for decontamination and repair of reactor inspection equipment. Airborne radioactive effluents from the cell are exhausted outside the building via a single bank of absolute filters. The system is continuously monitored whenever it is in operation.

The ground level of Cell #2 and 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 uncrated 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 absolute filters. One set of filters is located at the controlled zone, the other set is located just prior to the system discharge. A Continuous Air Monitor (CAM) is located between the two sets of absolute filters and is operated whenever the circulating system is in operation.

Item 13 - continued

The CAM will provide a high airborne alarm and will shutdown the circulating system if airborne radioactivity is detected past the first bank of absolute filters. Radioactive liquid wastes from Cell 2 are pumped to a retention tank system located at ground level. Disposal of these wastes are described in Item 15.

4. Building 3 - KDL Laboratory

This building consists of approximately 60,000 square feet used for the 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.

Item 14

Receipt, acquisition, ownership, possession, use, transfer, and import of all byproduct materials shall be under the control of the Nuclear Power Systems Development Department. The Vice-President, Development, has delegated to the Manager of Health Physics the responsibility to assure that all operations involving byproduct materials are performed in accordance with federal/state regulations and all other safety standards set forth in this license application. The Manager of Health Physics has the authority to halt any operation which falls outside these limits. He reports directly to the Vice-President, Development, see Exhibit 9. The Radiological Engineer is responsible for the day to day handling of radioactive materials. He reports to the Manager of Health Physics and has the authority to halt all unsafe operations in the absence of the Manager of Health Physics.

A Radiological Control Committee has been organized to perform the following functions:

- a) Evaluate proposed changes in the handling of byproduct materials for personnel safety and protection of the environment.
- b) Perform an annual audit of all operations involving byproduct materials. The committee shall submit its findings and recommendations to the Vice-President for Development.

Committee membership shall consist of:

Manager of Health Physics (Chairman)
Radiological Engineer
Supervisor of Analytical Radiochemistry
Radiological Safety Officer
One other scientist or engineer*

*This member must have at least five years of experience in the handling of radioactive materials and shall be appointed by the Vice-President for Development.

Item 14 - continued

Radiological Control Committee membership and/or Chairmanship may be revised by the Vice-President for Development without prior notification to the NRC staff.

All work with radioactive materials is controlled by a Radiation Work Permit (RWP). Exhibit 10 presents the procedure and rules applicable to the use of RWP's. These procedures and rules may be revised without prior notification of the NRC staff.

In accordance with 10CFR20.1(c) "as low as is reasonably achievable" Combustion Engineering, Inc. has invoked administrative limits for whole body exposure not to exceed 2.5 Rem/qtr. and 4.5 Rem/year. This administrative limit may be increased only with the approval of the Manager of Health Physics if in his opinion sufficient justification exists for the approval.

Combustion Engineering, Inc. conducts a 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 on-site routine sampling stations have been established as designated points for collection of quarterly atmospheric fallout samples and semi-annual soil and vegetation samples.

Radiological surveys are conducted on a routine basis in and adjacent to restricted areas. Sealed sources are inventoried and leak checked semi-annually, upon receipt and transfer, and prior to use if no leak check had been made within 6 months. If leak checks show activity greater than 0.005 microcuries, the source shall be withdrawn from service until repaired. Sources in permanent storage are excepted from periodic leak checks until just prior to being withdrawn from storage.

Item 15

All solid radioactive waste is packaged in accordance with applicable NRC and DOT requirements for shipment to a commercial waste disposal site. Combustion Engineering, Inc. presently has an agreement with Chem-Nuclear Systems, Inc. for the removal of all solid radioactive wastes from the Windsor site.

Radioactive liquid wastes from Building 5 are discharged into the radioactive retention and dilution system located in Building 6. The retention and dilution system is composed of ten 2,000 gallon hold tanks and four 5,000 gallon dilution tanks. The hold tanks fill in sequence with one overflowing into the next. Representative samples are taken from each hold tank and analyzed by the radiochemistry laboratory for gross alpha and beta/gamma activity. If the sample results indicate that the liquid is greater than 10% MPCw, per 10CFR20, a dilution factor is assigned and the liquid is transferred to one of the 5,000 gallon dilution tanks, diluted and discharged to the industrial waste drain. A 24-hour composite collector samples the industrial drain prior to its entry into the industrial waste stream, which in turn empties into the site stream and then into the Farmington River.

Radioactive liquid wastes generated in Buildings 1 and 2 are stored in hold tanks. Arrangements have been made with Chem-Nuclear Systems, Inc. to solidify, package, and remove this waste to a commercial waste disposal site.

EDUCATION:

A.S., Baltimore Junior College, 1952
B.S., Mechanical Engineering, University of Maryland, 1959

PROFESSIONAL EXPERIENCE:

Combustion Engineering, Inc., 1970 to Present
Development Department, Nuclear Power Systems
Manager, Health Physics, March 1974 to Present

Mr. Rosenthal is responsible for all health physics activities within the Development Department. He administers all NRC licenses for byproduct and special nuclear materials used by the Development Department and is designated by the NRC license as the Radiological Safety Officer and Radiation Protection Officer. In this capacity, he implements all NRC regulations to ensure compliance by the Development Department. He reviews and approves all proposed alteration, modification and additions to facilities where the use of radioactive materials are involved. He is responsible for providing health physics and radioactive material control services during all Development Department field service activities.

Supervisor, Mechanical Development, April 1970 to March 1974

Mr. Rosenthal was responsible for all activities related to mechanical development of Nuclear Steam Supply Systems. In this capacity, he supervised and directed the efforts of engineers and technicians in the planning, execution and analysis of evaluation and development programs. He was responsible for the design, installation and operation of test equipment used in the evaluation and development programs. He provided advice, consultation and recommendations in the area of technical expertise to NPS management, projects and other organizations.

Prior to assuming this position, Mr. Rosenthal was a senior staff engineer in the Nuclear Laboratories where he was responsible for the design, performance and reporting of tests to evaluate the performance and characteristics of reactor components at reactor operating conditions.

Electric Boat Company, Division of General Dynamics
Senior Nuclear Project Engineer, July 1968 to April 1970

As Senior Nuclear Project Engineer, Mr. Rosenthal was responsible for the design, procurement, test and evaluation of a submersible sea water pump motor. He was also responsible for reactor assembly of a prototype submarine reactor plant. In this capacity, he prepared installation procedures for the major reactor plant components and was responsible for the design of special handling equipment.

Refueling Director, February 1964 to July 1968

As Refueling Director, Mr. Rosenthal was responsible for the development of refueling procedures, tools and equipment to be used during refueling of submarine reactors. He personally supervised the refueling of four naval reactors.

Navy Department, Facilities Engineering Command, 1959 to 1960;
1963 to 1964

Mr. Rosenthal was responsible for technical control and execution of the Bureau's nuclear engineering research and development program. He investigated reactor designs, fuel fabrication, reactor control, radioactive waste, thermionic and thermoelectric concepts for application to existing requirements.

As a Mechanical Engineer, 1959 to 1960, Mr. Rosenthal was responsible for resolving engineering maintenance problems associated with boilers and unfired pressure vessels. He was also responsible for the preparation of economic studies of steam and electric utilities. Mr. Rosenthal performed utility conservation studies and also designed air conditioning systems.

Martin-Marietta Corporation
Reactor Systems Engineer, Nuclear Division, 1960 to 1963

Mr. Rosenthal was responsible for the design and fabrication of a radioactive waste disposal system for the processing of liquid radioactive waste. In this capacity, he performed analytical work, procured components and prepared fabrication instructions. He also performed engineering liaison duties with manufacturing organization during the construction of portable nuclear power plants. He was responsible for changes made to primary and secondary reactor systems in order to resolve fabrication and installation problems.

ACHIEVEMENTS AND PROFESSIONAL AFFILIATIONS:

American Nuclear Society

Connecticut Health Physics Society

Completed special training in Radiological Control Practices and Reactor Plant Testing

EDUCATION:

USN, Nuclear Power School, 1963
Engineering Laboratory Technician School, 1964
Engineering Laboratory Technician Refresher Course, 1965
University of Hartford Night School, Math and Physics, 1973

PROFESSIONAL EXPERIENCE:

Combustion Engineering, Inc., 1972 to Present
Development Department, Power Systems Group
Radiological Safety Engineer, Accountability Engineer

Mr. Limbert has the responsibility for advising and planning of the Health Physics programs for the Development Department reactor servicing and fuel development groups. He is also in charge of training of all radiation workers and supervising the routine radiation protection requirements of the Nuclear Regulatory Commission licenses. Mr. Limbert has the added responsibility for Nuclear Fuel Accountability.

Senior Chemistry Technician and Radiological Safety Assistant,
1970 to 1972

Mr. Limbert had responsibility for supervising and administering the health physics programs for the Nuclear Laboratories under the direction of the Radiological Safety Officer. He was also a Senior Technician in the Analytical Chemistry Group.

U. S. Navy, 1961 to 1970

Mr. Limbert enlisted in the U. S. Navy in 1961 and was trained as a steam mechanic. He spent a year on a conventionally powered submarine. He was then enrolled in the nuclear power training program and was trained to operate U. S. naval nuclear power plants. The training course lasted one year. Upon completion of this course, he was trained as an engineering laboratory technician. The training included chemistry and health physics courses of three months duration. Mr. Limbert then spent two years on two nuclear powered submarines. His duties included reactor plant operation, engineering laboratory technician and leading engineering laboratory technician in charge of health physics and chemistry for the entire reactor plant.

In 1966, Mr. Limbert was transferred to the Naval Prototype in Windsor, Connecticut, as an instructor. He taught and trained power plant operators and engineering laboratory technicians in chemistry, health physics and plant operations. From 1968 to 1970, Mr. Limbert was Leading Engineering Laboratory Technician at the Windsor site and as such was responsible for all chemistry and health physics operations for the U. S. Navy at the Windsor site.

ACHIEVEMENTS AND PROFESSIONAL AFFILIATIONS:

Connecticut Chapter - Health Physics Society

EDUCATION:

U. S. Navy, Nuclear Power School, 1974
NUS, Introduction to Nuclear Power - Parts I, II, III, 1977
Introduction to Environmental Protection, 1977

PROFESSIONAL EXPERIENCE:

Combustion Engineering, Inc., 1975 to Present
Development Department, Power Systems Group
Health Physics Technician

Provide routine health physics surveillance of research and development areas involving enriched fissile, source and by-products materials. Evaluate surveillance data, and institute the necessary control procedures to ensure the compliance with State and Federal regulations. Evaluate controlled areas and determine safe working conditions for personnel. Maintain records of personnel exposure, surveys and other pertinent materials as required.

U. S. Navy

Mr. Moreau served for six months at the Nuclear Power training unit, Windsor, Connecticut. Training was received in several Health Physics related areas such as meter and smear surveys, monitoring airborne activity, decontaminating equipment, establishing controlled areas and keeping records of personnel exposure. The training also covered areas involving emergency procedures for: spills, liquid as well as solid, and the procedures necessary to limit personnel exposures.

EDUCATION:

USN, Nuclear Power School, 1970 - 1971
USN, D2G Reactor Design School, 1973

PROFESSIONAL EXPERIENCE:

Combustion Engineering, Inc., 1977 to Present
Development Department, Nuclear Power Systems
Senior Health Physics Technician, Assistant Nuclear Materials
Accountability Engineer

Mr. Clark is responsible for establishing safety guidelines and directing personnel working with radioactive by-product and special nuclear materials. This includes providing health physics supervision and guidance for the repair and modification to reactor servicing equipment, work on irradiated test samples, and the production of experimental fuel pellets.

Mr. Clark is also the assistant to the nuclear materials accountability engineer and is responsible for the control of all special nuclear materials entering and leaving the Development Department.

Numanco Inc., 1975 - 1977
Senior Health Physics Technician

Mr. Clark started as a junior health physics technician and went through an on the job training program at the Quad Cities Nuclear Generating Station during a refueling and maintenance shutdown. He was then assigned to the Millstone Point Station where he worked in both Units I (BWR) and Unit II (PWR) during normal operation and maintenance shutdown conditions. Responsible for routine and special surveys of contaminated areas, radiation and airborne activity. Performed Isotopic analysis of survey samples of NaI and GeLi counting systems. Assisted in the calibration of personnel monitoring equipment and radiation survey instruments. Responsible for the surveillance and documentation of low level radioactive shipments.

U. S. Navy, 1969 - 1975
Electricians Mate First Class (Nuclear)

Mr. Clark entered the Navy in 1969 and was trained under the USN's nuclear training program. He then qualified as a nuclear electric plant operator and maintenance man on board the USS Long Beach. From 1973 - 1975, he was assigned to the new construction crew of the USS South Carolina. He was responsible for following various phases of reactor systems construction and testing, fuel loading, startup testing, shielding surveys and the training of plant operators.

RADIATION WORKERS
TRAINING LECTURE SERIES

Purpose and Scope

I. Purpose

The purpose of this lecture series is to acquaint persons who work with radioactive material with the basic principles and characteristics of atomic radiation and its effects.

II. Scope

This series will cover:

- A. A very basic introduction to the type and make-up of atomic particles including size, energy, and isotopic properties of atoms and their component parts.
- B. A discussion of what radioactivity is, how it produces radiations, and the sources of radioactivity and their effects on matter.
- C. How radioactivity and radiation hazards affects the body.
- D. Personnel protection and monitoring.
- E. Handling and usage of radioactive materials.

NHP-74-045
October 17, 1975
Page 1 of 13

93241

H. P. TRAINING LECTUREINTRODUCTION TO RADIATION THEORYATOMIC STRUCTURE

Basic Parts

1. Nucleous

The nucleous is the central portion of an atom and makes up about 99.9% of the weight of an atom. The nucleous is made up of various numbers of smaller particles - Neutrons and Protons.

2. Electrons

Electrons are very small charged particles that orbit around an atom.

3. Protons

A proton is a small charged particle about 1835 times as large as an electron.

4. Neutrons

A neutron is a particle which is about the same size as a proton but has no charge.

Relationship Between Basic Parts

The number of protons in a nucleous determines the properties of the atom. For example, hydrogen has one proton in the nucleous, argon has 18 protons in the nucleous, uranium has 92 protons. Therefore, we say that the number of protons determines what element we have.

Any atom tends to be electrically neutral. In order to be electrically neutral there must be equal numbers of positive charges (protons) and negative charges (electrons). As the atomic weight of the elements increases, the number of electrons also increase. They add onto an atom in levels or shells in the following manner. First Level 2 electron max. Second level 18 max. Third level 32 max. Etc. The further away from the nucleous the more loosely bound these electrons are. Therefore, the less energy it would require to remove one of these electrons from the atom.

If in some way one was removed, electrons from the outer shells would drop into the vacated position, but would give up energy in the process. This energy is then radiated away from the atom. This energy release is called x-ray radiation.

The elements are defined by the number of protons in the nucleus, but the nucleus also contains neutrons. The atoms of an element can contain different numbers of neutrons. For instance, most atoms of uranium contain 92 protons and 146 neutrons, but the number of neutrons can vary from 135 to 148. This does not alter the fact that the element is still uranium. Only the weight can vary slightly. The atoms which contain more or less neutrons are called isotopes of uranium. Different isotopes of the same element have different nuclear properties (example) U^{235} (92 proton, 143 neutron) fission when a neutron is added. But if a neutron is added to U^{238} , the nucleus undergoes a change and the atom ends up becoming Pu^{239} .

Another example of isotopic differences as influenced by nuclear properties is how different isotopes tend to break down or in other words decay. Some elements are naturally unstable because they have too much energy.

Definition of Radioactivity

Radioactivity is nothing more than the spontaneous breakup or disintegration of an unstable nucleus which results in the emission of radiation. Breakup of, and emission from, an unstable nucleus is called radioactive decay. When we talk about quantity of radioactivity we use some terms you might not be familiar with. First is DPM or disintegrations per minute, the second is curie. The relationship between these two terms is this: 1 curie = 2.2×10^{12} DPM. This is equivalent to 1 gram of radium.

Disintegration is simply the change in a nucleus and can involve more than one process, fragmentation, or simple energy loss.

Another is half-life. This is only a way of stating how long a nuclide will remain radioactive. For example, if a group of similar nuclides are radioactive, they all won't disintegrate at the same time. Theoretically some will not disintegrate at all. It has been proven though that over a given period of time, a certain number will have de-energized or disintegrated. This is a natural process and the half-life concept puts a random natural process into terms that are more meaningful.

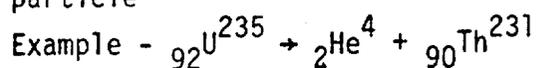
EXAMPLE I^{131} 8 days draw curve

Types of Radiations

- Gamma - This is a release of energy in the form of a photon, it has no mass and no charge.
- Beta - This is the ejection or emission from the nucleus of a very small particle of about the same weight as an electron but much more energetic and a negative electrical charge.
- Alpha - This is an emission of a relatively heavy particle which consists of two neutrons and two protons and a charge of +2 due to the protons included.
- Neutron - Neutrons are emitted from the nucleus at high energy and contain no charge but some mass.

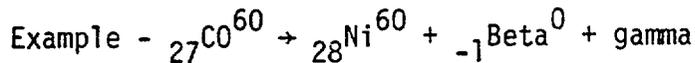
Production of Radiation

- Alpha - α is produced by an unstable nucleus breaking apart. This usually happens in heavier nuclides rather than lighter ones. The alpha particle

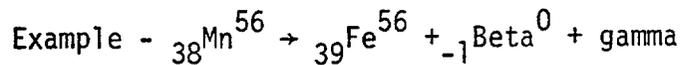


is ejected from the nucleus at high energy and travels completely out of the atom. An alpha particle is noted ${}^4_2\text{He}$ (The notation for helium) because the particle weighs the same but has no electrons.

Beta - β radiation is a little harder to explain. This is a negative particle that is ejected from a positive nucleus. One possible explanation is this: A neutron is converted to a proton and beta particle and the beta particle is then emitted. This theory is held up because of the results seen.



Gamma - Gamma is produced in almost all decay. This is the easiest way for a nucleus to rid itself of excess energy and thus become more stable. If, for example, a nuclide emits a beta particle but is still in an excited state, a gamma will be emitted also.



Neutron- Neutron radiation is produced principally by fissioning of heavy nuclides such as uranium or plutonium. There are, however, a few nuclides which spontaneously emit neutrons. One of these is ${}_{35}^{87}\text{Br} \rightarrow {}_0^1\text{n} + {}_{35}^{86}\text{Br} + \text{gamma}$ type of radiation is used to produce neutron test sources.

Interaction of Radiation with Matter

Alpha - Alpha particles lose energy mainly by interaction with the electrons orbiting the electron out of orbit leaving the atom positively charged. Ionization is the drawing away of electrons from an atom because of the electrical positive charge of the alpha particle ${}^4_2\text{He}$. The alpha particle has a great deal of energy so it takes a lot of interaction to stop it. On the good side, an alpha will react with almost anything, in fact it can be stopped by a sheet of paper.

Beta - Beta radiation reacts with matter in the form of collision with electrons which are about the same size. Therefore, it takes usually only one or two collisions to stop. If, however, a beta collides with a heavy nucleus, it will simply bounce away without losing much energy (inelastic scattering). Because of this, beta has a tendency to travel further than an alpha. It usually takes about 1/8 to 1/4 of an inch of metal to stop completely all beta.

Gamma - Photons or gammas interact with matter in three major processes;

1. Photoelectric effect - This occurs at the lower energy ranges and is very simple. The absorption of the gamma by an electron which thus leaves the atom to ionize something.
2. Compton effect or Compton scattering - This is basically the same as photoelectric effect except the gamma has more energy. This can be absorbed by the electron and a lower energy gamma goes off at an angle to react further.
3. Pair production - Very high energy gammas pass through the nucleus field of an atom and is converted to an electron in position (+ charged electron). These two particles then go off at an angle to each other. The positron will exist until it comes in contact with an electron and then they will annihilate themselves to form two or more intermediate energy gammas.

These three interactions need a lot of electrons and large massive nuclides to interact. Therefore, because no electrical charge is involved, a gamma will continue in a line until it hits an atom. This is another natural occurrence and operates on a probability of collision. This means that some gammas will always make it through a substance.

Example - 100 gammas → 2" lead 10 gammas

Neutrons - Neutrons interact with matter on a collision basis, each collision will cause a loss of energy. The best means of stopping neutrons radiation is with matter of roughly the same mass (example H₂O). This allows for elastic scattering or a ping pong ball being thrown into a bunch of ping pong balls. If a heavy atom is hit, the effect is like hitting a bowling ball with a ping pong ball, it just bounces away at approximately the same energy.

Example: 100 neutrons 10" of lead 90+ neutrons
100 neutrons 10" of water 10 neutrons

BIOLOGICAL HAZARDS OF RADIATION

In order to discuss the hazards of radiation, we must first define the terms used in a discussion of radiation.

1. Roentgen - That amount of radiation which will deliver 83 ergs per gram of air of X or gamma radiation or 1 esu of either charge.
2. Rem - Biological damage equivalent to one roentgen.
3. Milli Rem- 1/1000 of a rem.

The next item of interest is how radiation affects living tissue. Radiation causes ionization of matter as was discussed earlier this is the forming of electrically charged particles which give up energy by getting rid of their charges to atoms and forming ion pairs which alter the chemical or physical properties of an atom or molecule. If for instance this atom or molecule was part of a living cell, then that cell could be affected in any of several ways.

1. If the affected molecule was only a water molecule in a cell, then the result would be deposition of energy in the form of heat. Since cells require a delicate balance of heat, this could possibly kill the cell.
2. Another way of cell injury is if the affected molecule is a part of the cell coating. This would again cause energy to be absorbed but since the coating or lining is fairly insensitive to changes, no damage might occur. However, if the amount of radiation was high, then this lining or coating could be ruptured and the cell would die.
3. If the affected area was in the core or nucleus of the cell which houses the genetic memory of the cell, then the cell could reproduce itself in such a manner that would be harmful to other cells around it or poison them. The damaged molecule could, also, be broken and then reform in a jumbled form and reproduce itself at a faster rate or a slower rate or an erratic manner.

In all cases, if a cell is killed by radiation, then the harm is lessened for the reason that if a cell dies then there are millions of cells to take its place and no permanent damage is done. If, however, a cell is damaged and not killed, then the harm is increased due to a cell that is changed and allowed to reproduce itself. It could cause damage to the area it is in. This would delay the effects and returning to normal would take longer.

We must now look at the larger picture of radiation effects in the human body.

1. Radiation Sickness - 1 to 5 days

- a. General - headaches, vertigo, debility or inactivity, abnormal taste and smell.
- b. Gastric, intestinal - nausea, vomiting, diarrhea
- c. Cardiovascular - low blood pressure, shortness of breath
- d. Blood - red and white blood cell loss.
- e. Psychological - irritability, insomnia, fear

This is the result of 150 rem whole body dose. If same amount of radiation with only part of body exposed, then the symptoms are much less severe.

2. Loss of tissue and renewal

Only tissue and cells whose primary function is to propagate more cells such as blood forming organs, mucus membranes, skin, hair, reproductive organs, lenses of eyes, are affected in this way. What happens is that an extensive amount of cells are killed by direct interaction of radiation and indirect toxic activity by damaged cells. The result is that no new cells are produced and some are normally dying, therefore, there is an actual loss of tissue. These losses, normally, always return if there is enough healthy tissue left to seed the area.

3. The cells of the body which are formed as a child or adolescent and do not reproduce after that are less radiosensitive and require huge doses to cause any damage (nerves, bone, muscles, connective tissue). That is why no one is allowed to receive occupational exposure until age 18. The bad part of this is that, once damaged, these parts of the body seldom if ever are repaired completely so the damage is permanent.

The amount of dose needed to cause these various types of damage are:

<u>Dose</u> <u>(within a factor of 2 or 3)</u>	<u>Effects and Conditions</u>
10 r	Few or no detectable effects.
100 r	Mild irradiation sickness in part of the organism; no deaths.
1000 r	Necrosis of progenitive tissues; 100% death in 30 to 60 days.
10,000 r	Disruption of central nervous system function; death within minutes or hours.
100,000 r	Spastic seizures; death within seconds; sperm motility stopped.

PERSONNEL PROTECTION & MONITORING

Thus far in this course we have talked about what radiation is and how it affects us. We will now try to explain how to protect yourselves and the means and equipment used to do this.

Protective Clothing

The purpose of protective clothing is not to protect the individual from radiation but to protect him from contamination.

Shoe covers - cotton and rubber

Lab Coats and Coveralls - Cotton

Gloves - Rubber and cotton

Head Covers - Cotton

Putting on can be done outside closed off area. Depending on levels of contamination, the joints or meeting places of the separate pieces should be taped. The heavy wear areas (feet and hands) should have a double layer. If liquids are used, then the outer layer should be rubber.

Removing - Start with head gear then remove all tape, then remove outer pair of gloves to prevent contaminating street clothes. Next remove coveralls turning them inside out as you remove them. The shoe covers are then removed insuring that you don't put a clean foot on the contaminated area. The foot should be monitored before placing on a clean area. The last item to be removed is the gloves.

Personnel Monitoring Devices

1. TLD Badges
 - 1.1 TLD Badges (Thermoluminescent Dosimeters) are used to monitor accumulated Radiation Exposure.
 - 1.2 Badges shall be worn in all radiation areas or other controlled areas as posted.
 - 1.3 Ensure that you are wearing the badge assigned to you. Generally, your last name should appear in the badge window. There may be some exceptions. If in doubt, check with Health Physics.
 - 1.4 Badges are stored in a badge rack located in the north wing of Building 5 near the Chemistry Lab, outside the wire cage located in Building 16, and in the front entry way of Building 2. They should be returned to the rack when not in use. No badge should be removed from the site.

- 1.5 Badge is worn for a period of one month. All badges shall be placed in the rack at the end of the work day on the last day of each month to allow for changing the TLD's.
- 1.6 Badges shall be worn at chest level.
- 1.7 TLD Badges consist of a teflon sheet impregnated with lithium fluoride and marked with an identification code for each person. The radiation that hits the badge causes the lithium fluoride to store the energy. When the badge is heated, this energy is released in the form of light. The light is proportional to the amount of radiation absorbed. The holder has metal shields which will differentiate between beta and gamma. On the back of some, there is a separate chip which is used to monitor for neutrons.

TLD Badges have holders of different colors. The color means:

- Blue - Normal whole body beta gamma
- Red - Whole body beta gamma and neutrons
- Green - Area monitoring
- Yellow - HP emergency personnel
- Black - Visitors, spares, and special purpose

The packet should be removed from its plastic holder by Health Physics personnel only.

- 1.8 If your badge gets damaged or lost, report it to Health Physics --
IMMEDIATELY!!!

2. Dosimeters

These devices are used when there is a possibility of receiving a large dose in a short time. It is used for a quick check to give a rough estimate as to how much you are absorbing. This is used to limit time in a hot area.

3. Personnel Air Samplers

These air samplers are attached to the collar and use a pump to sample the air you are breathing. This is used in areas where there is a possibility of airborne contamination. The pump pulls air through a filter and the filter is counted. This gives us an actual level of contamination being deposited in lungs.

4. Smears

(Demonstrate)

5. Meters for Personnel Monitoring

1. RM-15 alpha
2. RM-15 beta
3. RM-12-A (manufacturing)
4. RM-2
5. RM-16

6. Area Survey Instruments

1. Thyac III - Beta gamma
2. Victoreen Neutron Meter
3. PM-4 (Neutron Meter)
4. E-120

7. Whole Body Counting

- 7.1 Explain Principle
- 7.2 Uranium W.B.C. Method and frequency
- 7.3 ByProduct W.B.C. Method and frequency

HANDLING AND USEAGE OF RADIOACTIVE MATERIAL

I. By-product Material

Define (any non-fissionable radioactive material).

A. Transportation

1. Transported only to and from Licensed NRC facilities
2. Transported only with special packaging
3. Transferred and received only by licensed personnel
4. Only materials and amounts listed on license

B. Storage

1. Must be stored in areas posted
2. Containers must be leak tight
3. Containers must provide shielding if dose is noted, if not then the area must be shielded to minimize dose to personnel.

C. Handling

1. Used only in areas where adequate protection is available.
2. Used only by personnel who are trained to work with radioactive material to the extent that they can handle is safely.
3. Must be used only under supervision of trained Health Physics personnel named NRC license.

II. Special Nuclear Material

Define - (Fissionable Material)

A. Transportation

1. Transported to licensed facilities different license than by-product
2. Special packaging and labeling.

B. Storage

1. Only in authorized areas. Criticality Area (Define)
350 gm U²³⁵ monitored

Alarm system

2. Twelve feet between areas
3. Areas in Building 5 - (Map)

C. Maximum Amount

1. Criticality Area
2. Building Labs and Manufacturing
3. Site
4. Enrichment

D. Accountability

E. Contamination Control

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RECORD OF REVISIONS

No.	Date	Pages Involved	Prepared by	Approval	Approval
1	10/17/75	13	J. M. Limbert		

NHP-74-045

PROCEDURE
FOR
CONTROL AND CALIBRATION
OF RADIATION DETECTION DEVICES

00000-NLE-054

Combustion Engineering
Development Department
Windsor, Connecticut

Prepared by: *[Signature]* Date: 2-23-78

Approved by: *Joseph P. Roman* Date: 2-23-78
Laboratory Supervisor

Approved by: *W.A. Rundle* Date: 2/23/78
Manager, Electrical and
Instrumentation Development

Original Issue Revision No.: 3
Date: 7-30-74 Date: 2-23-78

Record of Changes & Revisions

Revision	Change	Affected Pages	Description	Date of Approval
1	1	1	Nuclear Labs changed to Development Dept.	
1	2	1	EDT changed to ED&S	
1	3	4	Section 4.5.2 added	
1	4	5	Section 4.6.2 added	
1	5	5	Section 4.7.2 added	
1	6	6	Section 4.11.2 added	
2	7	5	Changed Section 4.9 from RM-2 to Remote Area Monitor System	
3	8	Bldg. 5 Sheet	Radiation Counting System Model MS-1/MS-3	
3		6	4.11 Radiation Counting System MS-1/MS-3	
3	9		Bldg. 2 sheet added	
3	10	3	Section 4.3 Victoreen 498 added	
3		Bldg. 5 Sheet	Victoreen 498 added	
3	11	Bldg. 5 Sheet	Deleted Neutron Survey Meter Model 488A	
3	12	6	Section 4.13 added	
3	13	7	Section 4.14 added	
3	14	7	Section 4.15 added	
3	15	7	Section 4.16 added	

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1.0 SCOPE

This procedure is established to assure the calibration and control of the radiation detection devices at Nuclear Products Manufacturing and the Development Department. Calibration shall be against certified standard radiation sources which have a known valid relationship to national standards.

2.0 DEFINITIONS

2.1 Standard Radiation Source

An instrument or master source having a known valid relationship to the National Bureau of Standards or other recognized national authority where such standards exist. These standards shall be maintained by the Health Physics Group in Building 5. Records shall be kept showing traceability to NBS standards. All sources will be available on request from the Health Physics Group - Building 5.

2.2 Radiation Detection Device

Any instrument used to measure or test for signs of alpha, beta or gamma type radiation.

2.3 Calibration Check

A comparison between the radiation device and a known standard of at least two points, but no more than five points. The range will be from zero to full scale.

3.0 TASK ASSIGNMENT

3.1 ED&S Instrument Laboratory

ED&S Instrument Laboratory shall be vested with the following responsibilities:

- 3.1.1 Calibration -- shall be performed in accordance with the requirements for accuracy and frequency as listed in Appendix A. Calibrations shall be performed on individual instruments as outlined in Section 4.0.
- 3.1.2 Maintenance -- Instruments shall be cleaned and repaired as necessary in order to maintain their calibration accuracy.
- 3.1.3 Identification -- Each instrument shall be identified with an instrument number, as established by ED&S Instrument Laboratory.

3.1.4 Records

3.1.4.1 Records of Radiation Detection Devices - Individual records of calibration of radiation detection devices shall be maintained and shall include the following:

- a) Instrument Type
- b) Manufacturer
- c) Instrument Number
- d) Location
- e) Standard Used
- f) Required Accuracy or Efficiency
- g) Calibration Cycle
- h) Date Calibrated
- i) Next Date Due for Calibration
- j) Acceptability
- k) Technician

All records will remain on file in the ED&S Instrument Laboratory for at least two years.

3.1.5 Status of Instrumentation -- All radiation detection devices requiring calibration will have a calibration sticker or rejected sticker affixed to it, indicating the current status of acceptability of the instrument. If a radiation detection device does not require calibration, a sticker stating NO CALIBRATION REQUIRED will be affixed.

3.1.5.1 In the event that an instrument does not meet the requirements of calibration as outlined in this procedure, a rejected sticker will be affixed to it and the ED&S Instrument Laboratory technician will notify the Health Physics Group in Building 5 or Building 17.

3.2 Health Physics Group, Building 5

3.2.1 Records of Standards -- A list of standards sources will be on file and maintained by the Health Physics Group in Building 5. This list shall contain the type of source, serial number and radiation disintegrations per minute.

4.0 CALIBRATION PROCEDURES

4.1 Nuclear Chicago Radiation Counter

4.1.1 Calibration shall be performed with both alpha and beta sources. Calibration checks shall be performed daily by

the operator. Sources will be placed in the counter and counted for a minimum of five minutes. Readings will show an efficiency for alpha detection of not less than 45 percent; for beta, not less than 48 percent.

4.1.2 Formula for determining efficiency:

$$\frac{\text{cpm}}{\text{dpm}} \times 100 = \% \text{ efficiency}$$

- a) cpm - counts per minute
- b) dpm - disintegrations per minute

4.2 Alpha Scintillation Counter LASS-1/SAC-4

4.2.1 Calibration shall be done using a standard disc type alpha source. Place the source in the counter and allow it to count for a minimum of ten minutes. Determine the efficiency by using the formula in Section 4.1.2. The efficiency shall be no less than 30 percent. Remove the source and allow the counter to count again for 10 minutes to determine any background counts. Background counts shall not exceed .3 cpm. Make any adjustments if necessary.

4.3 Thyac III/Victoreen 498

4.3.1 Calibration shall be done using a standard beta/gamma source (Cesium 137). Place the center of the probe on the centerline of the source at the specified distances. The probe shield should be closed. Set the meter response to slow and allow one minute for the meter to stabilize. Readings shall be as follows:

At 10 cm from the source, the meter will read 38.0 mr/hr.

At 20 cm from the source, the meter will read 9.5 mr/hr.

At 50 cm from the source, the meter will read 1.52 mr/hr.

At 100 cm from the source, the meter will read .38 mr/hr.

At 150 cm from the source, the meter will read .17 mr/hr.

Readings shall be accurate to within + 10 percent of full scale for each range. Make adjustments if necessary.

4.4 Gieger Counter E-120/E-520

4.4.1 Calibration shall be done using a standard beta/gamma source (Cesium 137). Place the center of the probe at the specified distances along the centerline of the source. The probe shield should be closed. Allow one minute for stabilization. Readings shall be as follows:

At 10 cm from the source, the meter shall read 38.0 mr/hr.

At 20 cm from the source, the meter shall read 9.50 mr/hr.

At 50 cm from the source, the meter shall read 1.52 mr/hr.

At 100 cm from the source, the meter shall read .38 mr/hr.

Readings shall be accurate to within + 5 percent of full scale for each range. Make adjustments if necessary.

4.5 Radiation Monitor RM-15 A/B and RM-14

4.5.1 Calibration shall be done using the standard disc type alpha or beta source. The source used will depend upon the type of detection used with the monitor. Place the center of the probe on the source and allow instrument to count for a minimum of three minutes. Use the formula in Section 4.1.2 to determine efficiency. The efficiency of alpha probes shall be no less than 28 percent; for beta probes, not less than 45 percent. Make adjustments if necessary.

4.5.2 Alpha detection probes shall be individually identified and labeled with proper operating voltage determined by calibration curve hereinafter referred to as plateau.

4.6 Radiation Monitor RM-3C

4.6.1 Calibration shall be done using the standard disc type alpha source. Place the center of the probe on the source and allow it to count for a minimum of three minutes. Determine the efficiency by the formula in Section 4.1.2. The efficiency shall be no less than 28 percent. Make adjustments if necessary.

4.6.2 Alpha detection probes shall be individually identified and labeled with proper operating voltage determined by calibration curve hereinafter referred to as plateau.

4.7 Alpha Counter PAC-4S

4.7.1 Calibration shall be done using the standard disc type alpha source. Place the center of the probe on the source and allow it to count for a minimum of three minutes. Determine the efficiency by the formula in Section 4.1.2. The efficiency shall be no less than 28 percent. Make adjustments if necessary.

4.7.2 Alpha detection probes shall be individually identified and labeled with proper operating voltage determined by calibration curve hereinafter referred to as plateau.

4.8 Rad-Gun

4.8.1 Calibration shall be done according to the manufacturer's manual — Victoreen, "Operating and Maintenance Instructions Rad-Gun Model AGB-10KG-SR".

4.9 Remote Area Monitor System

4.9.1 Calibration shall be done using the standard source, radium button #404. Using source holder designed for Building 5, expose the detector assembly to a radiation field within the first decade. Adjust zero until meter is reading correctly. Expose the detector to a radiation field within the top decade. Adjust the span control until the meter is reading correctly. Repeat until no further adjustments are necessary.

4.10 Radiation Monitor RM-12A

4.10.1 Calibration shall be done using the standard source radium button #404. Each monitor shall be marked on the front of the meter face as follows. Draw one line 3-1/32 inches from the side of the case and another line 3-3/8 inches from the top of the case. Place a white dot where these lines intersect. This dot will be the centerline for all measurements. Readings shall be as follows:

At 2-11/16 inches from the dot, the meter will read 5 mr/hr.

At 5/16 inches from the dot, the meter will read 10 mr/hr.

Readings shall be accurate to within ± 7 percent of full scale.

4.11 Radiation Counting System MS-1/MS-3

- 4.11.1 Calibration shall be done using standard disc type alpha and beta sources. Instruments are equipped for both alpha and beta detection probes. Place the source under the proper detector and allow the counter to count for a minimum of five minutes. Determine the efficiency by formula in Section 4.1.2. The efficiency of alpha probes shall be no less than 32 percent; for beta probes, not less than 45 percent. Make adjustments if necessary.
- 4.11.2 Alpha detection probes shall be individually identified and labeled with proper operating voltage determined by calibration curve hereinafter referred to as plateau.

4.12 Radiation Monitor RM-16

- 4.12.1 Calibration shall be done using the standard source radium button #404. A white dot shall mark the centerline of the detector probe. All measurements will be taken from this dot. Readings shall be as follows:

At 5 inches from the dot, the meter will read 5 mr/hr.

At 3-3/16 inches from the dot, the meter will read 10 mr/hr.

At 2-3/16 inches from the dot, the meter will read 18 mr/hr.

Readings shall be accurate to within \pm 10 percent of full scale. Make adjustments if necessary.

4.13 Radiation Monitor E-530N

- 4.13.1 Calibration shall be done using a standard beta/gamma source (Cesium 137). Place the center of the probe at the specified distances along the centerline of the source. The probe shield should be closed. Allow one minute for stabilization. Readings shall be as follows:

At 5 cm from the source, the meter shall read .1R.

At 10 cm from the source, the meter shall read .04R.

At 20 cm from the source, the meter shall read .015R.

Readings shall be accurate to within ± 5 percent of full scale for each range. Make adjustments if necessary.

4.14 Ion Chamber RO-2

4.14.1 Calibration shall be done using a standard beta/gamma source (Cesium 137). Open chamber and place the unit at specified distances along the centerline of the source. Allow one minute for stabilization. Reading shall be as follows:

At 10 cm from the source, the unit shall read 38.0 mr/hr.

At 20 cm from the source, the unit shall read 9.50 mr/hr.

At 50 cm from the source, the meter shall read 1.52 mr/hr.

At 100 cm from the source, the meter shall read .38 mr/hr.

Readings shall be accurate to within ± 5 percent of full scale of each range checked. Make adjustments if necessary.

4.15 Portal Monitor

4.15.1 Calibration shall be done weekly using Cesium Source Serial #32077. Place source on inscribed mark for each channel. Adjust the sensitivity of each counter module so an alarm condition occurs. Operator will log date when above check was made.

4.16 Controlled Air Monitor System CRM-51M

4.16.1 Calibration shall be done weekly using Cesium Source Serial #32077. Install source in place of filter paper for a minimum time of one minute. Note date and source number on chart paper.

BUILDING 2

	<u>Lab. Freq.</u>	<u>Qty.</u>
Portal Monitor	Weekly by Operator	1
Controlled Air Monitor System CRM 51M	Weekly by Operator	2
Alpha/Beta Counter Nuclear Chicago	A - 45% Eff. B - 48% Eff. Daily by Operator	1

BUILDING 5

		<u>Lab. Freq.</u>	<u>Qty.</u>
Alpha/Beta Counter Nuclear Chicago	A - 45% Eff. B - 48% Eff.	Daily by Operator	1
Remote Area Monitors	+ 10% F.S.	3 mo	10
Radiation Counting System Model MS-1/MS-3	A - 35% Eff. B - 45% Eff.	3 mo	4
Ion Chamber Model RO-2	+ 5% F.S.	3 mo	1
Radiation Monitor Model RM-15 (A)	28% Eff.	3 mo	3
Radiation Monitor Model RM-15 (B)	45% Eff.	3 mo	2
Survey Meter Model Thyac III	+ 10% F.S.	3 mo	2
Alpha Counter Model PAC-4S	28% Eff.	3 mo	1
Geiger Counter Model E-120	+ 5% F.S.	3 mo	2
Radiation Monitor Model RM-16	+ 5% F.S.	3 mo	2
Radiation Monitor Model RM-14 (B)	45% Eff.	3 mo	4
RAD-GUN	+ 10% F.S.	3 mo	1
Neutron Monitor Model PNR-4	+ 8% F.S.	-	1
Radiation Monitor E-530N	+ 5%	3 mo	2
Victoreen 498	+ 10% F.S.	3 mo	2
Eberline E-520	+ 8% F.S.	3 mo	3

BUILDING 17

<u>Instrument</u>	<u>Accuracy</u>	<u>Cal. Freq.</u>	<u>Qty.</u>
Alpha Scintillation Counter Model IASS-1	32% Eff.	3 mo	2
Radiation Monitor Model RM-3C	28% Eff.	3 mo	2
Radiation Monitor Model RM-12 A	<u>±</u> 7% F.S.	3 mo	10
Alpha Counter Model PAC-4S	28% Eff.	3 mo	1
Survey Meter Model Thyac III	<u>±</u> 10% F.S.	3 mo	2
Geiger Counter Model E-120	<u>±</u> 5% F.S.	3 mo	2
Eberline SAC 4	35% Eff.	3 mo	1

BUILDING IDENTIFICATION

- 1 STORAGE
- 2 NUCLEAR TEST BLDG.
- 3 KDI LABORATORY
- 3A KDI OFFICE
- 4 COMBUSTION DIVISION, ENG. & ADM.
- 5 NUCLEAR POWER DEPT.
- 6 HOT WASTE VAULT
- 6A FACILITIES ENGINEERING & SERVICES
- 7 PUMP HOUSE & BOILER HOUSE
- 7A CENTRAL RECEIVING
- 8 MAIN GUARD HOUSE
- 9 COOLING TOWER
- 10 SEWAGE PLANT
- 11 FUEL DUMP HOUSE
- 12 NUCLEAR ENGINEERING & PHYSICS
- 14 CATERINA ERCT & PROD. PLAN. DEPTS.
- 15 FACILITIES ENGINEERING & SERVICES
- 16 NUCLEAR ENGINEERING
- 17 FUEL FABRICATION
- 18 REACTOR TEST FACILITY
- 19 CORPORATE ADMIN. FINANCE, COMBUSTION
DEPT. & INDUSTRIAL GROUP
- 20 FACILITIES ENGINEERING & SERVICES
- 21 NUCLEAR MANUFACTURING WAREHOUSE
- 22 COMBUSTION DIVISION OFFICE AND SIMULATOR

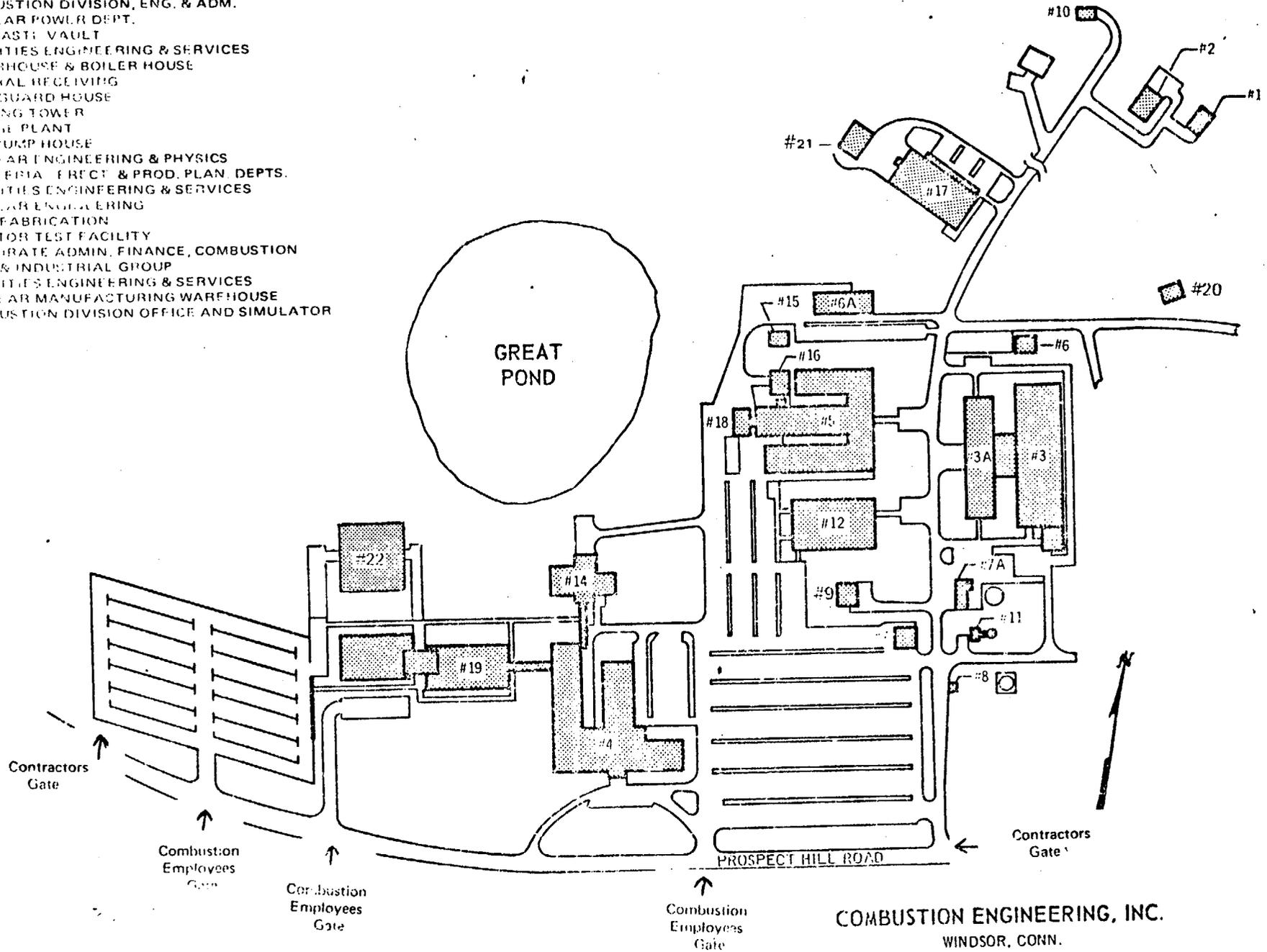
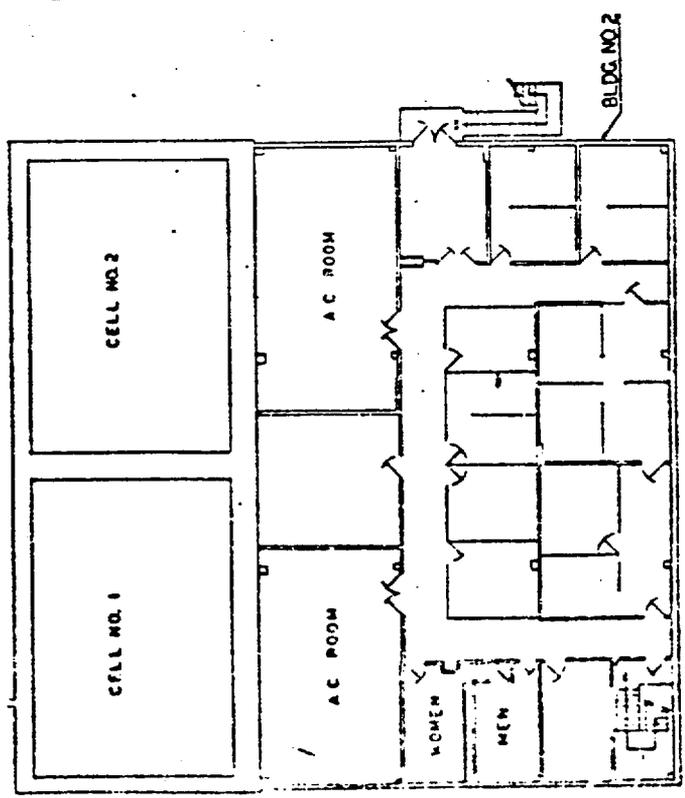


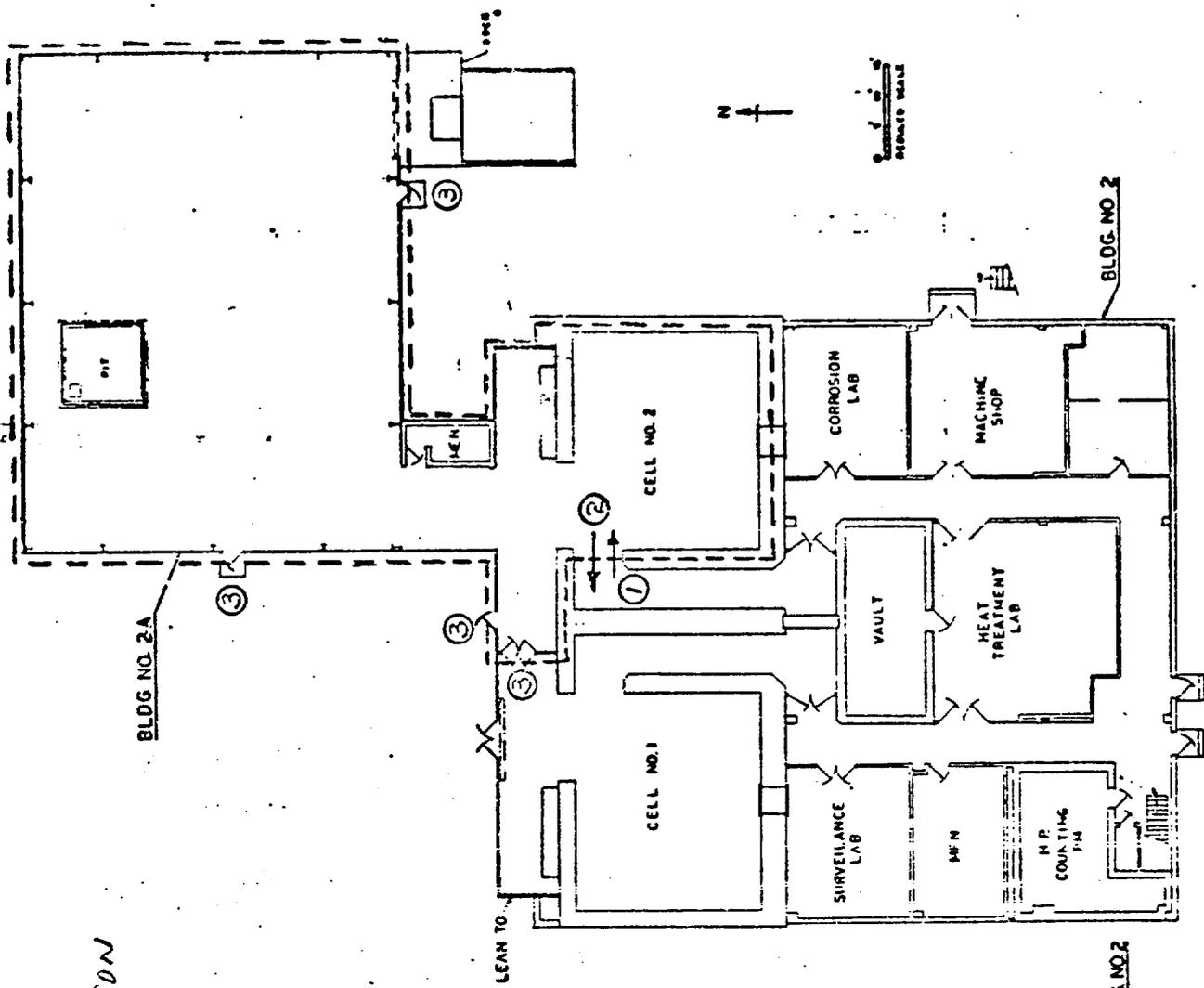
EXHIBIT 7

COMBUSTION ENGINEERING, INC.
WINDSOR, CONN.

- RESTRICTED AREA BOUNDARY
- ① NORMAL ENTRANCE
- ② NORMAL EXIT & FRISKER STATION
- ③ EMERGENCY EXIT



SECOND FLOOR PLAN



FIRST FLOOR PLAN

COMBUSTION ENGINEERING	
BLOGS 2 E 2-A KEY PLAN	
SCALE 1/8" = 1'-0"	PEM-2
DATE 12-20-57	
BY J.P.A.	