

MATERIALS LICENSE

Amendment No. 16

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

Licensee		In accordance with the letter dated January 21, 1997, 3. License Number 20-14597-01 is amended in its entirety to read as follows:	
1. Yankee Atomic Electric Company			
2. 580 Main Street Bolton, Massachusetts 01740-1398		4. Expiration Date September 30, 2004	
		5. Docket or Reference No. 030-11075	
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, source or special nuclear material with atomic number 1 through 83	A. Any	A. Not to exceed 100 millicuries per radionuclide and 1 curie total	
B. Any byproduct, source or special nuclear material with atomic number 84 through 98	B. Any	B. Not to exceed 1 millicurie per radionuclide and 10 millicuries total	
C. Chlorine 36	C. Any	C. 20 millicuries	
D. Strontium 90	D. Any	D. 30 millicuries	
E. Technetium 99	E. Any	E. 20 millicuries	
F. Xenon 133	F. Any	F. 50 millicuries	
G. Promethium 147	G. Any	G. 20 millicuries	
H. Thallium 204	H. Any	H. 20 millicuries	
I. Cobalt 60	I. Sealed sources	I. 500 millicuries	
J. Cesium 137	J. Sealed sources	J. 500 millicuries	
K. Cesium 137	K. Sealed source (3M Company Model 4F6H)	K. 1500 millicuries	
L. Cesium 137	L. Sealed source (Amersham Model CDC 3822)	L. 2000 millicuries	
M. Cesium 137	M. Sealed source (ORNL)	M. 50 curies	
N. Americium 241	N. Sealed sources (Amersham Model AMC.16)	N. 250 millicuries	
9. Authorized use			
A. through H. For laboratory measurements, tracer studies, preparation and distribution of calibration standards, and instrument and dosimetry device calibrations.			
I. through K. and N. Calibration and testing of instruments and dosimetry devices.			
L. Calibration and testing of dosimetry devices.			
M. For use in a Technical Operations Model 682 calibrator.			

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PDR ADOCK 03011075
C PDR

ML 10

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number

20-14597-01

Docket or Reference Number

030-11075

Amendment No. 16

CONDITIONS

10. A. Licensed material listed in 6.A. through 6.H. may be used only at the licensee's facilities located at 25 Research Drive, Westborough, Massachusetts and at temporary jobsites of the licensee anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.
- B. Licensed material listed in 6.I. through 6.N. may be used only at the licensee's facilities located at 25 Research Drive, Westborough, Massachusetts.
11. A. Licensed material shall be used by, or under the supervision of, individuals designated in writing by the Radiation Safety Committee, Mark A. Kralian, Chairperson.
- B. The Radiation Safety Officer for this license is James E. Rohrbacher.
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

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- (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 conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license.
17. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.
18. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number

20-14597-01

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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. Letter dated October 15, 1985
- B. Letter dated January 30, 1986
- C. Letter dated September 15, 1994
- D. Letter dated October 20, 1995
- E. Letter dated March 21, 1996
- F. Letter dated July 3, 1996



Date FEB 27 1997

For the U.S. Nuclear Regulatory Commission

ORIGINAL SIGNED BY:

By PENNY A. LANZISERA

Division of Nuclear Materials Safety

Region I

King of Prussia, Pennsylvania 19406

FEB 27 1997

Stephen P. Schultz
Vice President, Engineering Services
Yankee Atomic Electric Company
580 Main Street
Bolton, MA 01740-1398

Dear Mr. Schultz:

This refers to your license amendment request. Enclosed with this letter is the amended license. Please note that, in accordance with information provided during a telephone conversation by your Radiation Safety Officer, Mr. James Rohrbacher, the authorized use for the americium-241 sources is limited to calibration and testing of instruments and dosimetry devices.

Please review the enclosed document carefully and be sure that you understand and fully implement all the conditions incorporated into the amended license. If there are any errors or questions, please notify the U.S. Nuclear Regulatory Commission, Region I Office, Licensing Assistance Team, (610) 337-5093 or 5239, so that we can provide appropriate corrections and answers.

Thank you for your cooperation.

Sincerely,

Original Signed By:

Penny Lanzisera
Division of Nuclear Materials Safety

License No. 20-14597-01
Docket No. 030-11075
Control No. 124170

Enclosure:

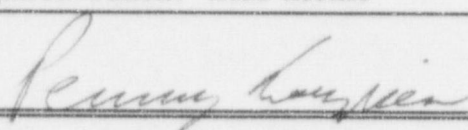
Amendment No. 16

DOCUMENT NAME: R:\WPS\MLTR\2014597.01

To receive a copy of this document, indicate in the box: "C" = Copy w/o attach/encl "E" = Copy w/ attach/encl "N" = No copy

OFFICE	DNMS/RI	N	DNMS/RI				
NAME	Lanzisera <i>PL</i>						
DATE	02/06/97	02/ /97	02/ /97	02/ /97	02/ /97		

OFFICIAL RECORD COPY **ML 10**

TELEPHONE CONVERSATION RECORD		Date: 2-6-97	Time: 4:20PM
Mail Control No.: 124170		License No.: 20-14597-01	Docket No.: 030-11075
Person Called: Jim Rohrbacher, RSO		Organization: Yankee Atomic	Telephone Number: 508 779-6711
Person Calling: Penny Lanzisera			
Subject: Authorized use for Am-241			
Summary: I left a message on Jim's voice mail and he returned my call. Jim stated that the use would be the same as for I. through K. material (calibration and testing of instruments and dosimetry devices).			
Action Required/Taken: issue license			
Signature: 		Date: 2-6-97	

YANKEE ATOMIC ENVIRONMENTAL LABORATORY

TELECOPY TRANSMITTAL SHEET

WE HAVE THE FOLLOWING TELECOPY MACHINE:
AT&T FAX 3510D (MANUAL)

FAX PHONE NUMBER (508) 836-9815

TO: PENNY LANZISERA
FROM: Jim Rohrbacher
DATE: 2-6-97
PAGES: 7 (INCLUDING TELECOPY TRANSMITTAL SHEET)

IF YOU HAVE ANY QUESTIONS ABOUT THE CONTENT OF THIS FAX,

PLEASE CONTACT: Jim
568-2545
AT (508) ~~779-6711~~, EXTENSION X

NOTES:

Please NOTE T.N. changes to Seal sources. The
specific source is an Amersham #AMC 16. And
This item (6N) will only be used at the Westboro
location. Any additional questions please call.

Jim Rohrbacher
RSO
YAE L

Americium-241

γ and primary X-ray sources

Disc sources, stainless steel window

Americium-241 incorporated in a ceramic enamel sealed in a welded stainless steel capsule.

Sources codes AMC 62-66 are designed for backscatter applications, the active ceramic is recessed into a tungsten alloy insert.

Nominal content activity*		Capsule	Typical photon output in photons/sec per steradian 59.5keV	Code
37	1	X 10/2	8×10^6	AMC 62
111	3	X 10/2	2.5×10^6	AMC 63
370	10	X 10/2	8×10^6	AMC 64
1110	30	X 11	2.4×10^7	AMC 65
3700	100	X 11/1	5.3×10^7	AMC 66

*Tolerance $\pm 10\%$

Recommended working life: 15 years

Nominal content activity*		Capsule	Typical photon output in photons/sec per steradian 59.5keV	Code
3.7	100	X 91	5.3×10^7	AMC 16
11.1	300	X 92	1.6×10^6	AMC 17
16.5	500	X 97	2.8×10^6	AMC 18
37	1000	X 93	5×10^6	AMC 19
111	3000	X 94	1.2×10^6	AMC 30
165	5000	X 95	2×10^7	AMC 50

*Tolerance $\pm 10\%$

Recommended working life: 15 years

IFAX TO: TIM ROHRBACKER

508-568-2520

FROM: ROGER FERRIS

PAGE 1 OF 6

DATE: JAN 15 97

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MC 13044

1.11	30	X 131/4	2.6×10^7	AMC 13145
3.7	100	X 131/4	6.7×10^7	AMC 13146
3.7	100	X 134/4	7.8×10^7	AMC 13446

*Tolerance $\pm 10\%$

Recommended working life: 10 years

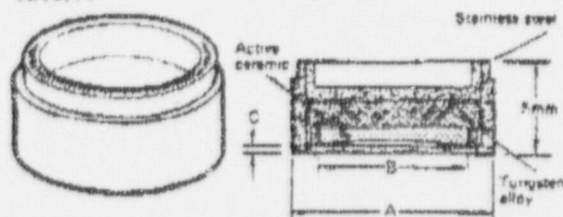
Quality Control, see page D1

Wipe test A

Bubble test D

Immersion test L

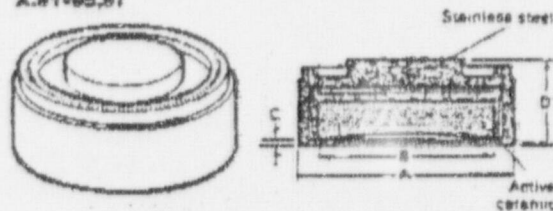
X.10.11



Capsule dimensions and Safety performance testing

Capsule	Overall diam. 'A' mm	Active diam. 'B' mm	Window thickness 'C' mm	Safety performance testing ANSI N19C classification	IAEA approval form	ICRP Model No.
X.10/2	8	4.2	0.2-0.25	C645/5	05/3/5	AMC 02
X.11	10.6	7.2	0.2-0.25	C646/4	05/4/5	AMC 03
X.11/1	10.8	8.0	0.2-0.25	C652/4	05/4/5	AMC 03

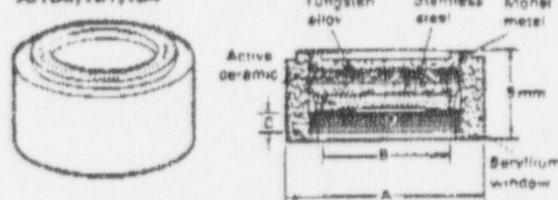
X.91-95,97



Capsule dimensions and Safety performance testing

Capsule	Overall diam. 'A' mm	Active diam. 'B' mm	Window thickness 'C' mm	Overall thickness 'D' mm	Safety performance testing ANSI N19C classification	IAEA approval form	ICRP Model No.
X.91	10.6	7.6	0.2-0.25	8	C644/4	05/3/5	AMC 16
X.92	18	12	0.2-0.25	8	C744/4	05/3/5	AMC 17
X.93	30	26	0.2-0.25	8	C644/4	05/4/5	AMC 19
X.94	36	31	0.25-0.3	8	C644/4	05/10/5	AMC 30
X.95	40	40	0.25-0.3	8	E044/4	05/12/5	AMC 50
X.97	22	16	0.2-0.25	8	C644/4	05/4/5	AMC 18

X.130,131,134



Capsule dimensions and Safety performance testing

Capsule	Overall diam. 'A' mm	Active diam. 'B' mm	Window thickness 'C' mm	Safety performance testing ANSI N19C classification	IAEA approval form	ICRP Model No.
X.130/4	8	4.2	0.05-1.05	C643/4	05/14/5	AMC 1
X.131/4	10.6	7.2	0.05-1.05	C643/4	05/14/5	AMC 1
X.134/4	18	10.6	0.05-1.05	C643/4	05/14/5	AMC 1

Neutron emission, see page S1.3

Safety performance testing, see page F1

01. 15. 97 09:41 AM *AMERSHAM CORP S. A. P02

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SOURCE
(Amended Copy)

ND: NR-136-S-158-S

DATE: SEP 28 1984

PAGE 1 OF 4

SOURCE TYPE: Low Energy Gamma SourceMODEL: AMC.16, AMC.18, AMC.19MANUFACTURER/DISTRIBUTOR:

Amersham Corporation
2636 S. Clearbrook Drive
Arlington Heights, IL 60005

ISOTOPE:MAXIMUM ACTIVITY:

Americium-241 (AMC.16)

125 millicuries

Americium-241 (AMC.18)

625 millicuries

Americium-241 (AMC.19)

1,250 millicuries

LEAK TEST FREQUENCY: 6 monthsPRINCIPAL USE:

(D) Gamma Gauge

CUSTOM SOURCE:☐ YES ☒ NO

01. 15. 97 09:41 AM *AMERSHAM CORP G. S. A. P03

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SOURCE
(Amended Copy)

NO: NR-136-S-158-S

DATE:

SEP 26 1994

PAGE 2 OF 4

SOURCE TYPE: Low Energy Gamma SourceDESCRIPTION:

Americium oxide is mechanically mixed with a powdered ceramic frit containing the oxides of silicon, sodium, and magnesium. The mix is heated until molten at about 1000°C. The mix is cooled and forms a solid glass or ceramic bead. The bead is placed into the recess of an insert and heated to 1000°C. As the bead softens, it flows into the recess, fills it, and forms a ceramic layer which adheres to the steel surface so that the active materials are contained as an integral part of the ceramic layer which is firmly bonded to the insert. The insert is placed in a single stainless steel capsule and sealed by welding.

The AMC.16 source has dimensions of 10.8 mm x 6 mm, the AMC.18 source has dimensions of 22 mm x 6 mm, and the AMC.19 source has dimensions of 30 mm x 6 mm.

LABELING:

All sources are marked by permanent engraving with the manufacturer's, logo, nuclide, the activity, the serial number, the model number, and the radiation symbol.

DIAGRAM:

See Attachment 1.

CONDITIONS OF NORMAL USE:

The source is used in gauging devices. For a specific set of conditions of use, look up the applicable gauging device registration document.

PROTOTYPE TESTING:

The manufacturer reported that the source type has been tested in accordance with ANSI N542-1977 and has achieved a rating of 77C64344.

The source capsules have also been approved by the United Kingdom competent authority as special form source.

01. 15. 87 09:41 AM *AMERSHAM CORP G. S. A. P04

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SOURCE
(Amended Copy)

NO: NR-136-S-158-5

DATE:

SEP 28 1994

PAGE 3 OF 4

SOURCE TYPE: Low Energy Gamma Source

EXTERNAL RADIATION LEVELS:

The manufacturer reports the following dose rates for the sources containing their respective maximum activity:

	Distance		
Model No.	5 cm	30 cm	100 cm
AMC.16	287 mR/hr	7 mR/hr	0.71 mR/hr
AMC.18	1.456 mR/hr	40 mR/hr	3.6 mR/hr
AMC.19	2,912 mR/hr	80 mR/hr	7.28 mR/hr

QUALITY ASSURANCE AND CONTROL:

During manufacture capsule components and materials are checked visually and dimensionally to ensure that they comply with the detailed engineering drawings.

During manufacture the welded seal is tested by a bubble test method and finished sources are checked by wipe and immersion tests and visual inspection.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- The source shall be distributed only to persons specifically licensed by the NRC or an Agreement State.
- The source shall not be subjected to environmental or other conditions of use which exceed ANSI Classification 77C64344.
- Handling, storage, use, transfer, and disposal: To be determined by the licensing authority.
- The source shall be leak tested at 6 month intervals using techniques capable of detecting 0.005 microcurie of removable contamination.
- This registration sheet and information contained within the references shall not be changed or transferred without the written consent of the NRC.

01.15.97

09:41 AM

*AMERSHAM CORP G. S. A. P05

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SOURCE
(Amended Copy)

NO: NR-136-S-158-S

DATE: SEP 80 1980

PAGE 4 OF 4

SOURCE TYPE: Low Energy Gamma Source

SAFETY ANALYSIS SUMMARY:

Based on our review of the information and test data cited, the claimed ANSI N542 classification, that the source design was previously deemed acceptable for licensing and that this Amendment was done to update the Automated Registry System, we continue to conclude that the source design is acceptable for licensing purposes. Furthermore, we conclude that the source design would be expected to maintain its integrity for normal conditions of use and accidental conditions which might occur.

REFERENCES:

The following supporting documents for the Amersham Models AMC.16, AMC.18, AMC.19 source design are hereby incorporated by reference and are made a part of this registry document.

- Amersham Corporation letter dated 6/30/77 and enclosures thereto.
- Supersedes Registration Sheet NR-136-S-159-U dated April '78.

ISSUING AGENCY:

U.S. Nuclear Regular Commission

DATE: _____

DATE: _____

REVIEWER: Stewart D. [Signature]CONCURRENCE: Joseph M. [Signature]

01. 15. 97

09:41 AM

*AMERSHAM CORP G. S. A. P06

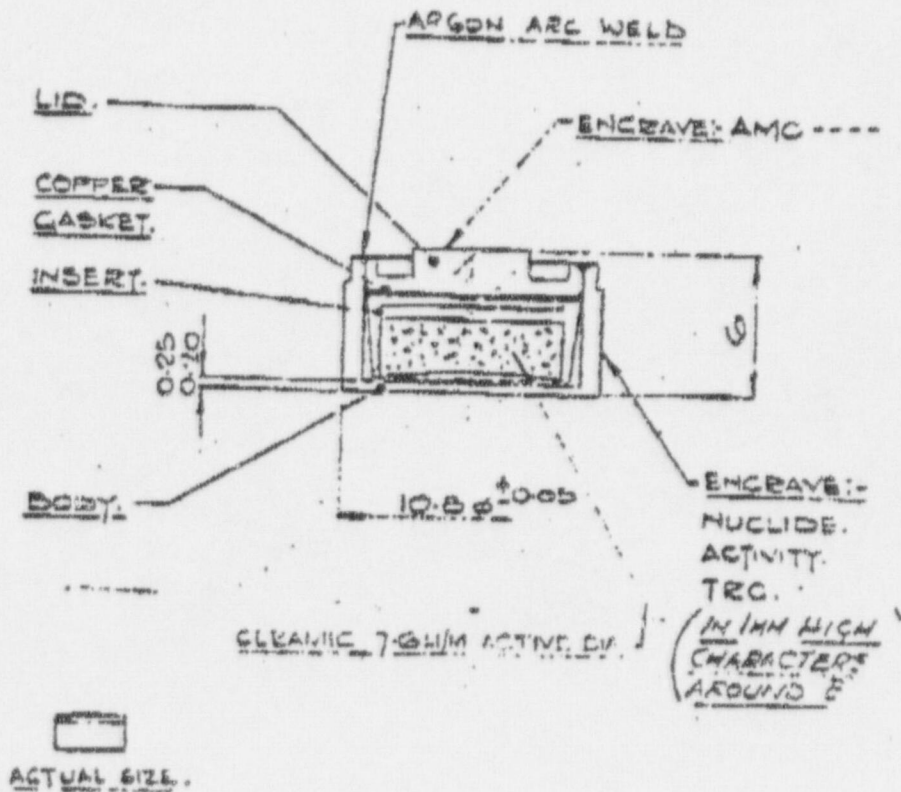
ATTACHMENT 1

NO: NR-136-S-158-S

DATE:

SEP 11 1996

PAGE 5 OF 5



TELEPHONE CONVERSATION RECORD		Date: 2/6/97	Time: 9:50 am
Mail Control No.: 124170		License No.: 20-14597-01	Docket No.: 030-11075
Person Called: Jim Rohrbacher, RSO		Organization: Yankee Atomic	Telephone Number: 508 779-6711
Person Calling: Penny Lanzisera			
Subject: Amendment			
Summary: Informed Jim that his request would require Yankee to re-assess the DFP and FA amounts specifically with regards to waste disposal for the Americium-241. Jim stated that the intent was for possession of 2 Am-241 Sealed Sources manufactured by Amersham. Jim also stated that the sources were registered in the State of Illinois. Jim decided that the request for any form was not necessary and that he would provide a copy the registrations so the americium could be listed as sealed sources on the license.			
Action Required/Taken: response			
Signature: <i>Penny Lanzisera</i>		Date: 2/6/97	

OFFICIAL RECORD COPY

ML 10

YANKEE ATOMIC ELECTRIC COMPANY



580 Main Street, Bolton, Massachusetts 01740-1398

STEPHEN P. SCHULTZ, Sc. D.
VICE PRESIDENT

January 21, 1997

EL 39/97

030-11075

United States Nuclear Regulatory Commission
Region I
Division of Radiation Safety and Safeguards
Licensing Assistance Section
475 Allendale Road
King of Prussia, PA 19406

Reference: NRC Materials License Number 20-14597-01

Subject: License Amendment Number 16

Dear Sirs:

The Yankee Atomic Electric Company Environmental Laboratory requests a license amendment to change the items listed below. A check for \$660.00 has been enclosed for the license amendment fee.

1. Add the addition under 6.N. , 7.N. and 8.N. (NRC FORM 374):

6.N. Americium 241

7.N. Any

8.N. 250 millicuries

2. Add to item 9. Authorized use (NRC FORM 374) the following statement:

N. For laboratory measurements, tracer studies, preparation and distribution of calibration standards, and instrument and dosimetry device calibrations.

Sincerely,

Stephen P. Schultz
Vice President
Engineering Sciences

OFFICIAL RECORD COPY, ML 10

124170

JAN 28 1997

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)
INFORMATION FROM LTS

PROGRAM CODE: 03610
STATUS CODE: 0
FEE CATEGORY: 3L 1D 2C 3P
EXP. DATE: 20040930
FEE COMMENTS: 3P CAL SERV.
DECOM FIN ASSUR REQD: Y

LICENSE FEE TRANSMITTAL

A. REGION I

1. APPLICATION ATTACHED

APPLICANT/LICENSEE: YANKEE ATOMIC ELECTRIC CO.
RECEIVED DATE: 970128
DOCKET NO: 3011075
CONTROL NO.: 124170
LICENSE NO.: 20-14597-01
ACTION TYPE: AMENDMENT

2. FEE ATTACHED

AMOUNT: \$660.00
CHECK NO.: 056179

3. COMMENTS

SIGNED M. A. Perkins

DATE 1/29/97

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED 1/1)

1. FEE CATEGORY AND AMOUNT: (3L) 1D 2C 3P 8660

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:

AMENDMENT _____
RENEWAL _____
LICENSE _____

3. OTHER _____

SIGNED _____

DATE _____

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Log	<u>916 V</u>
Remitter	
Check No.	<u>056179</u>
Amount	<u>\$660</u>
Fee Category	<u>3L 1D 2C 3P</u>
Type of Fee	<u>AMD</u>
Date Check Rec'd	<u>2/5/97</u>
Date Completed	
By	<u>BB</u>