

030-20012
4L 20635
3120
03212

FORM NRC-313 I (6-78) 10 CFR 3		U.S. NUCLEAR REGULATORY COMMISSION		1. APPLICATION FOR: (Check and/or complete as appropriate)	
APPLICATION FOR BYPRODUCT MATERIAL LICENSE INDUSTRIAL				<input checked="" type="checkbox"/> a. NEW LICENSE	
See attached instructions for details. Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.				<input type="checkbox"/> b. AMENDMENT TO LICENSE NUMBER	
				<input type="checkbox"/> c. RENEWAL OF LICENSE NUMBER	
2. APPLICANT'S NAME (Institution, firm, person, etc.) New England Power Company TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION 744-5540 617 234		3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION Howard C. Ekstrand TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION 744-5540 617 285			
4. APPLICANT'S MAILING ADDRESS (Include Zip Code) 24 Fort Avenue Salem, Massachusetts 01970		5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED (Include Zip Code) 24 Fort Avenue Salem, Massachusetts 01970			
(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)					
6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL (See Items 16 and 17 for required training and experience of each individual named below)					
FULL NAME		TITLE			
a. Refer to Supplemental Sheet No. 1					
b.					
c.					
7. RADIATION PROTECTION OFFICER Howard C. Ekstrand		Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.			
8. LICENSED MATERIAL					
L I N E NO.	ELEMENT AND MASS NUMBER A	CHEMICAL AND/OR PHYSICAL FORM B	NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source) C	MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTI- VITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME D	
(1)	Cs 137	Sealed Source	See Section 9	See Section 9	
(2)	Applicant... 766746 (Naumkeag Trust Co.)			RECEIVED BY LFMS	
(3)	Check No. 766746			Date 8/22/83	
(4)	Amount/Fee Category 8190-3L			Log. Aug 13	
	Type of Fee Application			By Brown	
	File Check Rec'd. 8/22/83			Orig To 8/24/83	
	Received By Brown			Action Compl. 8/24/83	
(1)	See Section 9				
(2)	8508210190 850806 REG1 LIC30				
(3)	20-20635-01 PDR				
(4)					

FORM NRC-313 I (6-78)

AUG 15 1983

ML10

"OFFICIAL RECORD COPY"

9. STORAGE OF SEALED SOURCES						
LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.			
(1)	For possession and use in Kay-Ray devices which have been evaluated and					
(2)	approved for licensing purposes and authorized for distribution under a					
(3)	license issued by the Nuclear Regulatory Commission or an Agreement State.					
(4)						

10. RADIATION DETECTION INSTRUMENTS						
LINE NO.	TYPE OF INSTRUMENT A.	MANUFACTURER'S NAME B.	MODEL NUMBER C.	NUMBER AVAILABLE D.	RADIATION DETECTED (alpha, beta, gamma, neutron) E.	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F.
(1)	G.M. Tube Survey	Eberline	E-130	1	Gamma	0.5, 5, 50 MR/HR
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10	
<input type="checkbox"/> a. CALIBRATED BY SERVICE COMPANY NAME, ADDRESS, AND FREQUENCY Kay-Ray Inc., 516 W. Campus Drive Arlington Heights, Il. 60004 Lic.# 11184-01 Frequency- 6 months	<input type="checkbox"/> b. CALIBRATED BY APPLICANT <i>Attach a separate sheet describing method, frequency and standards used for calibrating instruments.</i>

12. PERSONNEL MONITORING DEVICES		
TYPE (Check and/or complete as appropriate.) A.	SUPPLIER (Service Company) B.	EXCHANGE FREQUENCY C.
<input type="checkbox"/> (1) FILM BADGE <input type="checkbox"/> (2) THERMOLUMINESCENCE DOSIMETER (TLD) <input checked="" type="checkbox"/> (3) OTHER (Specify): <u>Refer to Supplemental</u> <u>Sheet No.2</u>		<input type="checkbox"/> MONTHLY <input type="checkbox"/> QUARTERLY <input type="checkbox"/> OTHER (Specify):

13. FACILITIES AND EQUIPMENT (Check where appropriate and attach annotated sketch(es) and description(s).)
<input type="checkbox"/> a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC. <input type="checkbox"/> b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC. <input type="checkbox"/> c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC. <input type="checkbox"/> d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL
a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED Kay-Ray Inc.
b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE. Sealed sources and devices will be returned to supplier for disposal.

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (if needed), day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.
16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.
 - a. Principles and practices of radiation protection.
 - b. Radioactivity measurement standardization and monitoring techniques and instruments.
 - c. Mathematics and calculations basic to the use and measurement of radioactivity.
 - d. Biological effects of radiation.
17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING.—18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

<p>a. LICENSE FEE REQUIRED (See Section 170.31, 10 CFR 170)</p> <p style="text-align: center;">\$110.00</p>	<p>b. CERTIFYING OFFICIAL (Signature) <i>L. E. Bailey</i></p> <p>c. NAME (Type or print) L. E. Bailey</p>
<p>(1) LICENSE FEE CATEGORY 3.L</p>	<p>d. TITLE Superintendent</p>
<p>(2) LICENSE FEE ENCLOSED \$ 110.00</p>	<p>e. DATE August 11, 1983</p>

SUPPLEMENTAL SHEET No. 1

ITEM 6: Individual(s) who will use or directly supervise the use of the licensed material.

Howard C. Ekstrand	Supervisor of Technical Services
John E. Mangan	Chief Engineer
Everett C. MacLeod	Assistant Chief Engineer
Robert O. Doward	Watch Engineer
Donald C. Grinnell	Watch Engineer
Joseph P. Labranch	Watch Engineer
Joel L. Lancey	Watch Engineer
Gregory E. Melnick	Watch Engineer
Albert J. O'Neill	Watch Engineer
Anthony Wojtas	Watch Engineer
William C. Connelly	Assistant Watch Engineer
Terry D. Flannagan	Assistant Watch Engineer
Lawrence E. Roux	Assistant Watch Engineer
Robert E. Scroggins	Assistant Watch Engineer

SUPPLEMENTAL SHEET No. 2

ITEM 12: Personnel Monitoring Devices

Personnel monitoring devices are not necessary. For supporting documentation see the description of the radiation protection program.

ITEM 15: Radiation Protection Program

SECTION I: Sketch of Installation

The enclosed sketch gives the specifics of the installation. All equipment will be located and mounted in accordance with the recommendations of the manufacturer.

ITEM 15: Radiation Protection Program.

SECTION II. Radiation Survey, Servicing, Maintenance, Etc.

Initial radiation survey, servicing, maintenance, relocation and repair of the source holder will be performed by Kay-Ray. The initial radiation survey will be used to confirm the calculations shown in Section VI of this item.

ITEM 15: Radiation Protection Program

SECTION III. Control Measures.

If maintenance is required inside the vessels, a lockout procedure will be employed to prevent personnel access with the source in the "measure" position.

A "Kirk" type key on both the source head and access door will be furnished. These doors cannot be opened until the source head is in the store position, allowing removal of the key to open the vessel doors.

ITEM 15: Radiation Protection Program

SECTION IV. Leak Testing.

Kay-Ray will perform the leak testing on the source holder.

The leak test kit used by Kay-Ray is the Kay-Ray, Inc. Model A Kit, which has been approved by the NRC for use in the source wiping of Kay-Ray source holders.

We wish to have our license worded to allow a 3 year source wipe interval on the devices listed above. An extension has recently been granted to Kay-Ray allowing a three year interval for source wiping, and we wish to have our license reflect this extended test period.

ITEM 15: Radiation Protection Program.

SECTION V. Procedure to be Followed in the Event of Damage to the Source Housing.

The following procedure will be followed in the event of damage to the source housing:

Emergency Procedure to be Followed After
Damage to Kay-Ray Source Holders

1. This procedure applies to all instances where damage is incurred by the source holder due to such action as fire, etc.

2. Immediately rope off the area around the source holder.

Use the following formula to determine the rope-off radius in feet: $R = \sqrt{0.7 \times (\text{Source Size, mCi})}$ For example, if you have a 100mCi source, $R = \sqrt{70} = 8.4 \text{ ft.}$

3. Inform plant Radiation Protection Officer or person responsible for the use of the source holder as to the situation.

4. Inform by phone or telegram the proper regional NRC office of the accident. (See next page)

5. Notify Kay-Ray at (312) 259-5600 if their assistance is desired.

6. Limit access to source head until a radiation survey and source wipe can be performed by qualified personnel or a representative.

UNITED STATES NUCLEAR REGULATORY COMMISSION
INSPECTION AND ENFORCEMENT REGIONAL OFFICES

REGION	ADDRESS	Telephone	
		Daytime	Nights and Holidays
I Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont	Region I, USNRC, Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, Pennsylvania 19406	(215) 337-5000	(215) 337-5000
II Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, Panama Canal Zone, Puerto Rico, South Carolina, Tennessee, Virginia, Virgin Islands, and West Virginia	Region II, USNRC, Office of Inspection and Enforcement, 101 Marietta Street, Suite 3100, Atlanta, Georgia 30303	(404) 221-4503	(404) 221-4503
III Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin	Region III, USNRC, Office of Inspection and Enforcement, 799 Roosevelt Road, Glen Ellyn, Illinois 60137	(312) 858-2660	(312) 858-2660
IV Arkansas, Colorado, Idaho, Kansas, Louisiana, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming	Region IV, USNRC, Office of Inspection and Enforcement, 611 Ryan Plaza Drive, Suite 1000, Arlington, Texas 76012	(817) 334-2841	(817) 334-2841
V Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington, and U.S. territories and possessions in the Pacific	Region V, USNRC, Office of Inspection and Enforcement, 1990 N. California Blvd., Suite 202, Walnut Creek, California 94596	(415) 392-8300	(415) 392-8300

ITEM 15: Radiation Protection Program

SECTION VI. Worst Case Personnel Radiation Exposure Calculation.

The attached calculation indicates a worst case operator exposure of 22.00 mR/yr. This exposure is based on the nearest operator location to the source housing and is less than 500 mR/year which is well below the limits set in 10CFR20 for personnel monitoring equipment. The calculated radiation exposure rate one will receive at the detector is approximately .5 mR/hr or less for level systems. These low levels drop off according to the square law and result in negligible operator exposure a few feet from the detector. These radiation exposures will be verified at the time of start-up. This will include the effects of the radiation scattering along the vessel walls if applicable. These provisions will be taken to verify that no one will receive a worst case exposure of 500 mR/yr. at the detector side of the vessel for this application.

ITEM 15: Radiation Protection Program.

SECTION VI. Worst Case Operator Exposure Calculation.

1. Formula - Worst Case Operator Exposure Per Year.

$$X = K \times S \times T \times 0.25$$

X = Worst case exposure in mR/year

K = Figure from the table

S = Source size in millicuries

T = Hours/day

0.25 = Normalizing factor which converts the mR/hr figure to a yearly figure. This factor assumes a 40 hour week, 50 weeks per year, and 1000mC source in each respective source.

2. Calculation;

Source: Kay-Ray Model 7062-BP, 100 millicuries

Operator distance: 12 feet, time: 8 hrs/day

$$X = .11 \times 100 \times 8 \times .25$$

$$X = 22.00 \text{ mR/year}$$

VALUES OF D AND K FOR KAY-KAY SOURCE HOLDER

GAMMA SOURCE HEADS

KR Model No.	7056	7050B	7051B	7062, 7062P,		
	7057	7060B	7061B	7062B, 7062BP	7063	7063P
(ft.)	K (mr/hr)	K (mr/hr)	K (mr/hr)	K (mr/hr)	K (mr/hr)	K (mr/hr)
0	0.63	12.5	3.0	500	50	15.0
1	0.05	0.59	0.17	11.22	2.3	0.82
2	0.02	0.18	0.06	3.31	0.74	0.26
3	0.009	0.09	0.03	1.56	0.34	0.12
4	0.006	0.05	0.02	0.90	0.20	0.07
5	0.004	0.03	0.01	0.59	0.14	0.05
6	0.003	0.02	0.008	0.41	0.09	0.03
7	0.002	0.02	0.006	0.31	0.08	0.03
8	0.002	0.01	0.005	0.24	0.06	0.02
9	0.001	0.01	0.004	0.19	0.06	0.02
10	0.001	0.009	0.003	0.15	0.03	0.01
11	0.0008	0.008	0.002	0.13	0.03	0.01
12	0.0007	0.006	0.002	0.11	0.02	0.009
13	0.0006	0.005	0.002	0.09	0.02	0.008
14	0.0005	0.005	0.002	0.08	0.02	0.007
15	0.0005	0.004	0.001	0.07	0.01	0.006
16	0.0004	0.004	0.001	0.06	0.01	0.005
17	0.0004	0.003	0.001	0.05	0.01	0.004
18	0.0003	0.003	0.001	0.05	0.01	0.004
19	0.0003	0.003	0.0009	0.04	0.01	0.004
20	0.0003	0.002	0.0008	0.04	0.008	0.003

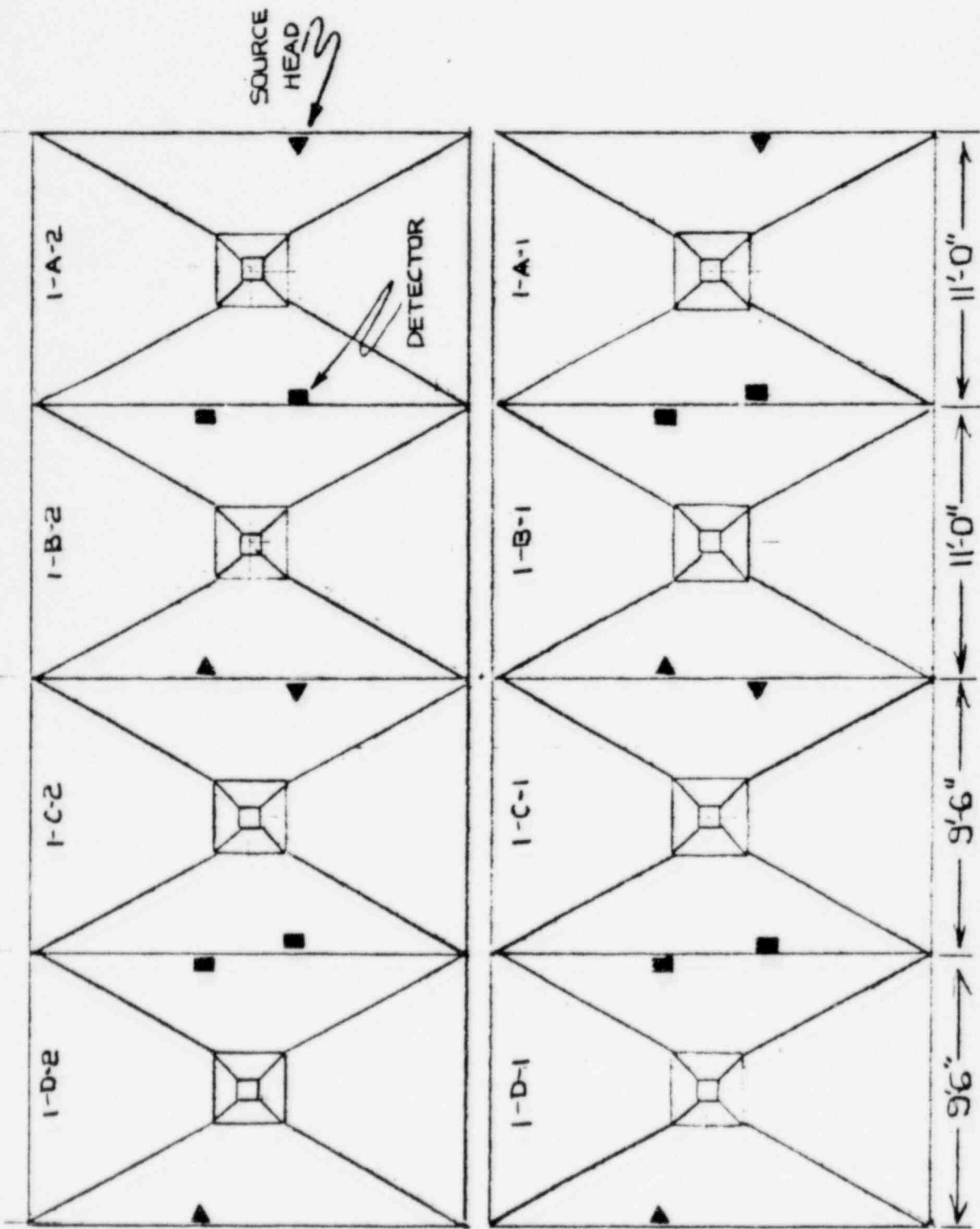
KR Model No.					
	7064	7064B	7065	7067	7068
D (ft.)	K (mr/hr)	K (mr/hr)	K (mr/hr)	7067P K (mr/hr)	7069 K (mr/hr)
0	15	3.25	120	5	7.5
1	1.02	0.22	5.62	0.48	0.38
2	0.36	0.08	1.77	0.17	0.12
3	0.18	0.04	0.85	0.08	0.06
4	0.12	0.03	0.50	0.05	0.03
5	0.06	0.01	0.33	0.03	0.02
6	0.05	0.01	0.23	0.02	0.01
7	0.04	0.007	0.17	0.02	0.01
8	0.03	0.006	0.13	0.01	0.009
9	0.02	0.005	0.11	0.01	0.007
10	0.02	0.004	0.09	0.009	0.006
11	0.01	0.003	0.07	0.007	0.005
12	0.01	0.003	0.06	0.006	0.004
13	0.01	0.003	0.05	0.006	0.003
14	0.01	0.002	0.04	0.005	0.003
15	0.006	0.002	0.04	0.004	0.003
16	0.006	0.002	0.03	0.004	0.002
17	0.006	0.001	0.03	0.003	0.002
18	0.006	0.001	0.03	0.003	0.002
19	0.005	0.001	0.02	0.002	0.002
20	0.005	0.001	0.02	0.002	0.001

ITEM 16: Formal Training in Radiation Safety

At the time of start-up a representative of the manufacturer will provide any specific training necessary for the safe operation of the system. Radiation protection procedures have previously been devised and submitted. As the scope of this license application does not include handling of the device containing radioactive material, further formal training is not indicated.

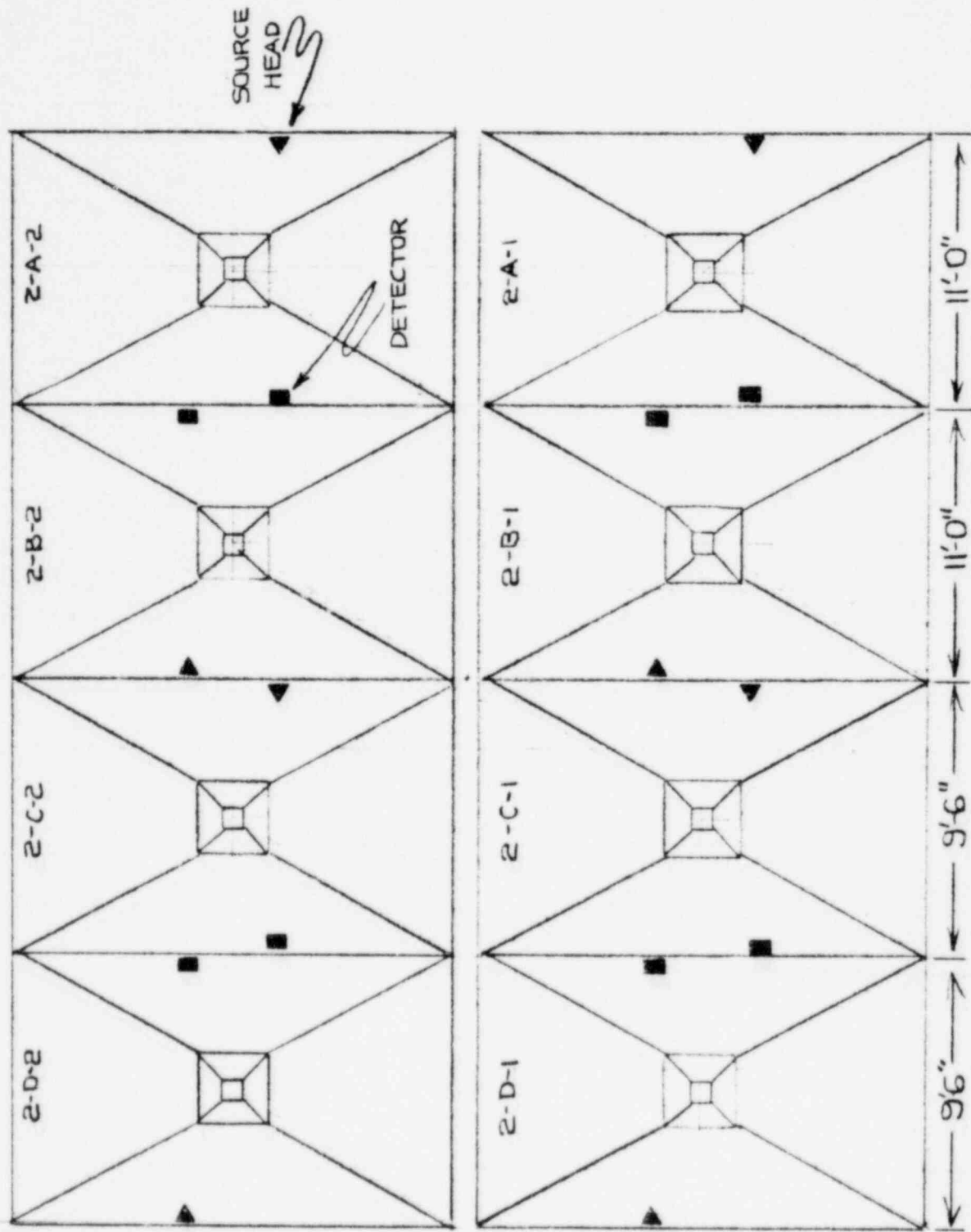
ITEM 17: Experience.

None of the individuals named as users of as Radiation Protection officer have had prior experience with radioactive materials.



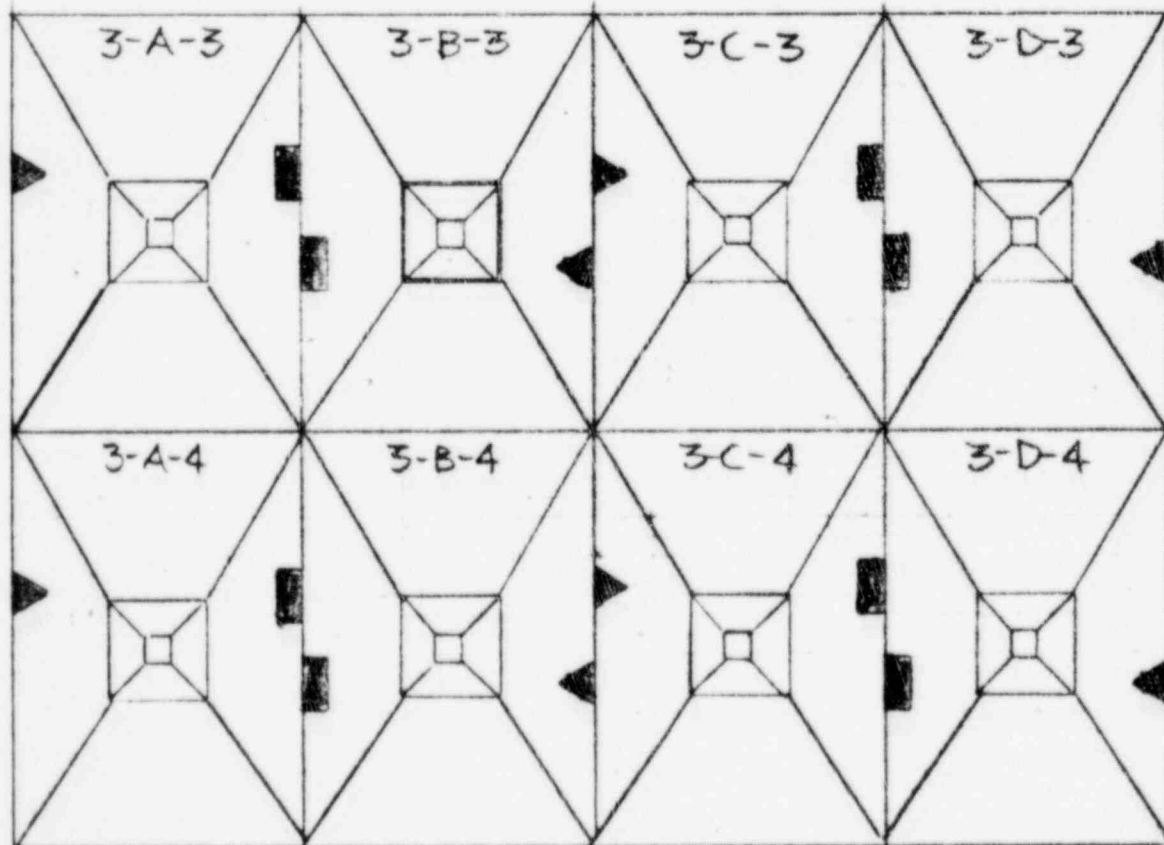
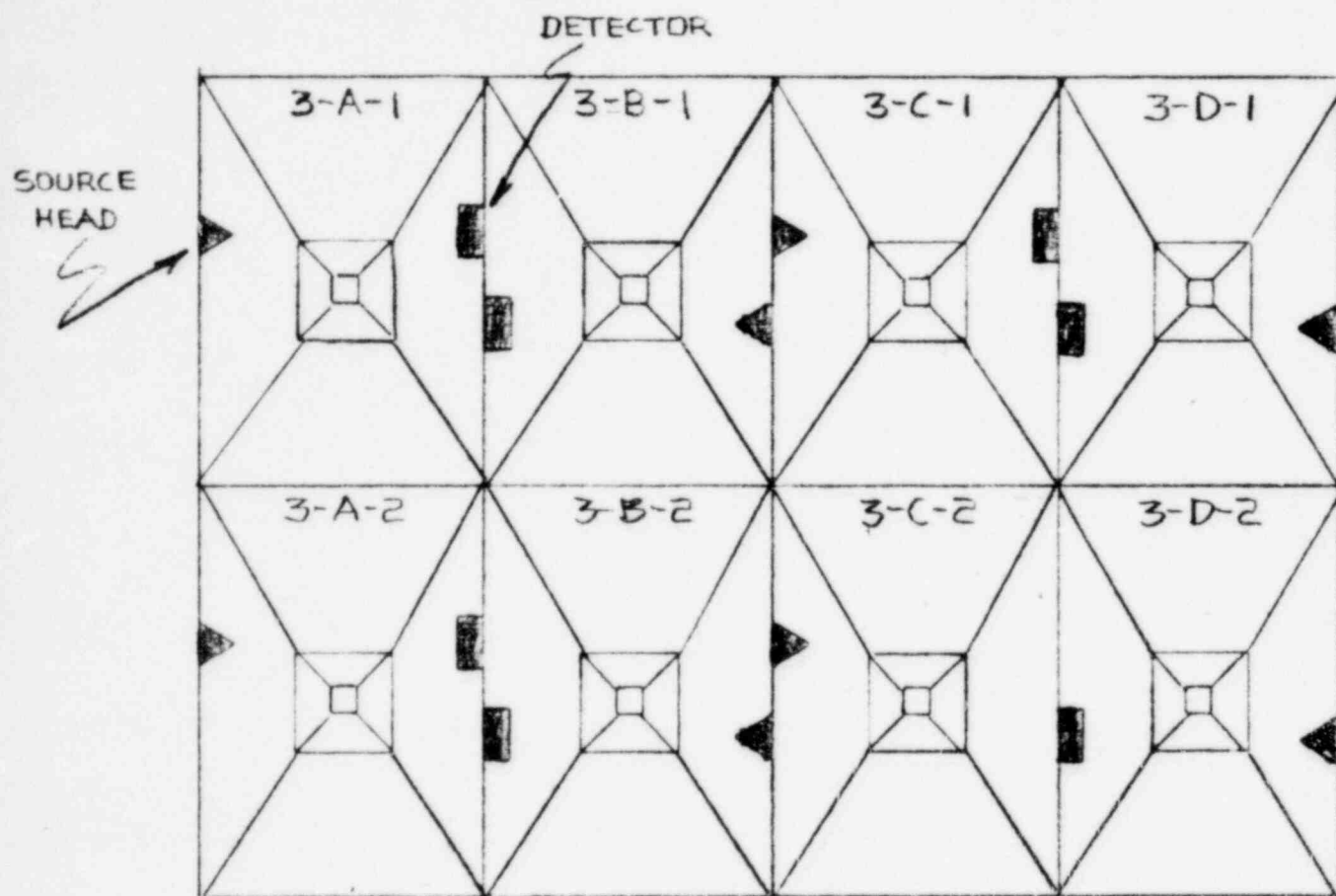
DISTANCES BETWEEN SOURCE HEAD & DETECTORS

UNIT #1 PRECIPITATOR
HOPPERS



DISTANCES BETWEEN SOURCE HEAD & DETECTORS

UNIT #2 PRECIPITATOR HOPPERS



11'-0" 11'-0" 9'-6" 9'-6"

DISTANCES BETWEEN SOURCE & DETECTOR

#3 UNIT PRECIPITATOR HOPPERS

11'-7 1/16

±

11'-7 5/16

2'-0" SOURCE F.S.
NOTE 2 DETECTOR NS.

HOPPER WALLS
1/4" CARBON STEEL

E 5

ROWS A & B

ELEV 61'-3"

9 ROWS C & D

ELEV. 58'-9"

A C SH. 2

6-190

JUNCTION
(4) 1/4 SNEE
FOR ATTACHE

6-10 NS & FS

DRILLING FLG DRILLED
 APPROPRIATE FOR 1" NPT (TYP)
 KEY ENVIRONMENTAL
 CORP. - SUPPLIED BY
 ERS

50'-3"

△ BAND HEATER 6-200

6-120
 BAND HEATER

6-130

FS 6-40

6-20 NS + FS

6-60 NS (2 PLS)

6-30 FS

6-50 NS + FS

MODULAR HEATERS

✓ FLOOR ELEV. 46'-3"

ELEVATION N-S

Also Available On
 Aperture Card

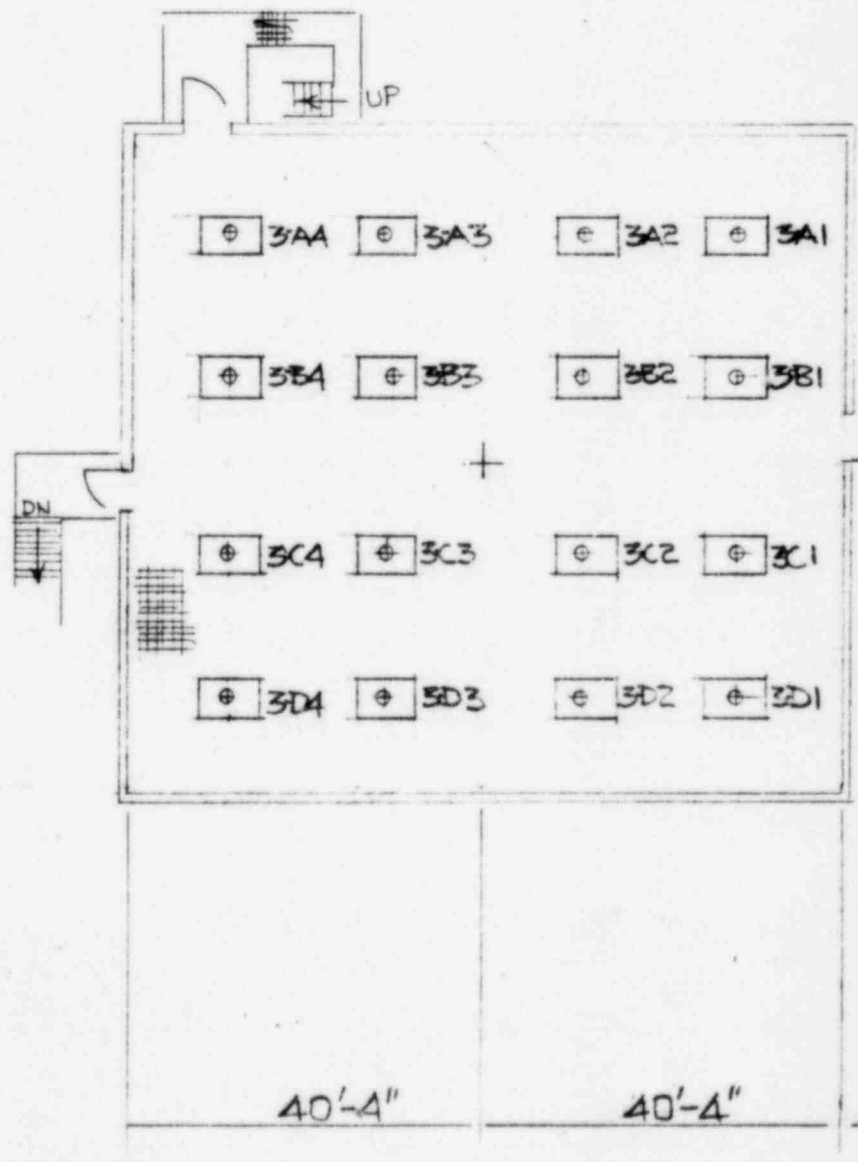
TI
 APERTURE
 CARD

THERMO COUPLE TAG	HOPPER	THERMO WELL TAG
TE-717	1A1	TW-625
TE-718	1A2	TW-626
TE-719	1B1	TW-627
TE-720	1B2	TW-628
TE-721	1C1	TW-629
TE-722	1C2	TW-630
TE-723	1D1	TW-631
TE-724	1D2	TW-632
TE-709	2A1	TW-617
TE-710	2A2	TW-618
TE-711	2B1	TW-619
TE-712	2B2	TW-620
TE-713	2C1	TW-621

8508210190-01

SHIPPING
 NUMBER

FILE
 MA



EXISTING POWER HOUSE

DN

15'-1 1/4"

27'-3 3/4"

27'-3 3/4"

Y

⊕ 2A2

⊕ 2A1

⊕ 2B2

⊕ 2B1

⊕ 2C2

⊕ 2C1

⊕ 2D2

⊕ 2D1

⊕ 1A2

⊕ 1A1

⊕ 1B2

⊕ 1B1

⊕ 1C2

⊕ 1C1

⊕ 1D2

⊕ 1D1

Also Available On
Aperture Card

TI
APERTURE
CARD

10'-1 1/4" 23'-3 1/4" 23'-3 1/4" 10'-1 1/2" 23'-3 1/4" 23'-3 1/4"

PRECIPITATOR HOPPER BOTTOM'S
ELEVATION 46'-3"

8508210190-02