030-08506

FORM NRC-313 I (6-78) 10 CFR 3

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

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.

1. APPLICATION FOR: *(Check and/or complete as appropriate)*

	a. NEW LICENSE
X	b. AMENDMENT TO LICENSE NUMBER 13-15057-01, Amendment No. 02
	c. RENEWAL OF LICENSE NUMBER

2. APPLICANT'S NAME *(Institution, firm, person, etc.)*

BREMEN CASTINGS, INC.

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
219-546-2411

3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION

Ralph Stickley

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
219-546-2411

4. APPLICANT'S MAILING ADDRESS *(Include Zip Code)*

BREMEN CASTINGS, INC.
500 North Baltimore Street
Bremen, IN 46506

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED *(Include Zip Code)*

BREMEN CASTINGS, INC.
500 North Baltimore Street
Bremen, IN 46506

(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.	Herbert Leeper	Maintenance Supt.
b.	Ralph Stickley	President
c.		

7. RADIATION PROTECTION OFFICER

Herbert Leeper

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

LINE NO.	A ELEMENT AND MASS NUMBER	B CHEMICAL AND/OR PHYSICAL FORM	C NAME OF MANUFACTURER AND MODEL NUMBER *(If Sealed Source)*	D MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	Cesium 137	Sealed Source	Kay-Ray Inc. Model No. 7700-E	1 x 200 mCi
(2)				
(3)				
(4)				

3858 $40/3L amendment - 1/22/82 Prorm

$40 refunded 4/20/82

1/22/82 Jan RB RCB Prorm III

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	To control level of cupola charges.
(2)	
(3)	
(4)	

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CONTROL NO. 05919

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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)	Source Housing	Kay-Ray Inc.	7063 P
(2)			
(3)			
(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)	None					
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☐ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

None

☐ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
☐ (1) FILM BADGE ☐ (2) THERMOLUMINESCENCE DOSIMETER (TLD) ☐ (3) OTHER (Specify): _____	Personnel monitoring device not necessary for supporting documentation. See attached response to Item 15.	☐ MONTHLY ☐ QUARTERLY ☐ OTHER (Specify): _____

13. FACILITIES AND EQUIPMENT (Check were appropriate and attach annotated sketch(es) and description(s).

☐ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.
☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.
☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

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 Mfg. 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.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)* $40.00	b. CERTIFYING OFFICIAL *(Signature)* Ralph Stickley
	c. NAME *(Type or print)* Ralph Stickley
(1) LICENSE FEE CATEGORY: 3.L	d. TITLE President
(2) LICENSE FEE ENCLOSED $40.00	e. DATE January 14, 1982

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15. This addendum describes the procedures to be followed as part of our Radiation Safety Program. Radiation exposure calculations are based on distances as presented in Section I of this addendum. This addendum is sectioned as follows:

I. Location of source in relation to other plant areas (See Attached Drawing, 15 - I)
II. Radiation Survey - Source housing maintenance
III. Control Measures
IV. Leak Testing
V. Procedure to be followed if source housing is damaged
VI. Worst case personnel radiation exposure calculation

15.-II. 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.

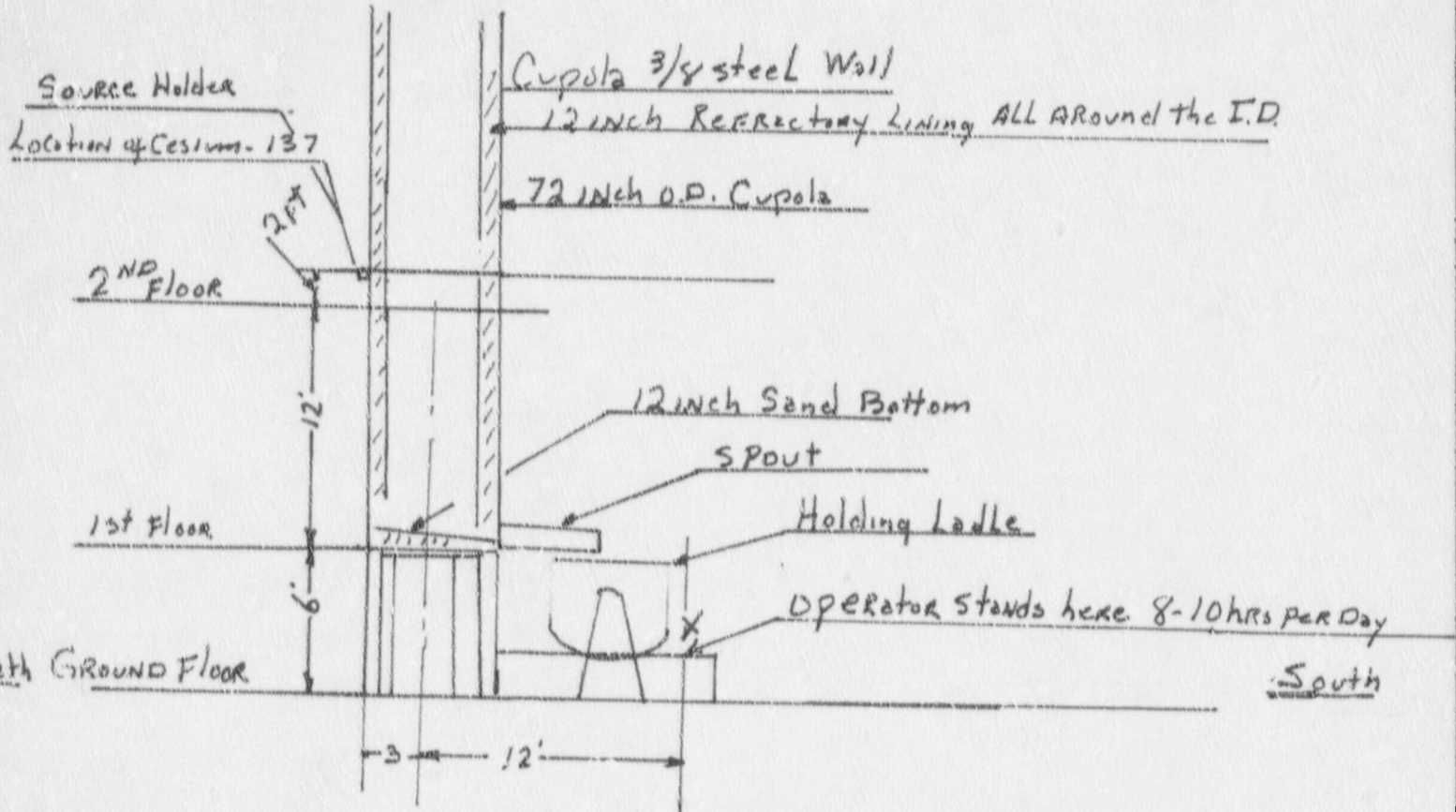
15.-III. If maintenance is required inside the vessels, a lockout procedure will be employed to prevent personnel access with the source in the "measure" position.

All vessel entrance doors will be locked. The Radiation Protection Office will maintain possession of the access door keys and will insure that source housings are locked in the closed position before granting access to the vessel. As the Radiation Protection Officer also maintains the keys to the source housing they can not be inadvertently opened while maintenance personnel are inside the vessel.

15.-IV. Kay-Ray will perform the leak testing on the source holder. The leak test kit used by Kay-Ray is either the General Radioisotope Products WT-4 kit, or Kay-Ray, Inc. Model A kit, which have 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. An extension has 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.

15 - I



Cupola office located 12' East of Cupola ON Ground Floor

No Personnel with in 20' to the North or West

Bremen Castings Inc.
500 N Baltimore St
Bremen Ind 46506
219-546-2411

Ralph Stickley

15.-V. 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 to a minimum of 15 feet in diameter.

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

4. Inform by phone or telegram the regional NRC office of the accident.

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 of Kay-Ray.

15.-VI. The attached calculation indicates a worst case operator exposure of 1.5 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. These low levels drop off according to the square law and result in negligible operator exposure a few feet from the detector. These radiation exposurers will be verified at the time of start-up. This will include the effects of 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/year at the detector side of the vessel.

The procedure for performing the above calculation, as supplied by Kay-Ray, Inc. has been included for reference.

PROCEDURE FOR CALCULATION OF WORST CASE RADIATION EXPOSURE TO OPERATING PERSONNEL

Step 1. From the sketch drawn for item 15-I showing relationship to gauge to the operating area, note the minimum distance and maximum time that any single person will be in the vicinity of the gauge. Define this distance as D in feet and T in hours per day. If D is greater than 20 feet, use the 20 ft. value in the table.

Step 2. From the attached find the table corresponding to the model number of the measurement head that is to be used in our application.

Step 3. Round down to the next lower value of D found in Step 1 and note the normalized value of K.

Step 4. Use the formula below to calculate X - the worst case operator exposure per year.

$$X = K \times S \times T \times .25$$

Where X = worst case exposure in mR/year
K = figure from Table 1
S = Source size in millicuries that is used in the source head in our application. This factor corrects X for the activity in mc supplied with the respective source head.

T = Hours/day'

.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 1000 mc source in each respective source head.

The Kay-Ray equipment supplied in our application has been specified to provide less than 500 mR/year exposure to any operating personnel.

Example Calculation:

In our application we require a 7063 P source housing with a 200 mc source. An operator stands within 35 feet of the gauge for a worse case average of 10 hours per day.

Following the step by step procedure above, the worst case exposure for this operator in mR/year is:

Step 1. D = 35 ft.
T = 10

Step 2. Choose table corresponding to 7063 P source head.

Worst Case Radiation Procedure (continued)

Step 3. Round down to next lower value of D or 20 ft. The corresponding value of K from the table is .003

Therefore: D = 20 ft.
K = .003

Step 4. The value of S is 200 mc in this example.

Therefore: $X = K \times S \times T \times .25 = .003 \times 200 \times 10 \times .25$

$X = 1.5$ mR/year

Item 16. Neither of the individuals named in items 6 & 7 have had formal training in the use of radioactive material. At the time of start-up a representative of the manufacturer will provide any specific training necessary for safe operation of the system. Radiation protection procedures have previously been devised and submitted in support of item 15. 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. Neither of the individuals named in items 6 & 7 have had prior experience with radioactive material.

CONTROL NO. 05319

VALUES OF D AND K FOR KAY-RAY SOURCE HOLDER

GAMMA SOURCE HEADS

KR Model No.	7056 7057	7050B 7060B	7051B 7061B	7062 7062P	7063	7063P
D (Ft.)	K (mr/hr)	K (mr/hr)	K (mr/hr)	K (mr/hr)	K (mr/hr)	K (mr/
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	7064P	7065	7067 7067P	7068 7069
D (ft.)	K (mr/hr)	K (mr/hr)	K (mr/hr)	K (mr/hr)	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