**MARTIN COMPANY**
Mail No. 729

NUCLEAR
DIVISION
Baltimore 3,
Maryland

January 29, 1963

United States Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Gentlemen:

Transmitted herewith are three (3) copies of an application for renewal of Byproduct Material License No. 19-1398-19 and three (3) copies of an application for renewal of Byproduct Material License No. 19-1398-27.

Yours very truly,

Richard H. Boutelle

Richard H. Boutelle, Chief
Health Physics Section

RHB:ebc

Enclosures (6)



A/106

Form AEC-313 (5-58)

ATOMIC ENERGY COMMISSION

# APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved. Budget Bureau No. 38-R027.4.

INSTRUCTIONS.–Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail three copies to: U. S. Atomic Energy Commission, Washington 25, D. C. Attention: Isotopes Branch, Division of Licensing and Regulation. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30 and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. *(Institution, firm, hospital, person, etc.)*

Martin-Marietta Corporation
Nuclear Division
Baltimore 3, Maryland

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. *(If different from 1 (a).)*

Middle River Plant
Middle River, Maryland

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Nuclear Components Department

3. PREVIOUS LICENSE NUMBER(S). *(If this is an application for renewal of a license, please indicate and give number.)*

Renewal of Byproduct Material License
No. 19-1398-19

4. INDIVIDUAL USER(S). *(Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)*

C. E. Hollens
Glenn Schaeffer

5. RADIATION PROTECTION OFFICER *(Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)*

Richard H. Boutelle

| 6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)* | (b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. *(If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)* |
|---|---|
| A. Iridium 192 | Sealed sources (Technical Operations Model A-424-1<br>Four sources not to exceed 50 curies each. Total 200 c. |
| B. Cobalt 60 | Sealed Sources (Technical Operations Model A-424-2<br>Two sources not to exceed 10 curies each. Total 20 c. |
| C. Thulium 170 | Sealed Sources (Technical Operation Type A<br>120 curies, not to exceed 60 curies per source. |
| D. Strontium-Yttrium 90 | Sealed Sources (Tracerlab Model RA-2 or Model S-1)<br>300 millicuries, not to exceed 150 millicuries per source. |
| E. Any byproduct material between Atomic Nos. 3 and 83 inclusive | Irridiated tool tips and irridiated Hastelloy C<br>2 curies total |



7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If byproduct material is for human use, supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)*

A. To be used in Technical Operations Models 412 or 498 exposure device for industrial radiography and in Technical Operations Model 414 source changer for source replacement and storage.
B. To be used in Technical Operations Model 402 exposure device for industrial radiography, and in Technical Operations Model 416 source changer for source replacement & storage.
C. To be used for instrument calibration, research and development, and industrial radiography.
D. To be used for instrument calibration and research and development programs.
E. To be used for laboratory studies of wear and corrosion.

(Continued on reverse side)

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## TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 *(Use supplemental sheets if necessary)*

| 8. TYPE OF TRAINING | WHERE TRAINED | DURATION OF TRAINING | ON THE JOB (Circle answer) | FORMAL COURSE (Circle answer) |
|---|---|---|---|---|
| a. Principles and practices of radiation protection | PREVIOUSLY SUBMITTED | | Yes No | Yes No |
| b. Radioactivity measurement standardization and monitoring techniques and instruments | | | Yes No | Yes No |
| c. Mathematics and calculations basic to the use and measurement of radioactivity | | | Yes No | Yes No |
| d. Biological effects of radiation | | | Yes No | Yes No |

9. EXPERIENCE WITH RADIATION. *(Actual use of radioisotopes or equivalent experience.)*

| ISOTOPE | MAXIMUM AMOUNT | WHERE EXPERIENCE WAS GAINED | DURATION OF EXPERIENCE | TYPE OF USE |
|---|---|---|---|---|
| | | PREVIOUSLY SUBMITTED | | |

10. RADIATION DETECTION INSTRUMENTS. *(Use supplemental sheets if necessary.)*

| TYPE OF INSTRUMENTS (Include make and model number of each) | NUMBER AVAILABLE | RADIATION DETECTED | SENSITIVITY RANGE (mr/hr) | WINDOW THICKNESS (mg/cm²) | USE (Monitoring, surveying, measuring) |
|---|---|---|---|---|---|
| PREVIOUSLY SUBMITTED | | | | | |

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.
PREVIOUSLY SUBMITTED

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*
PREVIOUSLY SUBMITTED

## INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. *(Circle answer)* Yes No PREVIOUSLY SUBMITTED

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source. Please refer to PROCEDURES FOR LEAK TESTING SEALED RADIATION SOURCES HPP-1 Revision A. (attached)

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. Decayed sources returned to vendor.

## CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, 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.

RECEIVED JAN 30 1963 U.S.A.E.C. Isotopes Branch Div. of L & R

Date January 29, 1963

Martin-Marietta Corporation
Applicant named in item 1

By: Richard H. Boutelle
Richard H. Boutelle, Chief
Health Physics Section
*Title of certifying official*

**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.

* U.S. GOVERNMENT PRINTING OFFICE : 1961 O—615963

MARTIN COMPANY

HPP-1 REVISION A LJB
August 28, 1962

# GENERAL PROCEDURES FOR LEAK TESTING SEALED RADIATION SOURCES

I. Purpose

Sealed radiation sources are leak tested for the purpose of detecting faulty or damaged source encapsulation which would allow release of radioactive material to the environment thereby creating a hazard to working personnel and possibly the public.

II. Sealed Sources Utilized in Remotely Operated Radiographic Devices

A. General

The sources included in this section are all sealed radiography sources incorporated in remotely operated radiographic equipment.

B. Procedure

1. At the time of the initial survey of a new radiographic exposure device, the Health Physicist will designate the nearest accessible area(s) which makes intimate contact with the source. This appropriate measuring point(s) shall be used thereafter as the location to be inspected by the wipe technique.
2. Wipes shall be taken using a cotton swab attached to a wooden stick, ("Q-Tip"). The swab shall be dipped in acetone or alcohol prior to wiping the area(s).
3. The swab shall be placed in an envelope and taken to the Health Physics Laboratory for counting.
4. The dry swab shall be counted using a thin window geiger-mueller or gas flow proportional counter and associated scaler. The counter shall be sufficiently sensitive to detect contamination levels far less than those specified in 10 CFR 31.105.

5. Results of all radiographic source leak tests shall be recorded in the Health Physics Monthly Source Inventory Log in units of microcuries and maintained for future reference. In the event that activity is measured, its significance will be noted and a recommended course of action will be followed. If the activity measured equals or exceeds the limits specified in the Commission regulations, the source will immediately be removed from service and sealed in a container to prevent the spread of contamination. As soon as practicable, the leaking source will be decontaminated and repaired or disposed of in accordance with 10 CFR 20.301 and 31.105.

C. Hazards and Precautions

The main hazard associated with leak testing these sources is the possibility of the surveyor's hand becoming contaminated. Immediately after performing the test and sealing the swab in the envelopes provided, the person shall monitor his hands and thoroughly wash them, if necessary.

D. Test Frequency

All sources shall be leak tested upon delivery to the Plant. Thereafter, they shall be leak tested with a frequency depending upon utilization. The more frequently a source is used, the more frequently it shall be tested. However, all sources shall be tested at least once every six month and at any time at the request of a user. The testing frequency shall be determined by the Health Physicist.

E. Sensitivity

The test described above will detect down to $10^{-5}$uc on a cotton swab.

F. Pertinent Experience of Personnel Performing Leak Testing

All Health Physics Personnel having demonstrated proficiency in the use and operation of all types of health physics survey and counting equipment and completed a minimum of 6 months on-the-job training will be assigned the task of leak testing radiation sources. Although some personnel have specialties within the scope of the health physics operations, every man must be able to perform all of the tasks required. This is done in order to establish a desirable degree of flexibility within the Health Physics Section. All leak testing will be performed under the Supervision of the Chief, Health Physics Section.

III. Sealed Sources Utilized in a Gamma Pool Facility

A. General

The sources included in this section are all sealed sources utilized in a pool type irradiator.

B. Procedure

1. a. Circulate the pool water using the circulation pump for 30 minutes prior to sampling in order to obtain a representative sample. Obtain a one (1) liter sample, after mixing, for analysis.

b. Alternate method for obtaining a representative sample in the event of power or pump failure, obtain three one (1) liter samples from the following depths:

(1) 4 feet below the pool surface.

(2) 8 feet below the pool surface.

(3) directly above the source configuration

Mix the three samples together and pour off a one (1) liter composite sample for analysis.

2. Place the liter sample in a poly bag.

3. Take several smears on the floor area adjacent to the sampling location.

4. Transport both the liquid and smear samples to the Health Physics Laboratory for analysis.

5. Transfer the pool sample to an evaporation vessel, add 2 milliliters of 1 N-$HNO_3$ and evaporate some down to approximately 50 ml. Transfer the 50 ml volume to a smaller vessel, rinse the large vessel thoroughly with demineralized water ( $\leq$ 10 ml) and continue the evaporation to 5 ml. Transfer the 5 ml sample to a counting planchet, rinse the evaporation vessel to insure complete transfer ( $\leq$ 2 ml) and evaporate to dryness.

6. The evaporated sample shall be counted using a thin window geiger-mueller or gas flow proportional counter and associated scaler. The counter shall be sufficiently sensitive to detect contamination levels far less than those specified in 10 CFR 20.303.

7. The results of all leak tests shall be recorded in the Gamma Pool Shield Water Log in units of microcuries per milliliter and maintained as permanent records for future reference. The results of previous analyses shall be compared with the present sample analysis to determine continued source integrity allowing for the fluctuations caused by the deionizer or addition of new

sources. The Health Physicist shall be notified in the event that the activity measured approaches 1/10 the limit specified in 10 CFR 20.303. If the activity measured exceeds the limit specified in the Commission regulations, the sources will be isolated one at a time and analyses will be performed to determine which source has ruptured. As soon as the faulty source has been identified, it will be removed from service and sealed in a container to prevent further spread of contamination. The leaking source will either be decontaminated and repaired by persons specifically authorized to do so by the Commission or it shall be disposed of in accordance with 10 CFR 20.301.

C. Hazards and Precautions

The main hazard associated with leak testing these source is the possibility of the surveyor's hand becoming contaminated while sampling. Care shall be exercised not to drip pool water on the floor adjacent to the pool facility. Immediately after obtaining the sample and placing it in the poly bag, the surveyor shall monitor his hands and thoroughly wash them, if necessary.

D. Test Frequency

The Gamma Pool Shield Water shall be analyzed at least once every six months. Additional analyses are conducted on a schedule consistent with sound radiological safety practices to ensure protection against radiation.

IV. Sealed Sources Utilized in a Shielded Gamma Irradiator for Dry Sample Irradiation.

A. General

The sources included in this section are all sealed sources utilized in a shielded dry irradiator.

B. Procedure

1. At the time of the initial survey of a new gamma irradiator, the Health Physicist will designate the nearest accessible area (s) which makes intimate contact with the source. This appropriate measuring point(s) shall be used thereafter as the location(s) to be inspected by the wipe technique.
2. Wipes shall be taken using a cotton swab attached to a wooden stick ("Q-Tip"). The swab shall be dipped in acetone or alcohol prior to wiping the area(s).
3. The swab shall be placed in an envelope and taken to the Health Physics Laboratory for counting.
4. The dry swab shall be counted using a thin window geiger-mueller or gas flow proportional counter and associated scaler. The counter shall be sufficiently sensitive to detect contamination levels far less than those specified by the Commission.
5. Results of all dry irradiator source leak tests shall be recorded in the Health Physics Source Inventory Log in units of microcuries and maintained as permanent records for future reference. In the event that activity is measured, its significance will be noted and compared with previous test results to determine source integrity. If the activity measured equals or exceeds

the limit specified by the Commission, the source will immediately be removed from service and sealed in a container to prevent the spread of contamination. As soon as practicable, the leaking source will be decontaminated and repaired by persons specifically authorized to do so by the Commission or disposed of in accordance with 10 CFR 20.301.

C. Hazards and Precautions

The main hazard associated with leak testing these sources is the possibility of the surveyor's hand becoming contaminated. The person performing the test shall monitor his hands and thoroughly wash them, if necessary, immediately after performing the test and sealing the swab in the envelope.

D. Test Frequency

The shielded gamma dry irradiator assembly(s) shall be leak tested at least once every six months. Additional analyses are conducted on a schedule consistent with sound radiological safety practices to ensure protection against radiation.

V. Sealed Sources Utilized for Instrument Calibration, Reactor Startup, Density Gauging, Space Experimental Studies and Thermo-Electric Devices.

A. General

The sources included in this section are all licensed alpha, beta gamma and neutron sources used for instrument calibration, reactor startup, density gauging, space radiation simulation studies and thermo-electric devices.

B. Procedure

1. The Health Physicist will designate the area(s) on the source or the nearest accessible area(s) which makes intimate contact with the source at the time of the initial survey of a new source, or shield assembly containing a new source. The designated measuring point(s) shall be used thereafter as the location(s) to be inspected by the wipe technique.
2. Wipes shall be taken using either a Q-Tip dipped in acetone or a dry 4.25 cm chemical filter paper attached on an extension rod, if necessary.
3. The Q-Tip or filter paper shall be placed in an envelope and taken to the Health Physics Laboratory for counting.
4. The wipe(s) shall be counted using a thin window geiger-mueller or gas flow proportional counter and associated scaler. The counter shall be sufficiently sensitive to detect contamination levels far less than those specified by the Commission.
5. The results of all source leak tests shall be recorded in the Health Physics Source Inventory Log in units of microcuries and maintained as permanent records for future reference. In the event that activity is measured, its significance will be noted and compared with previous test results to determine source integrity. If the activity measured equals or exceeds the limits specified by the Commission, the source will immediately be removed from service and sealed in a container to prevent the spread of contamination. As soon as practicable, the leaking source will be decontaminated and repaired by persons specifically authorized to do so by the Commission, or

disposed of in accordance with 10 CFR 20.301.

C. Hazards and Precautions

The main hazards associated with leak testing these sources is the potential exposure and possibility of the surveyor's hand becoming contaminated. The person performing the test shall exercise care to minimize his exposure and shall monitor his hands and thoroughly wash them, if necessary, immediately after performing the test and sealing the wipes in the envelope.

D. Test Frequency

All licensed sources shall be leak tested at least once every six months. Additional leak tests are conducted on a schedule consistent with sound radiological safety practices to ensure protection against radiation.

Richard J. Brisson
Richard J. Brisson
Sr. Health Physicist

Approved:

Richard H. Boutelle
Richard H. Boutelle, Chief
Health Physics Section

RJB:ebc