6-550-2

Form AEC-313 (9-55)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved. Budget Bureau No. 38-R027.3.

INSTRUCTIONS: Complete Items 1 through 19 if this is a new application. If renewal is requested, complete only Items 1 through 11 provided that with respect to the other items there has been no change in the information previously submitted. Mail two copies to: U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee, Attention: Isotopes Extension, Division of Civilian Application. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. General requirements for issuance of an AEC Byproduct Material License are contained in Title 10, Code of Federal Regulations, Part 30.

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

United Aircraft Corporation
Pratt & Whitney Aircraft
Fox Project, East Hartford, Conn.

(b) ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (*If different from shipping address*)

See attached sheet

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

See attached sheet

3. INDIVIDUAL USER (*Name and title of individual(s) who will use or directly supervise use of byproduct material*)

See attached sheet

4. RADIOLOGICAL SAFETY OFFICER (*Name of person qualified in radiological safety, if other than individual user*)

See attached sheet

5. PREVIOUS LICENSE OR AUTHORIZATION NUMBER (*If this is an application for renewal of a license for byproduct material obtained under a prior license or authorization for radioisotope procurement*)

See attached sheet

BYPRODUCT MATERIAL OR IRRADIATION SERVICE DESIRED

6. BYPRODUCT MATERIAL (*Element and mass number*)	7. CHEMICAL AND/OR PHYSICAL FORM (*Or catalog number*)	8. MAXIMUM AMOUNT OF RADIOACTIVITY IN MILLICURIES THAT YOU WILL POSSESS AT ANY ONE TIME
See attached sheet		See attached sheet

9. IF IRRADIATION SERVICE IS DESIRED, STATE PERTINENT DETAILS SUCH AS: CHEMICAL COMPOSITION AND WEIGHT IN GRAMS OF TARGET MATERIAL RADIOACTIVITY, IRRADIATION TIME IN DAYS, AND NEUTRON FLUX

None

STATEMENT OF USE

10. (a) DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (*If material is for "human use" complete Supplement A in lieu of this item. If material is to be used in or manufactured as a "sealed source" complete Supplement B in addition to this item.*)

See attached sheet

(b) DESCRIBE PROCEDURES WHICH WILL BE OBSERVED TO MINIMIZE HAZARD FROM HANDLING, STORAGE, AND DISPOSAL OF THE BYPRODUCT MATERIAL

See attached sheet

CERTIFICATE

11. 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 do solemnly swear (or affirm) that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief

State of Connecticut
County of Hartford
Subscribed and sworn to before me this 3rd day of May 1956

Basil D. Harris
Notary Public

UNITED AIRCRAFT CORPORATION
Applicant named in Item 1

By Charles T. Roelke
Charles T. Roelke, Assistant Secretary
Title of Certifying Official

May 3, 1956
Date

4-17

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.

(*Continued on reverse side*)

16—87264-

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

INSTRUCTIONS: Complete Items 12 through 19 if this is a new application. This information may be omitted from subsequent applications provided there is no change in the information previously submitted, and reference is made in Item 5 to the application on which this information appears.

TRAINING AND EXPERIENCE WITH RADIOACTIVITY OF INDIVIDUAL USER NAMED IN ITEM 3

12. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COUR (Circle answer
1. Principles and practices of radiological health safety.	See attached sheet		Yes No	Yes No
2. Radioactivity measurement standardization and monitoring techniques and instruments			Yes No	Yes No
3. Mathematics and calculations basic to the use and measurement of radioactivity.			Yes No	Yes No
4. Biological effects of radiation. . .			Yes No	Yes No
5. Actual use of radioisotopes in the types and quantities for which application is being made, or equivalent experience			Yes No	Yes No

13. ISOTOPE HANDLING EXPERIENCE

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
	See attached sheet			

14. If Radiological Safety Officer named in Item 4 is different from individual user named in Item 3, use supplementary sheet t provide equivalent information on "Training and Experience With Radioactivity of Radiological Safety Officer." Supplementary sheet is attached (*Circle answer*) (Yes) No

PHYSICAL FACILITIES, EQUIPMENT, AND RADIATION INSTRUMENTATION

15. RADIATION DETECTION INSTRUMENTS (*Use separate sheet 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*)
	See attached sheet				

16. FILM BADGES, DOSIMETERS, AND OTHER PERSONNEL MONITORING DEVICES INCLUDING BIO-ASSAY PROCEDURES

See attached sheet

17. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE (*For film badges specify method of calibration and processing, or nam supplier*)

See attached sheet

18. (a) DESCRIBE BRIEFLY REMOTE HANDLING EQUIPMENT, STORAGE CONTAINERS, SHIELDING, AND LABORATORY FACILITIES (*Working areas, fume hoods, etc.*)

See attached sheet

(b) SKETCHES OF SUCH FACILITIES ARE ATTACHED (*Circle answer*) Yes No

19. DESCRIBE BRIEFLY RADIATION SURVEYING PROCEDURES AND METHODS OF DISPOSING OF RADIOACTIVE WASTES

See attached sheet

U. S. GOVERNMENT PRINTING OFFICE 16—87264-5

6-550-2

Form AEC-313b (9-55)

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
SUPPLEMENT B—SEALED SOURCES

Form approved. Budget Bureau No. 38-R028.3.

If application is for byproduct material to be used in or manufactured as a "sealed source" complete this supplement and attach to the application for byproduct material license. Applicant for *use* of sealed source should complete Section I. An applicant desiring to *manufacture* a sealed source should complete Section II. If information has been submitted previously and there are no changes in the sealed source and/or device design or other changes in information submitted previously, details requested below may be omitted *provided* reference is made on line below to the application or other document on which this information appears:

SECTION I—USE (*See instructions*)

1. IF SEALED SOURCE OR DEVICE CONTAINING SEALED SOURCE IS MANUFACTURED COMMERCIALLY, GIVE FOLLOWING INFORMATION:

A. Manufacturer or supplier of sealed source and/or device Various

B. Make and model number of sealed source and/or device Various

C. Person who will hold legal title to sealed source Pratt & Whitney Aircraft, Fox Project, E. Hfd, Conn.

2. (a) NAME OF PERSON WHO WILL PERFORM NECESSARY PERIODIC LEAKAGE TESTS (*6-month intervals for beta-gamma; 3-month period for alpha emitters. See instructions*)

Dr. Gordon B. Wheeler or qualified representative

(b) IF ABOVE PERSON IS NOT THE SUPPLIER, MANUFACTURER, NOR A COMMERCIAL LABORATORY ROUTINELY OFFERING SUCH SERVICES, GIVE BRIEF STATEMENT OF EXPERIENCE OR TRAINING OF SUCH PERSON IN TECHNIQUES TO BE EMPLOYED, A STATEMENT OF LEAK TESTING PROCEDURES INCLUDING EVIDENCE OF ITS EFFICACY AND INSTRUMENTATION TO BE USED: See AEC 313 Item (14)

Leak testing will be as applicable, such as wipe tests or scrub tests and using such instrumentation of AEC 313 Item (15), as applicable, wherin quantitative determinations may be made.

3. ARRANGEMENTS WHICH WILL PREVAIL FOR PERFORMING INITIAL RADIATION SURVEY (*if appropriate*), SERVICING MAINTENANCE, REPAIR, CONTROL, AND DISPOSAL, ETC., OF THE SOURCE:

See AEC 313 Item (19)

SECTION II—MANUFACTURE

4. IF SEALED SOURCE TO BE MANUFACTURED OR FABRICATED BY THE APPLICANT IS DESIGNED TO TRANSMIT ONLY GAMMA RAYS AND CONTAINS IN ELEMENTAL FORM (*but not powders*) COBALT 60, IRIDIUM 192, GOLD 198, TANTALUM 182, OR THULIUM 170, GIVE FOLLOWING INFORMATION AND DISREGARD QUESTIONS 5 THROUGH 12 ON THIS SUPPLEMENT:

(a) Quantity of byproduct material per source and model number

(b) Leak testing procedure to be employed:

(c) Attach annotated engineering drawing of source container and holder, if any:

(d) Describe label to be affixed to source container and/or source holder (*or attach copy. See instructions*):

Sources will not be manufactured by applicant

(*Continued on reverse side*)

Form AEC-313b	APPLICATION FOR BYPRODUCT MATERIAL LICENSE SUPPLEMENT B–SEALED SOURCES	Page Two

ALL SEALED SOURCES OTHER THAN THOSE DEFINED IN ITEM 4

5. QUANTITY OF BYPRODUCT MATERIAL PER SOURCE AND MODEL OR DRAWING NUMBER

Various

6. MEANS BY WHICH BYPRODUCT MATERIAL WILL BE DEPOSITED IN SOURCE CONTAINER:

Various, per ORNL standards

7. ATTACH ANNOTATED ENGINEERING DRAWING OF SOURCE CONTAINER AND HOLDER, IF ANY:

per ORNL standards

8. TYPE OF SEAL TO BE USED TO PRECLUDE LEAKAGE OF RADIOACTIVITY TO EXTERIOR OF SOURCE:

Positive, per ORNL standards

9. IF SOURCE HOLDER IS TO BE USED WILL CONTAINER BE PERMANENTLY OR SEMIPERMANENTLY MOUNTED THEREIN?

Semipermanent

10. DESCRIBE LABEL TO BE AFFIXED TO CONTAINER AND/OR SOURCE HOLDER (*Or attach copy. See instructions*):

Standard recognized labels will be used.

11. EVIDENCE OF STABILITY OF SOURCE CONTAINER MATERIAL TO IRRADIATION FROM BYPRODUCT MATERIAL THEREIN (*Omit if such stability is obvious*):

-

12. LEAK TESTING PROCEDURE TO BE EMPLOYED INCLUDING EVIDENCE OF ITS EFFICACY AND INSTRUMENTATION TO BE USED:

See (2) (b)

DEVICES CONTAINING SEALED SOURCE

(Give following information if sealed source is to be mounted in a device)

13. ATTACH ANNOTATED ENGINEERING DRAWING OF DEVICE INCLUDING MODEL NUMBER AND DETAILS OF MOUNTING OF CONTAINER OR SOURCE HOLDER IN THE DEVICE:

-

14. DESCRIBE CONSTRUCTION AND OPERATION OF THE POSITIONING MECHANISM FOR BRINGING SOURCE INTO "ON" AND "OFF" POSITIONS:

-

15. DESCRIBE CONSTRUCTION AND OPERATION OF READILY VISIBLE INDICATOR OF DEVICE INDICATING "ON" AND "OFF" POSITIONS OF SOURCE:

-

16. DESCRIBE DESIGN FEATURES WHICH SERVE TO MINIMIZE RADIATION HAZARD FROM THE DIRECT BEAM AND SECONDARY RADIATION (*Including type and amou of shielding as well as limited accessibility inherent in installations where use is contemplated*)

-

17. DESCRIBE LABEL TO BE AFFIXED TO DEVICE (*Or attach copy. See instructions*):

-

18. RADIATION PROFILE OF A PROTOTYPE DEVICE IS ATTACHED. (*Circle your answer*): -	YES	NO

L-5505-2

April 25, 1956

Attachment sheet for AEC-313

Item 1(a) Name and shipping address of applicant:

Pratt & Whitney Aircraft
Fox Project
East Hartford 8, Conn.

Item 1(b) Addresses at which byproduct material will be used:

(1) P&WA Fox Project, East Hartford, Conn.
(2) P&WA Representative, University of California Radiation Lab., Livermore, Calif.
(3) P&WA Representative, National Reactor Testing Station, Idaho Falls, Idaho

Item 2 Department to use byproduct material:

Instrumentation Section, Fox Project

Item 3 Individual user:

(1) P. Bliss, Assistant Project Engineer, Fox Project, P&WA
(2) Manley Wu, P&WA representative at UCRL Livermore
(3) John Stewart, P&WA representative at NRTS.

Item 4 Radiological Safety Officer:

(1) Gordon B. Wheeler MD, Health Services, Fox Project, P&WA
(2) William Patton, Health Services representative at UCRL.

Item 5 Previous License or Authorization Number:

This constitutes a new application. Previous authorization AU35513 for 1.806 mc Sr-90 expires 12/31/56.

Items 6, 7, 8 Byproduct Material Desired:

	Material	Form	Maximum Total Inventory
(a)	Antimony 124(Be)	Sealed Sources	1000 millicuries
(b)	Cesium 137	Sealed Sources	1000 millicuries
(c)	Cobalt 60	Sealed Sources	5000 millicuries
(d)	Iridium 192	Sealed Sources	1000 millicuries
(e)	Polonium 210(Be)	Sealed Sources	15000 millicuries
(f)	Strontium 90	Sealed Sources	500 millicuries

Item 9 Irradiation Service Desired:

None

Item 10(a) Statement of use - Purpose:

Authorization is requested to possess within the next two year period the materials listed in Items 6, 7, and 8, for the purpose of instrument calibration, standardization, and development. The materials will be used as sealed beta, gamma, and neutron sources. This work is covered under AEC contract AT (11-1)-229 and AF contract 33(038)-27341.

Item 10(b) Statement of use - Handling, storage, and disposal procedures:

Sources will be stored in such manners that will minimize personnel hazards; gamma sources in lead pigs, concrete or water source wells, neutron sources in cadmium covered paraffin pigs, concrete or water source wells, beta sources stored in containers such that primary and secondard emissions are not hazardous. Water wells for source storage are drainable only to monitored holdup tanks. Sources large enough to constitute handling hazards will be handled by remote means in concrete cells. Sealed sources which might present leakage hazards will be checked for leakage periodically by recognized means. Disposal, if necessary, will be by recognized means such as sea burial or by return to vendor.

Item 11 Certificate

See AEC-313 Form Sheet

Item 12, 13 Training and Experience of Individual User:

The individual responsible named as at Fox Project is head of the Instrumentation Section of P&WA Fox Project and has had only job experience in handling radioisotopes. However, the personnel of the Section who will be directly concerned in source handling have had both formal and job training. This experience includes ORSORT training, Health Physics instrumentation and monitoring procedures, work with reactor beams, irradiated materials, neutron sources of the α-n, γ-n, d-d, and d-t types, tracer chemistry, and hot cell procedures. Experience also includes source construction and calibration. Job experience of these personnel varies from two to five years.

The individuals named for off-site receipt of active materials will be fully qualified to handle such calibrating sources as will be sent to them.

Item 14 Training and Experience of Radiological Safety Officers:

Gordon B. Wheeler MD

Training - Harvard School of Public Health - AEC Fellowship course in Radiation Physics and Chemistry and Occupational Medicine as Commissioned Officer of U. S. Public Health Service - 10/51 to 6/52

Practical Experience - New England Deaconess Hospital, Boston (Dr. Shields Warren) - Experience in therapeutic uses of various radio-isotopes - 6/52 to 9/52

State Department of Health - New Jersey - Physician on a physician/engineer team exploring possibilities of a pilot statewide radiation protection program including 10 weeks' experience off-site radiation monitoring at Nevada Proving Grounds - 10/52 to 7/53

Pratt & Whitney Aircraft - Supervisor of Special Health Services group. Responsible for the health and safety of personnel assigned to Fox (including Livermore and Oak Ridge) and Canel (nuclear engine) Projects. From 7/53 to present.

William F. Patton

Training - Vanderbilt University - under AEC Fellowship program Oak Ridge National Laboratory working with Health Physics group - 9/51 to 6/54

Practical Experience - Oak Ridge National Laboratory in Health Physics Section - 6/54 to 1/55

Pratt & Whitney Aircraft - Industrial Hygienist with Special Health Services group assigned to Fox Project and transferred to Livermore Research Laboratory. From 2/55 to present.

Item 15 Radiation Detection Instruments:

Instruments presently on hand or awaiting early delivery:

Type	Number	Sensitivity	Window	Use
NMC GS-3	4	0-20 mr/hr	30 mg	survey
T'lab SU-5A	1	0-20 mr/hr	30 mg	survey
NMC SS-3	1	background	heavy	survey
Vic. AN/PDR-10B	1	background	thin	survey
RCL Poppy Scaler	3	background	thin	survey
NRD Scint. head, ratemeter	1	background	various	survey
T'lab SU-3C Monitor	8	background	1.5 mg	lab monitor

Item 15 Continued

Type	Number	Sensitivity	Window	Use
Nuclear-Chicago 1500	2	background	30 mg	hand & foot
T'lab SU-1 H Cutie Pie	15	0-2.5 r/hr	2 mg	survey
Vic. 70A + 10 chb'rs	1 set	0-250 r	various	dose std's
Jordan RAMS	16 chan.	0-100 r/hr	heavy	monitor
NMC PCC-10	3	background	none	counting
NMC PCC-12	1	background	none	counting
NMC FPC-1	2	background	none	counting
RC CAX15A Scint. Head	1	background	various	counting
GM counting pig	1	background	1.5 mg	counting
RIDL 200J	5	-	-	scaler
T'lab SU-18	1	-	-	scaler
Victoreen 337	2	-	-	scaler

Additional neutron monitoring and survey equipment is to be obtained when necessary, such as BF_3 counter survey instruments, proton recoil counters, etc.

Item 16 Film badges, dosimeters, etc.:

Victoreen 200 mr pocket chambers, Keleket 200 mr pocket dosimeters, and Tracerlab film badge services are in use at present. Urinalyses are performed as necessary. Staplex High Volume and Millipore air samplers are used. Swipe tests for contamination are performed as necessary.

Item 17 Method, frequency, and standards of calibration:

The materials for which authorization is requested will be used for instrument calibration and standardization. A number of small calibrated alpha and beta standards are on hand for daily standardization of counting equipment. Small radium standards are on hand for calibration of gamma chambers. Frequency and techniques used are governed by the particular instruments involved.

Item 18 Handling equipment:

A calibrating cell will be available for source storage and use. This cell has one and two foot concrete walls and ceiling, a water-filled pit for source storage, a remote-operating crane, and a lead glass window for observing. A second cell will be similar to the ORNL "Well", see ORNL photo #12027. These cells are presently under construction and any activity obtained before the cells are available will be stored in protecting pigs.

Item 19 Survey procedures and disposal:

Use of sources will be restricted to limited access areas. Personnel involved in using sources are issued proper dosimeters and portable monitors are on hand for spot checks of radiation level or possible contamination. Fixed monitors with recorders are operated continuously in areas where activity is used. Sources are checked for possible leakage at periodic intervals; six months for beta-gamma, three month for alpha, weekly for radium. Water used for source storage periodically checked for contamination. Disposal, if any, will be by recognized means, such as sea burial in concrete, or by return to vendor.

owb/vml