

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

INSTRUCTIONS: Complete Items 1 through 19 if this is a new application. If renewal is requested, complete only Items 1 through 17 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 L, Oak Ridge, Tennessee. Attention: Isotopes Extension, Division of Civilian Applications. 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 50.

1. NAME AND SHIPPING ADDRESS OF APPLICANT

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

2. ADDRESSES AT WHICH BYPRODUCT MATERIAL WILL BE USED
(If different from shipping address)

See attached sheet

3. DEPARTMENT TO USE BYPRODUCT MATERIAL

See attached sheet

4. FEDERAL AGENCY USE ONLY

See attached sheet

5. FEDERAL AGENCY SAFETY OFFICER

See attached sheet

6. FEDERAL AGENCY LICENSE OR AUTHORIZATION NUMBER

See attached sheet

BYPRODUCT MATERIAL OR IRRADIATION SERVICE DESIRED

7. CHEMICAL AND/OR PHYSICAL FORM

See attached sheet

8. MAXIMUM AMOUNT OF BYPRODUCT MATERIAL OR IRRADIATION SERVICE DESIRED AT ANY ONE TIME

See attached sheet

9. IRRADIATION SERVICE DESIRED. STATE PERTINENT DETAILS SUCH AS CHEMICAL COMPOSITION AND WEIGHT IN GRAMS OF TARGET MATERIAL, RADICAL TYPE, INTENSITY OF IRRADIATION, AND NEUTRON FLUX

None

STATEMENT OF USE

10. DESCRIBE IN DETAIL THE BYPRODUCT MATERIAL WILL BE USED FOR

See attached sheet

11. DESCRIBE THE PRECAUTIONS WHICH WILL BE OBSERVED TO MINIMIZE HAZARD FROM HANDLING, STORAGE, AND DISPOSAL OF THE BYPRODUCT MATERIAL

See attached sheet

CERTIFICATE

12. I hereby certify that the information furnished in this application is true and correct to the best of my knowledge and belief, and that I am duly qualified to make such a statement.

Edward J. Harris

Charles E. ...

May 3, 1950

4-18

WARNING

13. THIS LICENSE IS VALID ONLY IF THE BYPRODUCT MATERIAL IS USED IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE LICENSE AND THE REGULATIONS OF THE ATOMIC ENERGY COMMISSION.

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
SUPPLEMENT B SEALED SOURCES

ALL SEALED SOURCES OTHER THAN THOSE DEFINED IN ITEM 4

5. QUANTITY OF BYPRODUCT MATERIAL PER SOURCE AND MODEL OR DESIGNATION

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

Standard recognized labels will be used.

11. EVIDENCE OF STABILITY OF SOURCE CONTAINER MATERIAL TO IRRADIATION FROM BYPRODUCT MATERIAL THEREIN

-

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

See (2) (b)

DEVICES CONTAINING SEALED SOURCE

(to be filled in by applicant)

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 amount of shielding as well as limited accessibility to source container*

-

17. DESCRIBE LABEL TO BE AFFIXED TO DEVICE *(See instructions)*

-

18. RADIATION PROFILE OF A PROTOTYPE DEVICE IS ATTACHED *(See instructions)*

YES NO

2-550

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
SUPPLEMENT B SEALED SOURCES

Form No. 100-3-100

If applicant is not a manufacturer, supplier, or distributor of sealed sources, the applicant should state the name of the manufacturer, supplier, or distributor from whom the sealed sources are being obtained. If the applicant is a manufacturer, supplier, or distributor, the applicant should state the name of the manufacturer, supplier, or distributor from whom the sealed sources are being obtained. The applicant should also state the name of the person who will perform the necessary periodic leakage tests. The applicant should also state the name of the person who will perform the necessary periodic leakage tests. The applicant should also state the name of the person who will perform the necessary periodic leakage tests.

SECTION I—USE

1. If sealed source or device containing sealed source is manufactured commercially, give following information:
A. Name of manufacturer, supplier, or distributor: **Various**
B. Name of manufacturer, supplier, or distributor: **Various**
C. Name of manufacturer, supplier, or distributor: **Pratt & Whitney Aircraft, Fox Project, E.Hfc, Conn.**

2. Name of person who will perform necessary periodic leakage tests: **Dr. Gordon B. Wheeler or qualified representative**

3. If applicant 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 equipment, techniques, 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, wherein quantitative determinations may be made.

4. Arrangements which will prevail for performing initial radiation source service, maintenance, repair, and replacement: **See AEC 313 Item (19)**

SECTION B—MANUFACTURE

1. If sealed source or device containing sealed source is manufactured by applicant, is designed to contain, and contains, in elements, a substance which is a byproduct of a nuclear reaction, the applicant should state the name of the substance, the name of the element, and the name of the isotope.

Sources will not be manufactured by applicant

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 <small>(Circle answer)</small>	FORMAL COURSE <small>(Circle answer)</small>
1. Principles and practices of radiological safety	See attached sheet		Yes ___ No ___	Yes ___ No ___
2. Knowledge of measurement standards, apparatus and instruments			Yes ___ No ___	Yes ___ No ___
3. Mathematics and other factors 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 to 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 <small>(Indicate make and model number of each)</small>	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE <small>(CPM)</small>	WINDOW THICKNESS	USE <small>(Monitoring, surveying, measuring)</small>
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 name 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

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) F. Bliss, Assistant Project Engineer, Fox Project, P&WA
- (2) Marley W., P&WA representative at UCRL Livermore
- (3) John Stewart, P&WA representative at NRTS.

Item 4 Radiological Safety Officer:

- (1) Gordon E. 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 AEC-313 for 1.806 mc Sr-90 expires 12/31/56.

Items 6, 7, 8 Byproduct Material Desired:

<u>Material</u>	<u>Form</u>	<u>Maximum Total Inventory</u>
(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	25000 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)-27321.

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 secondary 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 Users:

The individual responsible named as at Fox Project is head of the Instrumentation Section of PWR 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 ^{252}Cf , ^{240}Pu , and ^{241}Am types, trace counting, 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 calibration sources as will be sent to them.

Item 11

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. Shield 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 Canal (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 SS-3	4	0-20 mr/hr	30 mg	surv
Tilak SS-5A	1	0-20 mr/hr	30 mg	surv
NMC SS-3	1	background	heavy	surv
Vac. AN/PDR-10E	1	background	thin	surv
RCI Poppy Scaler	3	background	thin	surv
NMC SS-3 head ratemeter	1	background	various	surv
Tilak SS-50 Monitor	8	background	10 mg	surv

April 25, 1956

Item 15 Continued

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

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. Urinalys 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 technique 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 processing pipes.

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

IN REPLY REFER TO:
IFB:REC (877)

Oak Ridge, Tennessee
May 31, 1956

Dr. P. Bliss
Assistant Project Manager
United Aircraft Corporation
Pratt & Whitney Aircraft
Fox Project
East Hartford, Connecticut

Subject: APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Dear Dr. Bliss:

Prior to issuing a license for the procurement of byproduct material, we would appreciate clarification as to whether or not handling equipment, storage facilities, and instruments are the same at all three installations where you plan to use radioisotopes. If they are not the same, we would like specific details about the facilities at each installation.

We would also like to receive a copy of the written administrative instructions establishing radiological protection control procedures that will be furnished to all individuals responsible for handling the licensed material. The procedures should include the assignment of responsibility for radiological protection and security of the source from unauthorized use.

Please be assured that upon receipt of the above information your application will be given prompt consideration.

Very truly yours,

for: Lester R. Rogers, Chief
Byproduct Licensing Branch
Isotopes Extension
Division of Civilian Applications

Isotopes
Isotopes

PRATT & WHITNEY AIRCRAFT

DIVISION OF THE PRATT & WHITNEY CORPORATION
EAST BRIDGEWATER, CONNECTICUT
AERONAUTICAL

676
~~Handwritten signature~~
REC

June 9, 1956

Mr. Lester R. Rogers
Chief, Byproduct Licensing Branch
Isotopes Extension
Division of Civilian Application
Atomic Energy Commission
Oak Ridge, Tennessee

Ref: IEE: REC 877

Dear Sir:

In reply to your letter, the handling equipment, storage facilities, and instrumentation as described in our authorization request are as of the installation at Fox Project - CANEL. The instruments listed are largely in use at present and additional quantities are presently on order. Our Special Health Services department is the operating organization presently handling safety procedures as is necessary under our AEC and Air Force contracts.

Regarding the equipment at our Livermore operation, this is a presently operating hot lab handling large quantities of radioactives and, as such, has on hand a number of area monitors, survey instruments, and personnel monitoring equipment. Control is handled by a representative of the Fox Project Special Health Services as named in our request. This equipment should be sufficient to handle the instrument calibrating sources that we would wish to transfer there from time to time. The work is under cognizance of the San Francisco Operations Office.

Regarding our operations at the National Reactor Testing Station at Idaho Falls, they are under the control of the applicable Health Physics Group there. Certain of our equipment which we wish to transfer to that site from time to time to insure radioactive check sources, such as the Jordan HAMS system that we presently have on hand under AU-35513 for Strontium 90.

Mr. Lester R. Rogers

June 12, 1956

Administrative procedures and responsibilities of our Special Health Services Group in relation to radiation hazards follow those illustrated in our "Manual for Source and Special Nuclear Materials Control", particularly page 24, a copy of which (No. 31) I am enclosing. Also enclosed is a copy of one of our Radiation Hazard Notification sheets which happens to be involved in an operation typical in present radiation work here.

Very truly yours,

PRATT & WHITNEY AIRCRAFT

P. Blist
Philip Blist
Fox Project

Ph:ps

Enc. 1 4 1018

cc: C. W. Bilhara
Dr. G. E. Wheeler
J. T. Consiglio, Hartford Area AEC

MANUAL FOR SOURCE
AND SPECIAL NUCLEAR MATERIALS CONTROL

PWA & PWL

OFFICIAL USE ONLY

*Illustrations of all forms
mentioned in the text will
be found at the back of the
manual.*

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