Form AEC-313
(2-57)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

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

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 two copies to: U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tenn. Attention: Isotopes Extension, Division of Civilian Application. 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.)*

McDonnell Aircraft Corporation
P. O. Box 6101
St. Louis, Missouri

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

Same

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Research — Manufacturing
Inspection — General Engineering
Quality Control

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

24-2261-1
24-2261-2

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.)*

William L. Kester, Associate Scientist
James G. Harris, Gen'e Foreman Inspection
Nicholas A. Lamb, Chief, Process Control
C. G. Young, Scientist (Chairman, Isotope Committee)

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.)*

William L. Kester (Acting)

6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)*

Iron-59
Cobalt-60
Krypton-85
Iodine-131
Cesium-137
Tungsten-185
Tungsten-187
Iridium-192
Thallium-204
Radium-226
Chromium-51
Molybdenum-93
Niobium-94
Tantalum-182

(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.)*

(See attachment)

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.)*

Krypton to be used in illuminators. ?
Iridium to be used in radiography.
Cobalt to be used in standardization, radiography and wear studies.
Cesium to be used in tagging tools.
Tungsten and Iron used in wear studies.
Thallium and Radium used as standard sources.
Iodine used as tracer.
Chromium, molybdenum, niobium, tantalum used in wear studies

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(Continued on reverse side)

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	See attachment No. 8		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 affects 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
		See attachment No. 9		

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/cm^2)*	USE *(Monitoring, surveying, measuring)*
Thyac Survey Meter Victoreen 389C	1	beta gamma	.01 - 20 mr	5	survey
Cutie Pie, NRD CS-40	2	gamma	1 mr - 20 r	-	monitor, survey
NRD Scintillation Probes Penetrometers	5	gamma	.001 - 10 mr	-	survey

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.
Calibrated using standard Co-60 and Ra-226 sources. Calibrated monthly and after any repair.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*
7 film badges provided weekly. Tracerlab
8 Victoreen dosimeters, pocket 0-200 mr. 2 changers

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
See attachment #13

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.
See attachment #14

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. Oak Ridge National Laboratory

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.

Date 6 October 1958

McDonnell Aircraft Corporation
Applicant named in Item 1

By:

Director of Research
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.

ATTACHMENT 6B

Kr-85	8 sealed sources 150 mc each; 16 sealed sources 20 mc each. Total 2 curies U. S. Radium Model LAB-484-1A	2 curies
Co-60	2 curies - sealed source need mod No ORNL of ISC	4 curies
Cs-137	Capsules containing 4 microcuries Cs-137 - produced by Nuclear Consultants, Inc.	100 millicuries
Ir-192	5 sealed sources 2 curies each Isotope Specialties Type 30	10 curies
Co-60	2 sealed sources, calibrated, up to 100 millicuries each, for calibration of survey instruments ORNL or Isotope Specialties	200 millicuries
Ra-266	2 sealed sources, up to 1.0 millicurie each, standard source Supplier unknown as yet	2 millicuries
Co-60 W-185 Fe-59 Cr-51 Mo-93 Nb-94 Ta-182	Irradiated tools, bearings, gears, to be used in wear studies	10 curies
I-131	Solution of KI-131 to be used in tracer studies. 4 up to 100 mc	200 millicuries
Tl-204	10 millicuries solution for standardization of counters	20 mc
Cs-137	10 millicuries solution for standardization of counters	20 mc
Co-60	10 millicuries solution for standardization of counters	20 mc

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TRAINING AND EXPERIENCE WITH RADIOACTIVITY

William L. Kester

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8. Type of Training	Where Trained	Duration of Tng.	On the Job	Formal
a. Principles and Practices of Radiation Protection	University of Chicago Argonne National Lab Convair, Ft. Worth	1946 - 1949 1949 - 1955 1955 - 1958	yes	yes
b. Radioactivity Measurement Standardization and Monitoring Techniques and Instrumentation	University of Chicago Argonne National Lab Convair, Ft. Worth	1946 - 1949 1949 - 1955 1955 - 1958	yes	yes
c. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	University of Chicago Argonne National Lab Convair, Ft. Worth	1946 - 1949 1949 - 1955 1955 - 1958	yes	yes
d. Biological Effects of Radiation	Argonne National Lab Convair, Ft. Worth	1949 - 1955 1955 - 1958	yes	no

9. Experience with Radiation

Isotope	Max Amounts	Where Exp. Was Gained	Duration of Experience	Types of Use
Po^{210}	50c	Convair, Ft. Worth	3 years	PoBe neutron Source, Scattering Exps.
Co^{60}	3000c	"	"	Radiation Effects, Calibration, Scatter
Ra^{226}	.5c	"	"	Standard Thermal Neutron Pile
Kr^{85}	.5c	Convair and Argonne	7 years	Bremstrahlung Sources, Fission Yield
A^{41}	.5c	" "	"	Reactor Hazards Experiments
I^{131}	.1c	" "	"	Xe^{131} Production, Tracer Exps.
Xe^{133}	.1c	" "	"	Detector Experiments
Fission Products	5c	" "	"	Reactor Hazards Experiments
Reactor Irradiation	—	Convair, Ft. Worth	3 years	Radiation Effects, Hazards Exps., Material Irradiation.

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TRAINING AND EXPERIENCE WITH RADIOACTIVITY

C. G. Young, Jr.

8. Type of Training	Where Trained	Duration of Trng.	On the Job	Formal
a. Principles and Practices of Radiation Protection	Special Weapons Course AFSWP Sandia Base, New Mexico	6 mos.	x	x
	Nuclear Reactor Engineering, University of Maryland	1 year		x
b. Radioactivity Measurement Standardization and Monitoring Techniques and Instrumentation	Special Weapons Course AFSWP Sandia Base, New Mexico	6 mos.	x	x
	Nuclear Reactor Engineering, University of Maryland	1 year		x
c. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	Special Weapons Course AFSWP Sandia Base, New Mexico	6 mos.	x	x
	Nuclear Reactor Engineering, University of Maryland	1 year		x
d. Biological Effects of Radiation	Special Weapons Course AFSWP Sandia Base, New Mexico	6 mos.	x	x
	Nuclear Reactor Engineering, University of Maryland	1 year		x

9. Experience with Radiation

Isotope	Max. Amounts	Where Exp. was Gained	Duration of Experience	Types of Use
Ir-192	2 curies	McDonnell Aircraft Corp.	1 mo.	Radiography
Sr-90	6 curies	Los Alamos Scientific Lab.	1 year	Densitometer Design

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TRAINING AND EXPERIENCE WITH RADIOACTIVITY

Nicholas A. Lamb

8. Type of Training	Where Trained	Duration of Trng.	On the Job	Formal
a. Principles and Practices of Radiation Protection	Mass. Inst. Tech. Summer Course #10209	2 weeks	x	x
	McDonnell Aircraft Corp.	1 year	x	x
b. Radioactivity Measurement Standardization and Monitoring Techniques and Instrumentation	Mass. Inst. Tech. Summer Course #10209	2 weeks	x	x
	McDonnell Aircraft Corp.	1 year	x	x
c. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	Mass. Inst. Tech. Summer Course #10209	2 weeks	x	x
	McDonnell Aircraft Corp.	1 year	x	x
d. Biological Effects of Radiation	Mass. Inst. Tech. Summer Course #10209	2 weeks	x	x
	McDonnell Aircraft Corp.	1 year	x	x

9. Experience with Radiation

Isotope	Max. Amounts	Where Exp. was Gained	Duration of Experience	Types of Use
Ir-192	2 curies	McDonnell Aircraft Corp.	6 mos.	Radiography
X-ray	250 kv	McDonnell Aircraft Corp.	1 year	Radiography

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TRAINING AND EXPERIENCE WITH RADIOACTIVITY

James G. Harris

8. Type of Training	Where Trained	Duration of Trng.	On the Job	Formal
a. Principles and Practices of Radiation Protection	Univ. of Missouri	3 mos.	x	x
	Washington Univ.	3 mos.	x	x
	McDonnell Aircraft Corp.	1 year	x	x
b. Radioactivity Measurement Standardization and Monitoring Techniques and Instrumentation.	Univ. of Missouri	3 mos.	x	x
	Washington Univ.	3 mos.	x	x
	McDonnell Aircraft Corp.	1 year	x	x
c. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	Univ. of Missouri	3 mos.	x	x
	Washington Univ.	3 mos.	x	x
	McDonnell Aircraft Corp.	1 year	x	x
d. Biological Effects of Radiation	Univ. of Missouri	3 mos.	x	x
	Washington Univ.	3 mos.	x	x
	McDonnell Aircraft Corp.	1 year	x	x

9. Experience with Radiation

Isotope	Max. Amounts	Where Exp. was Gained	Duration of Experience	Types of Use
Ir-192	2 curies	McDonnell Aircraft Corp.	6 mos.	Radiography
X-ray	250 Kv	McDonnell Aircraft Corp.	3 years	Radiography

Attachment No. 13

The Radioisotope Laboratory, Figure 1, contains facilities for the inspection, testing and calibration of radioactive sources and for low-level radiochemical operations.

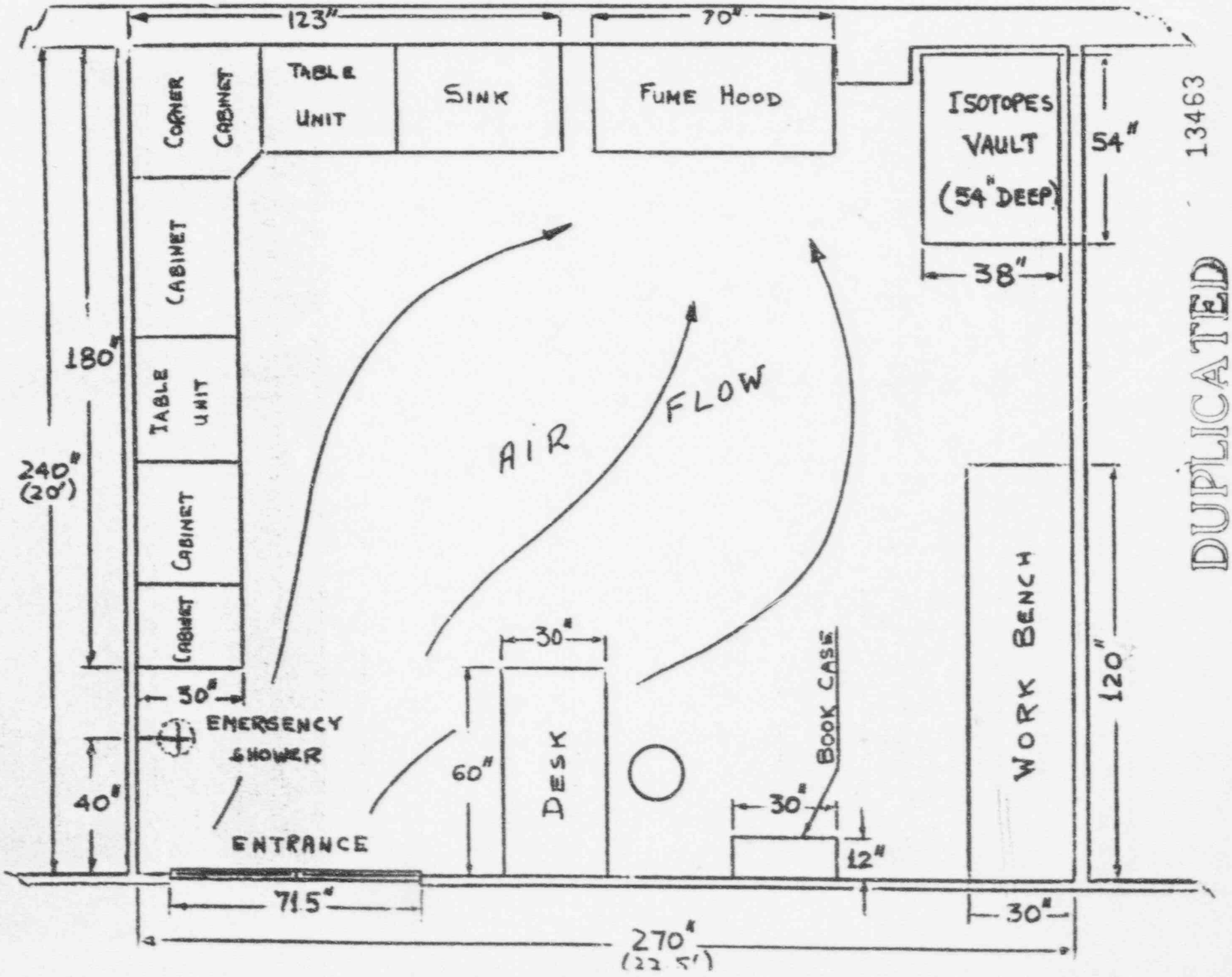
Reduced air pressure in the room minimizes the chance spread of airborne activity from the laboratory in the event of an accidental spill. Air flowing from the entrance diagonally across the room, is vented directly to the outside through a radiological hood. The hood is a stainless steel Metalab Model IH-72 equipped with a filter and a blower capable of furnishing a minimum air flow of 750 cfm at all times.

The laboratory is equipped with Aloe Scientific Company stainless steel topped furniture. The floor is covered with waxed asphalt tile which can be replaced easily in cases of contamination.

A concrete storage vault, Figure 2, is located in the corner by the hood. This vault is designed and built in such a manner that the major portion is underground in order to take advantage of the shielding afforded by the surrounding earth. Shielding in the form of concrete plugs can be lowered into the various sections of the vault to reduce the intensity of stray radiation to values below those set forth in 10 CFR 20.

RADIOISOTOPE LABORATORY

FIG 1



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