

License Number **24-2261-3**
(666)

Amendment No. **12**

McDonnell Aircraft Corporation
St. Louis, Missouri

Attention: **William L. Kester** **H. E. Winn**
T. C. Link **C. J. Wolf**
F. C. McCallister, Jr. **Joseph F. Froechtenigt**
C. S. Sittler **R. G. Plummer**
N. A. Lamb

In accordance with application dated June 25, 1965, License No. 24-2261-3 is amended as follows:

To add:

<p>6. Byproduct material (element and mass number)</p> <p>X. Hydrogen 3</p> <p>Y. Strontium 90</p>	<p>7. Chemical and/or physical form</p> <p>X. Foil in Jarrell-Ash Model 28-750 or 28-751 detector cells</p> <p>Y. Foil in Jarrell-Ash Model 28-752 or 28-755 detector cells</p>	<p>8. Maximum amount of radioactivity which licensee may possess at any one time</p> <p>X. Not to exceed 100 milli-curies per cell</p> <p>Y. Not to exceed 20 milli-curies per cell</p>
--	---	---

9. Authorized use

X. and Y. To be used with Jarrell-Ash Company gas chromatography units for sample analysis.

To amend Condition 13 A and add Condition 20 to read:

13. A. Byproduct material shall be used by, or under the supervision of, William L. Kester, T. C. Link, F. C. McCallister, Jr., H. E. Winn, C. J. Wolf, Joseph F. Froechtenigt, or N. A. Lamb.

20. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in Section 20.203(a)(1), Title 10, Code of Federal Regulations, Part 20, the licensee is hereby authorized to label detector cells and cell baths, containing byproduct material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.

For the U. S. Atomic Energy Commission

Date JUL 2 1965

Original Signed by
Robert E. [Signature]
Isotopes Branch
by Division of Materials Licensing
Division of Licensing and Regulation
Washington 25, D. C.

1. REB/rel

REB 7/2/65

A1389

MCDONNELL *Aircraft Corporation*
Lambert-Saint Louis MUNICIPAL AIRPORT • BOX 516 ST LOUIS MO 63166

29 JUN 1965
Ref: USAEC-220-2789

United States Atomic Energy Commission
Washington 25, D. C.

Attention: Robert E. Brinkman
Isotopes Branch
Division of Licensing and Regulation

Subject: Byproduct Material License Modification

Enclosures: (1) AEC Form 313 (3 copies)

Gentlemen:

1. Completed forms AEC 313 are submitted in application for renewal of Byproduct Material License 24-2261-3, issued to McDonnell Aircraft Corp.
2. The sources listed in paragraph 6b of the application are commercial items supplied by Jarrell-Ashe for use as ionization sources in the detector of their Model 28-700 gas chromatograph.
3. Should you wish further information concerning these devices, please do not hesitate to contact me.

Yours very truly,

MCDONNELL AIRCRAFT CORPORATION



W. L. Kester
Scientist
Research Division

NOTES
MAIL ROOM
RECEIVED
JUL 1 1965
WIK:enc

COPIES TO
JUL 1 1965

RECEIVED

A/290

9701170419 / P

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

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, D.C., 20545. 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.) McDonnell Aircraft Corporation Lambert-Saint Louis Municipal Airport Box 516 St. Louis, Missouri 63166		(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (If different from 1 (a)) SAME AS 1. (a)
2. DEPARTMENT TO USE BYPRODUCT MATERIAL Quality Control		3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.) 24-2261-3
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.) N. A. Lamb See Original Application for Resume		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.) T. C. Linck Same as Original Application
6. (a) BYPRODUCT MATERIAL. (Elements and mass number of each.) Hydrogen-3 Strontium-90	(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLCURIES 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.) 2 100 Millicurie sealed sources 2 20 Millicurie sealed sources	
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.) These sources are used in the detector system of a Jarrell-Ashe model 28-700 Gas Chromatograph and are supplied by Jarrell-Ashe for this purpose.		

69332

(Continued on reverse side)

0701170423 280

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 Use supplemental sheets if necessary

B. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)		FORMAL COURSE (Circle answer)	
			Yes	No	Yes	No
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						

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE

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)

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

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

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

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.

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 estimate of the type and amount of activity involved.

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 THE 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

25 June

RECEIVED

JUL 1 PM

1965

U.S. ATOMIC ENERGY COMMISSION

REGISTRATION DIVISION

MAIL ROOM

McDonnell Aircraft Corporation

Applicant named in item 1

By:

W. L. Kester

Scientist

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.

MCDONNELL *Aircraft Corporation*
Lambert-Saint Louis MUNICIPAL AIRPORT • 807 316 ST LOUIS MO 63166

24 March 1966
Ref: USAEC-220-3237

United States Atomic Energy Commission
Washington 25, D. C.

Attention: Isotopes Branch
Division of Licensing and Regulation

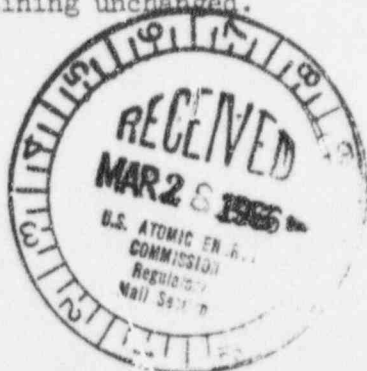
Subject: Byproduct Material License Modification

Enclosures: (1) AEC form 313 (3 copies)

Gentlemen:

1. Forms AEC 313 are submitted in application for modification of Byproduct Material License #24-2261-3 issued to McDonnell Aircraft Corporation.
2. Programs being initiated in the Research Division call for the use of a wide variety of radioisotopes and source configurations. The licensed materials are to be used in research and development of isotope heat sources, dosimeters, precision spectrometers, nuclear electric power sources and spectrometer systems for neutron activation and x-ray fluorescence analysis. Such a wide variety of research programs make it impractical to attempt to forecast exact material requirements.
3. In view of the above, we request that our license be modified to permit possession and use of any byproduct material between Atomic number 3 and 89, inclusive, in any form. We request a possession limit of 25 millicuries of each material.
4. We further request that paragraph 6, section N, relating to Americium 241 be changed to 2 millicuries of Am-241, as sealed sources of not over 1 millicurie each, and up to 10 microcuries of Americium 241 in any form.
5. The above modification should apply only to parts A through O of paragraph 6, with the parts P through Y remaining unchanged.

DUPLICATED
FOR DIV. OF COMPLIANCE

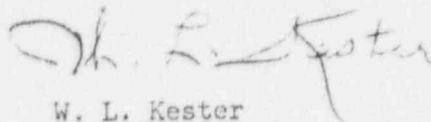


9401170445 2PP

6. Should you require further information, please contact me.

Yours very truly,

MCDONNELL AIRCRAFT CORPORATION



W. L. Kester
Scientist
Research Division

WLK:nb



Form AEC-513
(5-58)

ATOMIC ENERGY COMMISSION

Form approved
Budget Bureau No. 38-8027-4

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

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.)		(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. (If different from 1 (a).)	
McDonnell Aircraft Corporation Lambert Saint Louis Municipal Airport Box 516 St. Louis, Missouri 63166		McDonnell Aircraft Corporation Lambert Saint Louis Municipal Airport Box 516 St. Louis, Missouri 63166	
2. DEPARTMENT TO USE BYPRODUCT MATERIAL		3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.)	
Research Division		24-2261-3	
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.)		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.)	
W. L. Kester R. F. Reising N. K. Flammang		T. C. Link	
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.)	
Any byproduct material with Atomic numbers 3 to 89, inclusive. Americium 241		Any chemical and/or physical form and quantities up to 25 millicuries each. 2 each 1 millicurie sealed sources, and 10 microcuries in any chemical and/or physical form.	
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.)			
Alpha, beta and gamma sources are required for research programs involving development of: 1. Isotopic heat sources 2. SNAP generators 3. Neutron activation analysis 4. X-ray fluorescence 5. Precision dosimetry and spectrum analysis systems 6. Studies of the effect of count rates, gamma contribution to β spectra, and sum spectra interpretation			
CONTINUED ON SUPPLEMENTAL SHEET			

(Continued on reverse side)

9701070453 SEP

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

B. 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		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring technique 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
SEE ATTACHMENT				

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)
SAME AS ORIGINAL APPLICATION					

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

SAME AS ORIGINAL APPLICATION

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

SAME AS ORIGINAL APPLICATION

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 <input checked="" type="checkbox"/> No
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. SAME AS ORIGINAL APPLICATION
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. SAME AS ORIGINAL APPLICATION

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 23 Mar 1966

McDonnell Aircraft Corporation

Applicant named in item 1

By: *John E. Kester*

Scientist, Research Division

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.

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED.
CONT.

By product material may be purchased as:

1. Aqueous solution for use in preparation of radiation sources having precisely known characteristics.
2. As alloys for use in research on heat sources and electrical power generation.

The changing requirements of a research program make it impractical to list detailed specifications for each material that may be used.

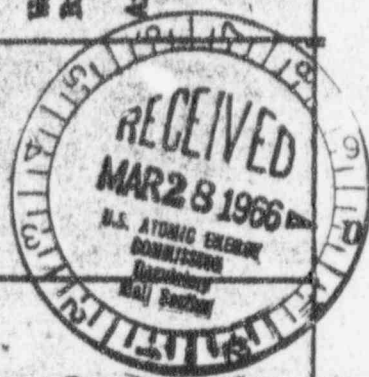


TRAINING AND EXPERIENCE WITH RADIOACTIVITY

R. F. Reising

8. Type of Training		Where Trained	Duration of Eng.	On the Job	Formal
a.	Principles and Practices of Radiation Protection	Washington University Argonne National Lab	1959 - 1963 1963 - 1965	Yes Yes	Yes Yes
b.	Radioactivity Measurement Standardization and Monitoring Techniques and Instrumentation	Washington University Argonne National Lab	1959 - 1963 1963 - 1965	Yes Yes	Yes Yes
c.	Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	Washington University Argonne National Lab	1959 - 1963 1963 - 1965	Yes Yes	Yes No
d.	Biological Effects of Radiation	Washington University Argonne National Lab	1954 - 1963 1963 - 1965	Yes Yes	Yes No

9. Experience with Radiation		Where Exp. Was Gained	Duration of Experience	Types of Use
Isotope	Max Amount	Washington University Argonne National Lab	4 years 1-1/2 years	A & γ Sources For Decay Scheme Studies. Prep. and Use.
$Z = 11$ to $Z = 83$ γ & α emitters)	10mc	Argonne National Lab	1-1/2 years	Cyclotron Targets For Fission Studies And Sources For Decay Scheme Studies. Prep. and Use.
- 89 to $Z = 98$	10mc	Washington University Brookhaven National Lab	4 years 2 weeks	Decay Scheme Studies of ^{235}U , ^{238}U And ^{239}Pu
Cyclotron Irradiations		Argonne National Lab		Determination of The Transition State Energies In Energetic Fission



TRAINING AND EXPERIENCE WITH RADIOACTIVITY

Norbert K. Flammang

8. Type of Training	Where Trained	Duration of Tng.	On the Job	Formal
a. Principles and Practices of Radiation Protection	Washington University MAC	1958 - 1962 1962 - Present	Yes Yes	Yes No
b. Radioactivity Measurement Standardization and Monitoring Techniques and Instrumentation	Washington University MAC	1958 - 1962 1962 - Present	Yes Yes	Yes No
c. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity	Washington University MAC	1958 - 1962 1962 - Present	Yes Yes	Yes No
d. Biological Effects of Radiation	Washington University	1958 - 1962	Yes	Yes

9. Experience with Radiation

Isotope	Max Amounts	Where Exp. Was Gained	Duration of Experience	Types of Use
Be ¹⁰	50mc	Washington University	3 years	Cyclotron Experiments
B ¹²	20mc	Washington University	3 years	Half-Life Experiment, Decay Scheme
Cl ⁴⁰	20mc	Washington University	3 years	Half-Life Experiment, Decay Scheme
Ag ¹⁰⁸	100mc	MAC	4 months	Reactor And Counting System Calibration
Ag ¹¹⁰	100mc	MAC	4 months	Reactor And Counting System Calibration
In ¹¹⁶	100mc	MAC	4 months	Reactor And Counting System Calibration
Au ¹⁹⁸	100mc	MAC	4 months	Reactor And Counting System Calibration
Cyclotron Irradiation		Washington University	3 years	Half-Life Experiment, Decay Scheme Scattering Experiments

BYPRODUCT MATERIAL LICENSE NO. 24-2261-3 AMENDMENT NO. 13
(G68)

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

<p>Licensee</p> <p>1. Name McDonnell Aircraft Corporation</p> <p>2. Address St. Louis, Missouri 63166</p>		<p>In accordance with application dated March 23, 1966,</p> <p>3. License number 24-2261-3 is amended in its entirety to read as follows:</p> <p>4. Expiration date July 31, 1968</p> <p>5. Reference No.</p>
<p>6. Byproduct material (element and mass number)</p> <p>A. Any byproduct material with Atomic numbers 3 to 89, inclusive</p>	<p>7. Chemical and/or physical form</p> <p>A. Any</p> <p>(SEE PAGE 2)</p>	<p>8. Maximum amount of radioactivity which licensee may possess at any one time</p> <p>A. Not to exceed 25 millicuries per radionuclide</p>

9. Authorized use
- A., B., C. and D. Research and development as defined in Section 30.4(q), 10 CFR 30.
 - E. Ionization source in NRC Equipment Corporation Model 0714 pressure gauge.
 - F. Testing and calibration of detector units.
 - G. and H. "Open-air" handling technique for industrial radiography.
- (SEE PAGE 2)

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.
11. A. Byproduct material licensed as Subitem E may also be used at Wallops Island, Virginia.
- B. Byproduct material licensed as Subitem F may also be used at Cape Kennedy, Florida.
12. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation", and Part 34, "Licenses for Radiography and Radiation Safety Requirements for Radiographic Operations".
13. A. Byproduct material shall be used by, or under the supervision of, William L. Kester, T. C. Link, F. C. McCallister, Jr., H. E. Winn, C. J. Wolf, Joseph F. Froechtenigt, N. A. Lamb, R. F. Reising, or N. K. Flammang.
- B. The only person authorized to act as radiographer under this license is F. C. McCallister. "Radiographer" is defined in Paragraph 34.2(b), 10 CFR 34.
- (SEE PAGE 3)

A/392

9701170 H60 H22

MATERIAL LICENSE

License Number 24-2261-3
(G68)

Continued From Page 1

Supplementary Sheet

Amendment No. 13

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
B. Americium 241	B. Any	B. 10 microcuries
C. Americium 241	C. Sealed sources	C. Two sources of 1 millicurie each
D. Any byproduct material with Atomic numbers 3 to 83, inclusive	D. Irradiated metal and crystal samples	D. 1 curie total
E. Hydrogen 3	E. Tritium foil (Radiation Research Corp. Model TT-1)	E. 400 millicuries
F. Americium 241	F. Foil manufactured by Radiation Research Corp. and contained in Lion Research Corp. carbon dioxide detector	F. 20 millicuries not to exceed 1 millicurie per detector
G. Iridium 192	G. Sealed sources (Isotopes Specialties Co. Type 30)	G. Five sources not to exceed 2 curies each
H. Cobalt 60	H. Sealed sources (Nuclear Chicago Corp. Model RR-60)	H. Two sources not to exceed 1 curie each
I. Cobalt 60	I. Sealed sources	I. 200 millicuries
J. Cesium 137	J. Sealed sources (Nuclear Consultants, Inc., custom sources)	J. 100 millicuries; no single source to exceed 4 microcuries
K. Krypton 85	K. Sealed sources (U.S. Radium Corp. Model LAB 484-1A)	K. Eight sources of 150 millicuries each and 16 sources of 20 millicuries each
L. Hydrogen 3	L. Foil in Jarrell-Ash Model 28-750 or 28-751 detector cells	L. Not to exceed 100 millicuries per cell
M. Strontium 90	M. Foil in Jarrell-Ash Model 28-752 or 28-755 detector cells	M. Not to exceed 20 millicurie per cell

9. Authorized use

I. Instrument calibration.

J. Tagging of bucking bars and seat ejection safety pins for detection after manufacture.

K. For use in aircraft in-flight refueling equipment.

L. and M. To be used with Jarrell-Ash Company gas chromatography units for sample analysis

(SEE PAGE 3)

MATERIAL LICENSE

License Number 24-2261-3
(G68)

Continued From Page 2

Supplementary Sheet

Amendment No. 13

CONDITIONS

14. A. (1) Notwithstanding the periodic leak test required by the preceding paragraph, any licensed sealed source containing byproduct material is exempted from periodic leak tests provided the quantity of byproduct material contained in the source does not exceed ten times the quantity specified for the byproduct material in Column II, Schedule A, Section 31.100, 10 CFR 31.
- (2) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.
- B. Each sealed source fabricated by the licensee shall be tested for contamination and/or leakage immediately after fabrication. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall repair and/or decontaminate and retest the source. Sealed sources fabricated for distribution and containing byproduct material (with the exception of byproduct material with a half-life not exceeding thirty days, byproduct material in the form of gas, and Iridium 192) shall, in addition to an initial test upon fabrication, be stored for a period of seven days and retested prior to transfer to another person or as otherwise specifically provided for in this license.
- C. Each sealed source containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.
- D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.
- E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the test with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A

(SEE PAGE 4)

MATERIAL LICENSE

License Number 24-2261-3
(668)

Supplementary Sheet

Amendment No. 13

Continued From Page 3

CONDITIONS

Condition 14 E. continued:

copy of such report shall also be sent to the Director, Region III, Division of Compliance, USAEC, Oakbrook Professional Building, Oak Brook, Illinois, 60523.

15. Notwithstanding and in lieu of, the requirements of Sections 20.203(f)(1) and 20.203(f)(2), 10 CFR 20, bucking bars and seat ejection safety pins referenced in Item 9(f), shall be labeled with an uncolored standard radiation symbol and the legend "Contains Radioactive Material, AEC License 24-2261-3".
16. The licensee is authorized to receive, possess and use sealed sources of Iridium 192 and Cobalt 60 where the radioactivity exceeds the maximum amount of radioactivity specified in Item 8 of this license provided:
- A. Such possession does not exceed the quantity per source specified in Item 8 by more than 20% for Iridium 192 or 10% for Cobalt 60; and
 - B. Records of the licensee show that no more than the maximum amount of radioactivity per source specified in Item 8 of the license was ordered from the supplier or transferor of the byproduct material.
17. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in Section 20.203(a)(1), Title 10, Code of Federal Regulations, Part 20, the licensee is hereby authorized to label detector cells and cell baths, containing byproduct material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.
18. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations and procedures contained in applications dated October 6, 1958, and March 21, 1961, and in related documents and amendments as follows:
- A. Administrative instructions entitled "Safe Practice Procedures" submitted May 22, 1959.
 - B. Letter dated May 13, 1959, from W. L. Kester.
 - C. Operating and emergency procedures entitled "Radiographic Procedures (Iridium 192)" and dated August 1, 1961.
 - D. Letter dated September 8, 1961, from W. L. Kester.

For the U. S. Atomic Energy Commission

Original Signed by
Robert E. Brinkman
Isotopes BranchDivision of Materials Licensing
Washington, D. C. 20545

APR 8 1966

Date

by

250 4/8/66

1. REC/BK

MCDONNELL *Aircraft Corporation*
Lambert-Saint Louis MUNICIPAL AIRPORT • BOX 516, ST. LOUIS, MO. 63166

8 December 1966
Ref: USAEC-220-3721

United States Atomic Energy Commission
Washington, D. C. 20545

Attention: Isotopes Branch
Division of Licensing and Regulation

Subject: Tagging Radioactive Sources

Gentlemen:

1. Paragraph 15 of Byproduct Material License 24-2261-3 issued to the McDonnell Company (formerly McDonnell Aircraft Corp.) states, in part:

Notwithstanding and in lieu of, the requirements of sections 20.203 (f)(1) and 20.203 (f)(4), 10 CFR 20, bucking bars and seat ejection safety pins referenced in Item 9.J. shall be labeled with an uncolored standard radiation symbol and the legend "Contains Radioactive Material, AEC License 24-2261-3".

2. Heretofore, the legend "Contains Radioactive Materials, AEC License 24-2261-3" has been affixed to these devices by means of a magenta and yellow decal. Experience has shown that the rough handling to which the bucking bars are subjected has made this method of labeling unsatisfactory. It is therefore proposed that in order to provide a more enduring label, the decals be replaced by a stamping made into the surface of the bars and bearing the same legend. This procedure would produce a marking which, while more permanent, could not be colored easily.
3. Comments made in the past by various inspectors have raised the question of whether or not our proposed change (and deletion of color) would comply with the provisions of our license. In view of this we would appreciate your approving our proposed modification.

Yours very truly,

MCDONNELL COMPANY

W. L. Kester
W. L. Kester
Scientist
Research Division

WLK:emc



9701170467 *1P*

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICFNS'

Page 1 of 1 Pages

Supplementary Sheet

License Number 24-02261-C

Amendment No. 14

McDonnell Aircraft Corporation
St. Louis, Missouri 63166

In accordance with letter dated December 8, 1966, Condition 15. of License Number 24-02261-03 is amended as follows:

15. Notwithstanding and in lieu of the requirements of Section 20.203(f), 10 CFR 20, the licensee is authorized to label or stamp tagged bucking bars and tagged seat ejection pins with an uncolored standard radiation symbol and the legend "Contains Radioactive Material, AEC License 24-2261-3."

A1394

Date DEC 22 1966

For the U. S. Atomic Energy Commission
Original Signed By
Robert E. Brinkman
by Isotopes Branch

Division of Materials Licensing
Washington, D. C. 20545

WTH/CP

REB 12/22/66

~~9401170472 1e~~

Form AEC-313
8-64
10 CFR 30

UNITED STATES ATOMIC ENERGY COMMISSION
APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved
Budget Bureau No. 38-R027

INSTRUCTIONS. — Complete Items 1 through 16 if this is an initial application or an application for renewal of a license. Information contained in previous applications filed with the Commission with respect to Items 8 through 15 may be incorporated by reference provided references are clear and specific. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail two copies to: U.S. Atomic Energy Commission, Washington, D.C., 20545, Attention: Isotopes Branch, Division of Materials Licensing. 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. Include ZIP Code.) McDonnell Company P.O. Box 516 Lambert-St. Louis Municipal Airport St. Louis, Missouri 63166 Building 102		(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (If different from 1 (a). Include ZIP Code.) Same As 1(a)
2 DEPARTMENT TO USE BYPRODUCT MATERIAL Chemical Laboratory, Department 256B		3 PREVIOUS LICENSE NUMBER(S) (If this is an application for renewal of a license, please indicate and give number.)
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.) John H. Taylor Terry T. Bartels Jack T. Ballinger		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.) Jack T. Ballinger
6 (a) BYPRODUCT MATERIAL (Elements and mass number of each.) Tritium Hydrogen 3 Nickel 63	(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLCURIES 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.) F & M Electron Capture Detector Model No. 2-2837 containing U.S. Radium Lab 508-1 foil. A maximum of two cells, each containing 200 millicuries of tritium to be possessed at any one time. A maximum of two cells each containing 2 millicuries of Nickel 63 to be possessed at any one time.	

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.)

F & M Model 5750 Research Gas Chromatograph for laboratory analysis.

(Continued on reverse side)

970/21001 4A

A1395
93364T1
not
retested

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 <small>(Use supplemental sheets if necessary.)</small>					
B. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB <small>Circle answer</small>	FORMAL COURSE <small>Circle answer</small>	
a. Principles and practices of radiation protection	Eastern Illinois University		Yes No	Yes	No
b. Radioactivity measurement standardization and monitoring techniques and instruments	(1) Nuclear Chemistry 436 (1 yr.) (2) Physical Chemistry (1 year) (3) Physics (1 year)		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	Jack T. Ballinger (See Attached Sheet)		Yes No	Yes	No

9. EXPERIENCE WITH RADIATION <small>(Actual use of radioisotopes or equivalent experience.)</small>				
ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE

10. RADIATION DETECTION INSTRUMENTS <small>(Use supplemental sheets if necessary.)</small>					
TYPE OF INSTRUMENTS <small>(Include make and model number of each)</small>	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE <small>(mr/hr)</small>	WINDOW THICKNESS <small>(mg/cm²)</small>	USE <small>(Monitoring, surveying, measuring)</small>
None Required With This Instrument.					

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

None Required With This Instrument.

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

None Required With This Instrument.

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS IN DUPLICATE

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

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.

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.

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 20, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

Date March 28, 1967

McDonnell Companies
Applicant named in item 1

By: *Jack T. Ballinger*
Asst. Engineer
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.

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

(CONTINUED)

13. Facilities and Equipment

The effluent gas will be piped into a fume hood at temperatures above 150°C.

14. Radiation Protection Program

Follow manufacturer's recommendations.

15. Waste Disposal

Return to supplier - F & M Scientific Corporation, Avondale, Pa.

8. John H. Taylor

Southern Illinois University
Physics (1 yr.)
Physical Chemistry (1 yr.)

Army Chemical Corps
Course in radiological warfare.

T. T. Bartels

University of Wisconsin

- (a) Physics (1 yr.)
- (b) Physical Chemistry (1 semester)
- (c) Administrative Control of 93% Enriched U²³⁵ -- 1-1/2 yrs. -
United Nuclear Corp., St. Louis Research Lab.
- (d) Experience in storage and safety requirements during
enriched (93%) uranium scrap recovery operations (8 months) --
United Nuclear Corp., Hematite, Missouri.



93364

and read out