



CONTROL PROCEDURE

NO: 6.515

PAGE 1 OF 5

DATE: 4 Nov 70

SUPERSEDES OP 6.515
dtd 23 Mar 70

SUBJECT: RADIOACTIVE MATERIAL

A. SUMMARY:

1. Radioactive material procured or generated by MCAIR will be stored, handled, transferred, and disposed of in accordance with applicable government regulations.

B. APPLICABLE TO:

All Department

C. DEFINITIONS:

1. Radioactive Material: Any material that undergoes a process of spontaneous disintegration in which energy is liberated. This process is accomplished by the emission of one or more types of radiation, such as alpha particles, beta particles, gamma photons, neutrons; but not including radiation such as infrared, ultraviolet, visual light, radar or radio waves.
2. Radiation Producing Devices: Any device that generates X rays or imparts kinetic energy to charged particles, such as protons and electrons.

D. REGULATIONS:

1. The Chairman Isotope Committee is responsible for approving the proper use of radioactive material in any program, including how radioactive material will be handled and procurements of radioactive material. R
2. The designated program manager shall involve the Chairman Isotope Committee in the early planning for any use of radioactive material. N

3. The Safety and Medical Department is responsible to prepare Safe Practice Procedures and insure compliance.

4. The Safety and Medical Department is responsible to control the use of radioactive material and radiation producing devices in accordance with government regulations.

E. PROCEDURE I: APPOINTMENT OF ISOTOPE COMMITTEEVice President General Engineering

1. Appoint principal to serve as Chairman Isotope Committee.

Chairman Isotope Committee

2. Request appropriate division heads to appoint representatives to serve on Isotope Committee.

Division Heads

3. Appoint representatives and furnish names to Chairman Isotope Committee.

E. PROCEDURE II: PROCUREMENT, RECEIPT, ISSUE AND SHIPMENT OF RADIOACTIVE MATERIALDepartment Head of Requesting Department

1. Have MAC 283R, PURCHASE REQUISITION, prepared indicating radioactive material requirements and memo prepared detailing intended use of radioactive material; approve and forward to Chairman Isotope Committee.

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E. PROCEDURE II: PROCUREMENT, RECEIPT,
ISSUE AND SHIPMENT OF RADIOACTIVE
MATERIAL (Cont'd)

Chairman Isotope Committee

2. Review intended use of radioactive material and assist in the development of implementation responsibilities.

3. Determine if required material is available at MCAIR or, if other radioactive material available may be substituted; determine if MCAIR is currently licensed to use the type and quantity of radioactive material required.

NOTE: If radioactive material is available at MCAIR or the proposed program is disapproved, void PURCHASE REQUISITION and notify requesting department accordingly.

4. Prepare application for appropriate Atomic Energy Commission (AEC) specific license if additional license is required or if an existing license must be revised or renewed; retain PURCHASE REQUISITION until receipt of required license from AEC.

5. Approve PURCHASE REQUISITION and add the following information and instruction:

- a. In remarks section of the PURCHASE REQUISITION stamp, "Radioactive Material procure and store in accordance with CP 6.515".

- b. Appropriate AEC authorization, if applicable.

6. Forward copies of PURCHASE REQUISITION as follows:

- a. Original and one copy to Purchasing Department.

- b. One copy to Safety and Medical Department.

7. Prepare a description of all approved programs on radioactive material which require special handling; forward to Manager Safety and Medical and request preparation of Safe Practice Procedures.

Purchasing Department

8. Verify that PURCHASE REQUISITION has been reviewed by Chairman Isotope Committee.

9. Obtain approvals according to CP 6.101 and issue MAC 877 (Series), PURCHASE ORDER, according to CP 6.106 indicating the following:

- a. Items listed thereon are radioactive and must be shipped to Receiving Department.

NOTE: Deliveries of radioactive material to other than Receiving Department must be approved by Chairman Isotope Committee and Safety and Medical Department.

- b. Appropriate AEC authorization, if applicable.

10. Distribute PURCHASE ORDER in accordance with CP 6.106 and forward additional copies to Chairman Isotope Committee, Safety and Medical Department, and Materials Laboratories Department.

Chairman Isotope Committee

11. Review PURCHASE ORDER and file for future reference.

Safety and Medical Department

12. Review PURCHASE REQUISITION, received in E.II.6.b., and notify MDC Insurance Department when 10 or more curies are required and/or when inventory is to be increased to 10 or more curies of any one type of radioactive material.

E. PROCEDURE II: PROCUREMENT, RECEIPT,
ISSUE AND SHIPMENT OF RADIOACTIVE
MATERIAL (Cont'd)

MTC Insurance Department

13. Reviews need for and procures additional insurance coverage as required.

Manager Safety and Medical

14. Have Safe Practice Procedures developed as requested by Chairman Isotope Committee in E.II.7.; approve and forward to Chairman Isotope Committee.

Chairman Isotope Committee

15. Review Safe Practice Procedures and approve if justified; forward to Safety and Medical Department.

Safety and Medical Department

16. Distribute copies of approved Safe Practice Procedures to the following:
 - a. Chairman Isotope Committee
 - b. Materials Laboratories Department
 - c. Requesting Department
17. Review PURCHASE ORDER and notify Receiving Department of all PURCHASE ORDERS issued for radioactive material requiring special handling.
18. File PURCHASE REQUISITION and PURCHASE ORDER for future reference.
19. Prepare a list of persons authorized to withdraw radioactive material from Materials Laboratories Department storage vault and furnish to Chairman Isotope Committee and Materials Laboratories Department; update list as required.

Chairman Isotope Committee

20. Maintain a current file of Safe Practice Procedures.
21. Maintain a current list of persons authorized to withdraw radioactive material from Materials Laboratories Department storage vault.

Receiving Department

22. Notify Safety and Medical Department immediately upon receipt of radioactive material.

NOTE: Hold shipment of radioactive material unopened in a segregated area until instructed otherwise by Safety and Medical Department.

Safety and Medical Department

23. Supervise the receipt of all shipments of radioactive material and direct inspection.
24. Direct inventory coded nonhazardous radioactive material to Stores Department; direct all other radioactive material to Materials Laboratories Department.
25. Approve by signing MAC 284S, RECEIVING REPORT-SINGLE ITEM.

Materials Laboratories Department

26. Review PURCHASE ORDER indicating material on order and file for future reference.
27. Store all radioactive material in accordance with applicable Safe Practice Procedure and maintain a current file of Safe Practice Procedures.

NOTE: Report immediately all losses of radioactive material, damages to radioactive material, and any incidents involving personnel or property to Safety and Medical Department.

PROCEDURE II: PROCUREMENT, RECEIPT,
ISSUE AND SHIPMENT OF RADIOACTIVE
MATERIAL (Cont'd)

28. Notify requesting department upon receipt of requested material.

Stores Department

29. Issue inventory coded nonhazardous radioactive material upon presentation of an authorized MAC 282, MATERIAL REQUISITION.

Materials Laboratories Department

30. Maintain a current list of persons authorized to withdraw radioactive material from storage.

31. Issue noninventory coded radioactive material to authorized personnel upon request; record all transactions on MAC 2294, RADIOACTIVE MATERIAL INVENTORY RECORD; and obtain signature of authorized individual for disbursement of radioactive material.

Requesting Department

32. Comply with Safe Practice Procedure applicable to program utilizing radioactive material.

- a. Maintain a current file of applicable Safe Practice Procedures.
- b. Report immediately all losses of radioactive material, damage to radioactive material and any incident involving personnel or property to Safety and Medical Department.

33. Obtain signature approval of the Chairman Isotope Committee before deviating from previously approved program for utilization of radioactive material.

34. Report quantities of radioactive material consumed in use to Safety and Medical Department in accordance with applicable Safe Practice Procedures.

35. Return all unused quantities of noninventory coded radioactive material, scrap, or any material contaminated as a result of use with radioactive material, to Materials Laboratories Department in accordance with applicable Safe Practice Procedures.

36. Return all unused inventory coded radioactive material to Stores Department according to CP 6.610.

Materials Laboratories Department

37. Request Purchasing Department prepare MAC 1150, SHIPPING REQUEST/PACKING SHEET; MAC 1205 (DD 250), MATERIAL INSPECTION AND RECEIVING REPORT; or MAC 1205B (DD 1149), REQUISITION AND INVOICE/SHIPPING DOCUMENT, as appropriate for radioactive material to be removed from MCAIR and obtain signature approval of Safety and Medical Department.

NOTE: Radioactive material to be disposed of by MCAIR will be disposed of in accordance with applicable Safe Practice Procedure.

Safety and Medical Department

38. Supervise movement of radioactive material to Shipping Department and removal from MCAIR.

Shipping Department

39. Package and ship radioactive material in accordance with appropriate federal regulations; request Safety and Medical Department to inspect all shipping containers prior to shipment.

E. PROCEDURE II: PROCUREMENT, RECEIPT,
ISSUE AND SHIPMENT OF RADIOACTIVE
MATERIAL (Cont'd)

Safety and Medical Department

- 40. Approve shipping document certifying that shipment is properly packaged.
- 41. Conduct decontamination operations and radiation surveys as required; assure compliance of Company personnel with Safe Practice Procedure; and prepare reports as required by the Chairman Isotope Committee.

Group Manager Laboratory

- 42. Have quarterly report prepared, review and forward to Safety and Medical Department giving type and quantity of radioactive material received, issued and disposed of during the past quarter and current inventories in house.

F. REFERENCES:

1. General

- a. CP 6.101, Routing and Approval of Purchase Requisitions
- b. CP 6.106, Purchase Orders and Purchase Change Orders
- c. CP 6.610, Stores Issues and Returns
- d. CP 6.751, Shipping

2. Forms

- a. MAC 282, Material Requisition
- b. MAC 283R, Purchase Requisition
- c. MAC 284S, Receiving Report-Single Item
- d. MAC 877 (Series), Purchase Order
- e. MAC 1150, Shipping Request/Packing Sheet
- f. MAC 1205 (DD 250), Material Inspection and Receiving Report
- g. MAC 1205B (DD 1149), Requisition and Invoice/Shipping Document
- h. MAC 2294, Radioactive Material Inventory Record



A. L. Boyd
Vice President
Fiscal Management

MCDONNELL DOUGLAS

CORPORATION

30 DEC 1977

Ref: USAEC-256-003

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

Attention: Isotope Branch
Division of Materials Licensing

Subject: Application for Modification of Byproduct Material License

Enclosure: (1) Form AEC 313 (2 copies)
(2) Supplemental Sheets to Encl. (1)

Gentlemen:

Enclosed are forms AEC-313 in application for modification of byproduct material license #24-2261-03 issued to McDonnell Douglas Corporation.

In keeping with suggestions made during our recent facilities inspection we wish to change the material authorization given in section 6 and 7 of this license.

Most of the items retained are commercially prepared sealed sources used in specific pieces of equipment such as gas detectors, gas chromatographs and illuminators.

There often arises a need for small quantities of byproduct material to be used as calibrators, tracers, beta and gamma sources and the like. These requirements usually appear on short notice, therefore, we wish to retain the authorization for 25 millicuries of "any byproduct material with atomic numbers 3 to 89, inclusive". This is section A of our present license.

Should you wish further information, please contact me.

Very truly yours,

MCDONNELL DOUGLAS CORP.

W. L. Kester

W. L. Kester
Chairman, Isotope Committee

WLK:jg

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Saint Louis, Missouri 63166

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UNITED STATES ATOMIC ENERGY COMMISSION
APPLICATION FOR BYPRODUCT MATERIAL LICENSE

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 Douglas Corporation P. O. Box 516 St. Louis, Missouri 63166		(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 Manufacturing, Quality Control, Research, General Engineering		3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.) 24-2261-03	
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.) D. L. Holt W. L. Kester N. A. Lamb T. C. Linck F. C. McCallister (Radiography) C. J. Wolf		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 D. L. Holt	
6. (a) BYPRODUCT MATERIAL. (Elements and mass number of each.) See Attachment		(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.) See Attachment			

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(Continued on reverse side)

94062/0013 4R

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			Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments	See Attachment		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			

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

Same as Original

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

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	Same as Original
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
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

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.

McDonnell Douglas Corporation
 Applicant named in item 1
 By: William L. Kester
 Chairman, Isotope Committee
 Title of certifying official
 Date: 22 December 1970

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 Douglas Corporation
P.O. Box 516
St. Louis, Missouri 63166

FCRM AEC-313

6.(a)

- A. Any byproduct material with atomic numbers 3 to 89, inclusive.
- B. Americium 241
- C. Cobalt 60
- D. Cesium 137
- E. Hydrogen 3
- F. Hydrogen 3
- G. Hydrogen 3
- H. Strontium 90
- I. Nickel 63
- J. Promethium 147

6.(b)

- A. Any chemical form; 25 millicuries each nuclide.
- B. Sealed sources; foil manufactured by Radiation Research Corp., and contained in Lion Research Corp. carbon dioxide detectors; 20 millicuries, not to exceed 1 millicurie per detector.
- C. Sealed sources (wire), not to exceed 200 millicuries.
- D. Sealed sources, (custom, Nuclear Consultants or Mallinckrodt); 250 millicuries, no single source to exceed 8 microcuries.
- E. Foil in Jarrell-Ash Model 28-750 or 28-751 Detector cells; not to exceed 100 millicuries per cell.
- F. Foil in F & M Model 2-2837 detector cells; not to exceed 200 millicuries per cell.
- G. Foil in Varian Aerograph Model 02-00014-00 Electron Capture Detector; not to exceed 300 millicuries per cell.
- H. Foil in Jarrell-Ash Model 28-752 or 28-755 detector cells; not to exceed 20 millicuries per cell.
- I. Sealed source in F & M Model 2-1695 detector cells; not to exceed 2 millicuries per cell.
- J. Sealed sources (3M Model 1E2J); 3 sources not to exceed 1 curie per source.

McDonnell Douglas Corporation
P.O. Box 516
St. Louis, Missouri 63166

FORM AEC-313

7. A. Research & Development as described in Section 30.4 (q), 10 CFR 30.
- B. Testing and calibration of carbon dioxide detectors.
- C. Instrument calibration.
- D. Tagging bucking bars and seat ejection safety pins for detection after manufacture.
- E&H. To be used in Jarrell-Ash Company gas chromatograph for sample detection.
- F&I. To be used in F & M Scientific Company gas chromatograph for sample detection.
- G. To be used in Varian Company gas chromatograph for sample detection.
- J. To be used on self-luminous markers.

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Page 1 of 1 Pages

Supplementary Sheet

License Number 24-02261-03

Amendment No. 20

McDonnell Douglas Corporation
P. O. Box 516
St. Louis, Missouri 63166

In accordance with application dated December 22, 1970, License Number 24-02261-03 is amended as follows:

Subitem 6.A. is amended to read:

6.A. Any byproduct
material between
Atomic Nos. 3 to 89,
inclusive

Date: JAN 13 1971

For the U. S. Atomic Energy Commission

Original Signed By

Robert E. Brinkman

Materials Branch

by

Division of Materials Licensing
Washington, D. C. 20545

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1/13/71

24-02261-03 LP

MCDONNELL DOUGLAS

CORPORATION

22 JAN 1971
USAEC-256-004

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

Attention: Isotopes Branch
Division of Materials Licensing

Subject: Application for Modification of Byproduct Material License

Enclosure: (1) Form AEC-313 (2 copies)
(2) Handling Procedure for Sources (2 copies)

Gentlemen:

1. In October of 1970 we submitted a request for modification of Byproduct Material License #24-2261-03 issued to McDonnell Douglas Corporation. The modification consisted of adding 0.1 micrograms of californium to our authorized isotopes. As a result of telephone conversations with your Mr. Layfield, we wish to modify this request. Accordingly, we are resubmitting completed Forms AEC-313 in application of license modification.
2. Should you wish further information, please contact me at (314) 232-5477.

Yours very truly,

MCDONNELL DOUGLAS CORPORATION

W. L. Kester
W. L. Kester, Chairman
Isotope Committee

WLK:jg

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UNITED STATES ATOMIC ENERGY COMMISSION
APPLICATION FOR BYPRODUCT MATERIAL LICENSE

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 13 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.)		(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (If different from 1 (a). Include ZIP Code.)	
McDonnell Douglas Corporation P.O. Box 516 St. Louis, Missouri 63166		Same	
2 DEPARTMENT TO USE BYPRODUCT MATERIAL Research & General Engineering		3 PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.) 24-2261-03, 24-2261-04, 24-2261-05	
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.) W. R. Binns Research Scientist W. L. Kester		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 D. L. Holt	
6 (a) BYPRODUCT MATERIAL (Elements and mass number of each) Cf-252		(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.) 0.1 microcurie on 1" diameter stainless steel plate.	
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.) The Cf-252 will be used as a calibration source inside a sealed ionization chamber which has 1/8" aluminum walls. See enclosure.			

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All operations involving the source will be carried out by personnel wearing rubber gloves. The work will be performed in a laboratory having limited access to personnel. Operations involving californium will be performed over a stainless steel or a plastic tray having a liner of absorbant paper carrying a moisture barrier on the back side. The paper and gloves will be discarded into the radioactive waste after use. The trays will be assayed for alpha contamination and either cleaned or discarded should they be found to carry alpha activity.

At the completion of the experiment, the ion chamber will be classed as radioactive scrap. It will be transferred unopened to a burial site for disposal. Should other uses arise for the device or its contained source, then appropriate handling procedures will be submitted for AEC approval.

HANDLING PROCEDURES FOR CALIFORNIUM-252 SOURCE

Fission fragments produced during spontaneous fission of californium-252 will be used to calibrate an ionization chamber. The source, deposited upon a 1" diameter by 1/8" thick stainless steel plate, will consist of approximately 0.1 microcurie of Cf-252 in a 1/8" diameter spot in the center of the disc. The source is to be prepared at the Oak Ridge National Laboratory⁽¹⁾.

Upon receipt at McDonnell Douglas, the device will be installed in the interior of an ionization chamber, Figure 1. The outer case for the ion chamber is a box made of 1/8" thick aluminum sheet with welded seams. Since the assembly must be gas tight, it will be capable of retaining any californium that may creep from the source holder. It is planned that the chamber will remain sealed for the life of the experiment which is approximately two years.

Californium, in common with other alpha emitters, tends to creep. Because of the hazard attendant with this behavior, the following precautions will be adopted in handling the source disc. These procedures are deemed to be sufficient to insure hazard-free operations.

The source, upon receipt, will be stored unopened in an isolated area where it will await transfer to personnel trained and experienced in handling radioactive materials⁽²⁾. These persons will include Mr. Denver Holt and Dr. W. Kester.

The package and its contents will be transferred to the laboratory that presently houses the Co-60 irradiator. Here the package will be opened and samples of packing material adjacent to the source will be assayed for alpha activity. A "wipe" taken with a butyl alcohol moistened ashless filter paper will be made of the source disc. This, too, will be assayed for alpha activity.

The aforementioned alpha assay will consist of ashing the samples or wipes in a 1" diameter stainless steel cup and counting the residue in a 2 π geometry gas-flow counter.

Counting times, based upon background and efficiency, will be selected so that alpha activities of approximately 0.001 microcuries can be detected.

Depending upon whether or not activity is present, the shipping container will either be discarded or retained for burial with other radioactive waste materials.

If the source is found to be contaminated, it will be cleaned by wiping with nitric acid. This will be followed by butyl alcohol rinses. Should this procedure fail to clean the plate, it will be returned to the vendor.

The clean source will be permanently installed on a shelf in the ion chamber and the whole unit then sealed shut.

(1) Telecon: Mr. Virgil Johnson, Dec. 21, 1970 and Dr. Adair, Jan. 7, 1971. Both of Isotopes Sales, ORNL.

(2) Training and experience data are on file from previous applications.

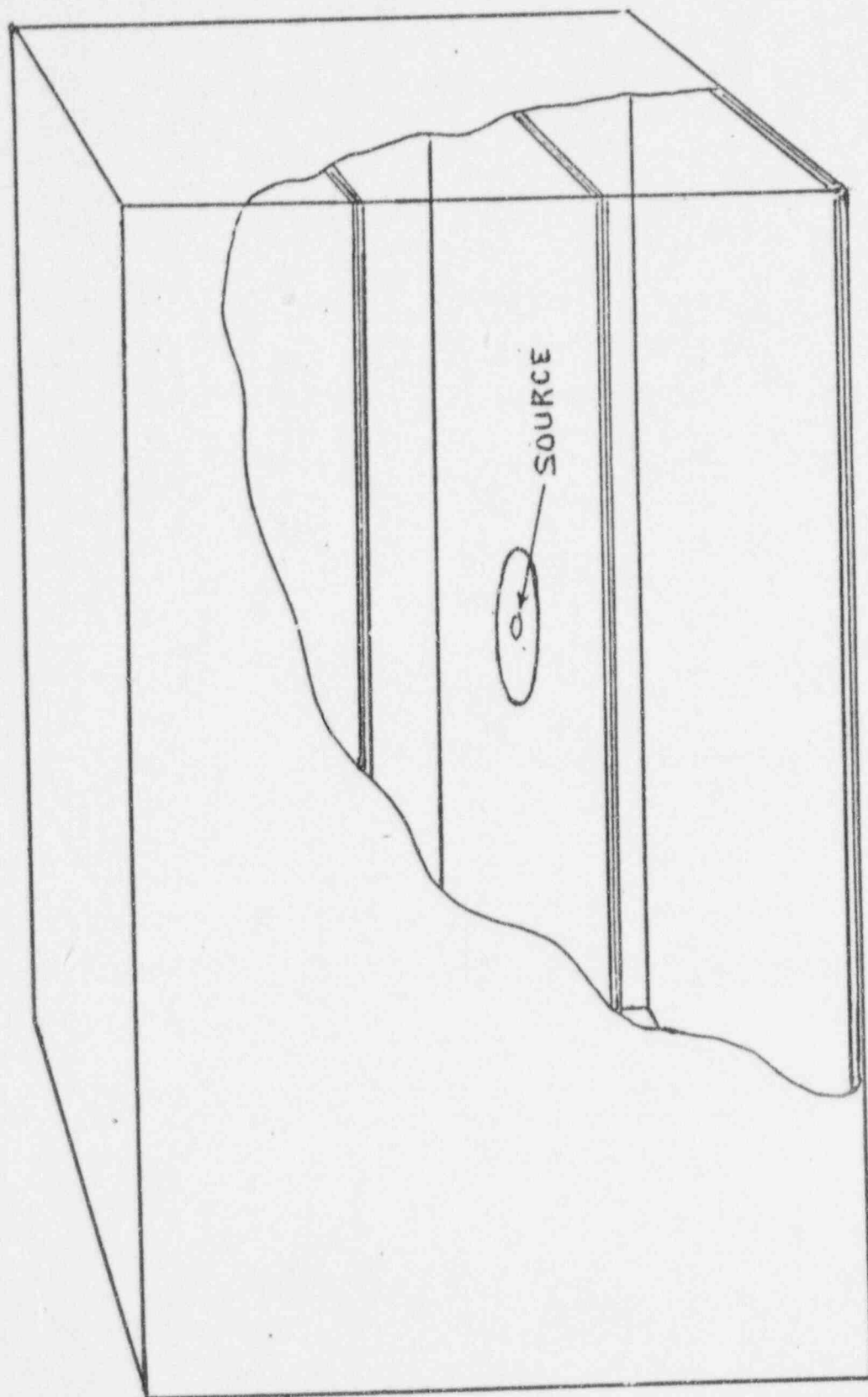


FIGURE 1 - IONIZATION CHAMBER AND Cf-252 SOURCE

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

Page 1 of 1 Pages

License Number 24-02261-03

Amendment No. 21

McDonnell Douglas Corporation
P. O. Box 516
St. Louis, Missouri 63166

In accordance with application dated January 21, 1971, License Number 24-02261-03 is amended as follows:

To add:

- | | | |
|--|----------------------------------|---|
| 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 |
|--|----------------------------------|---|

L. Californium 252

L. Deposited source

L. 0.1 microcurie

9. Authorized use

- L. To be used in a sealed ionization chamber for purposes of calibration.

For the U. S. Atomic Energy Commission

UNITED STATES
NATIONAL ARCHIVES

Date FEB 2 1971

by Materials Branch

Division of Materials Licensing
Washington, D. C. 20545

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McDonnell Douglas Corporation
ATTN: D. J. Lauenstein
P.O. Box 516
St. Louis, Missouri 63166

FEB 24 1971

Gentlemen:

This responds to your recent inquiry regarding your receipt of Invoice L-1733-71, dated February 5, 1971, covering fees for facilities and materials licenses.

The invoice specifies the annual fee charged for your AEC license pursuant to Part 170 of the Commission's regulations. (A copy of an explanatory letter dated January 19, 1971, which was sent to all licensees affected by the revised fee schedule, is attached.)

The invoice pertains to the following license issued to you:

License No. 24-02261-03

User and Address:

W. L. Kester, Chairman, Isotope Committee

Material Covered or Activity Authorized:

Radioisotopes for Research and General Engineering

Please note that the fee invoice is not related to the expiration date specified in the license, nor does it affect removal of your license.

We trust that the above provides you with the necessary information to identify the activity to which the fee is applicable.

DISTRIBUTION:

File
Rleith, OC
Lic. File No. 24-02261-03
WOMiller, SLR (2)
SLR R/F
DR R/F

Sincerely,

Original Signed by
Wm. O. Miller

for Eber R. Price, Director
Division of State and
Licensee Relations

Enclosures:

1. Notice to AEC Licensees on License Fees dtd 1/19/71
2. Invoice and Card

A/412

GRESS OFFICE	SLR:DIR				
T18 SURNAME	WOMiller:mlm	ERPrice			
R01 DATE	2/24/71	2/ /71			

9609050144 200

MCDONNELL DOUGLAS

CORPORATION

13 APR 1971

USAEC-256-005

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

Attention: Isotopes Branch
Division of Materials Licensing

Subject: Application for Modification of Byproduct Material License

Enclosure: (1) Form AEC-313 (2 copies)

Gentlemen:

1. Forms AEC-313, Enclosure (1), are submitted for modification of Byproduct Material License #24-2261-03 issued to the McDonnell Douglas Corporation.
2. The material to be covered by the modification is luminescent paint on compasses that are a part of a survival kit furnished with each F-4 type aircraft.
3. The compasses are supplied to McDonnell by the U. S. Air Force under their license #34-01466-02. After installation they are returned to the Air Force.
4. A small number of these compasses accompany aircraft shipped to Israel, West Germany, and Japan. Since the quantity of tritium to be transferred in each aircraft is small, we assume that no export license is required for this action other than the General License #AEC-GL-3622 referred to in Paragraph 36.22 of 10CFR36.
5. Should you require further information, please contact me at (314) 232-5477.

Yours very truly,

MCDONNELL DOUGLAS CORPORATION

W. L. Kester
W. L. Kester, Chairman
Isotope Committee

A/H/z

WIK:jv

UNITED STATES ATOMIC ENERGY COMMISSION
APPLICATION FOR BYPRODUCT MATERIAL LICENSE

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 Douglas Corporation P. O. Box 516 St. Louis, Missouri 63166		(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (If different from 1 (a). Include ZIP Code.) Same	
2 DEPARTMENT TO USE BYPRODUCT MATERIAL Manufacturing Division		3 PREVIOUS LICENSE NUMBER(S) (If this is an application for renewal of a license, please indicate and give number.) 24-2261-03, 24-2261-04, 24-2261-05	
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.) D. L. Holt		5 RADIATION PROTECTION OFFICER (Name of person designated as radiation protection officer other than individual user. Attach resume of his training and experience as in Items 8 and 9.) T. C. Linck D. L. Holt	
6 (a) BYPRODUCT MATERIAL (Elements and mass number of each.) H-3		(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.) Luminescent markers for aircraft compass. 10 millicuries, no single source greater than 100 microcuries.	

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.)

Survival Kits are supplied with each F-4 type aircraft. In each kit there is a compass having luminescent paint which contains tritium. The compasses are government furnished items (GFI) supplied by Kelly AFB, Texas. At various times our stock rooms may have as many as 100 of these units on hand awaiting shipment with various aircraft.

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

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

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Same as original application				

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 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

Same as original application

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 test, 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 13 April 1971

McDonnell Douglas Corporation

Applicant named in item 1

By: S. L. Keaton

Chairman, Isotope Committee

Title of certifying official

CO 6

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.

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 24-02261-03

Amendment No. 22

McDonnell Douglas Corporation
P. O. Box 516
St. Louis, Missouri 63166

In accordance with application dated April 13, 1971, License Number 24-02261-03 is amended as follows:

To add:

6. Byproduct material
(element and mass number)

M. Hydrogen 3

7. Chemical and/or physical form

M. Luminous Compasses
(GFE)

8. Maximum amount of radioactivity which licensee may possess at any one time

M. Not to exceed 100
microcuries per compass
nor 100 millicuries
total

9. Authorized use

M. Storage and shipment.

Date APR 27 1971

For the U. S. Atomic Energy Commission

Original Signed by
Robert E. Brinkman

by Materials Branch

Division of Materials Licensing
Washington, D. C. 20545

Ref KM

24-02261-03 10

MCDONNELL DOUGLAS

CORPORATION

4 MAY 1971

USAEC-256-006

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

Attention: Isotopes Branch
Division of Materials Licensing

SUBJECT: Application for Modification of Byproduct Material License

Enclosure: (1) Form AEC-313 (2 copies)

Gentlemen:

1. Forms AEC-313, Enclosure (1), are resubmitted for modification of Byproduct Material License #24-2261-03 issued to the McDonnell Douglas Corporation.
2. The material to be covered by the modification is luminescent paint on compasses that are a part of a survival kit furnished with each F-4 type aircraft.
3. The original application, dated 13 April 1971, listed each compass as containing up to 100 microcuries of tritium. Major Furtado of the Air Force at Wright-Patterson AFB advised us that the value should have been in millicuries with a maximum of 125 mCi being possible in any single one. This application is a request for correction of the error on our part.
4. The compasses are supplied to McDonnell by the U. S. Air Force under their license #34-01466-02. After installation they are returned to the Air Force.
5. A small number of these compasses accompany aircraft shipped to Israel, West Germany, and Japan. Since the quantity of tritium to be transferred in each aircraft is small, we assume that no export license is required for this action other than the General License #AEC-GL-3622 referred to in Paragraph 36.22 of 10CFR36.
6. I regret this inconvenience. Should you require further information, please contact me at (314) 232-5477.

Very truly yours,

MCDONNELL DOUGLAS CORPORATION

W. L. Kester
W. L. Kester, Chairman
Isotope Committee

WLK:jg

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UNITED STATES ATOMIC ENERGY COMMISSION
APPLICATION FOR BYPRODUCT MATERIAL LICENSE

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 Douglas Corporation P.O. Box 516 St. Louis, Missouri 63166		(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. (If different from 1(a). Include ZIP Code.) Same	
2. DEPARTMENT TO USE BYPRODUCT MATERIAL Manufacturing Division		3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.) 24-2261-03, 24-2261-04, 24-2261-05	
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.) D. L. Holt		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 D. L. Holt	
6. (a) BYPRODUCT MATERIAL. (Elements and mass number of each.) H-3		(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.) Luminescent markers for aircraft compass. 12.5 curies, no single source greater than 125 millicuries.	
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.) Survival Kits are supplied with each F-4 type aircraft. In each kit there is a compass having luminescent paint which contains tritium. The compasses are government furnished items (GFE) supplied by Kelly AFB, Texas. At various times our stock rooms may have as many as 100 of these units on hand awaiting shipment with various aircraft.			

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SENT TO COMPLIANCE

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)						Page 1 of 2
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	Same as Original Application		Yes No	Yes No		
b. Radioactivity measurement standardization and monitoring techniques and instruments			Yes No	Yes No		
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes No	Yes No		
d. Biological effects of radiation			Yes No	Yes No		

9. EXPERIENCE WITH RADIATION. (Actual use of radionuclides or equivalent experience.)				
ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Same as Original Application				

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 IN DUPLICATE	
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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)	
<p>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.</p>	
<p>Date <u>4 May 1971</u></p>	<p style="text-align: right;"> <u>McDonnell Douglas Corporation</u> Applicant named in Item 1, Item 4 By: <u>[Signature]</u> <u>Chairman, Isotope Committee</u> Title of certifying official </p>

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.

BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 24-02261-03

Amendment No. 23

McDonnell Douglas Corporation
P.O. Box 516
St. Louis, Missouri 63166

In accordance with application dated May 4, 1971, License Number
24-02261-03 is amended as follows:

Subitem 8.M. is amended to read:

8.M. Not to exceed 125 millicuries per
compass nor 12.5 curies total

Date MAY 13 1971

For the U. S. Atomic Energy Commission

Original - 5
Robert E. Brinkman

by Materials Branch

Division of Materials Licensing
Washington, D. C. 20545

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