DOCKET NO 40-29
Regulatory Suppl File Cy.

MCDONNELL DOUGLAS CORPORATION

27 SEP 1968

Ref: USAEC-220-5743

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

Attention: Director
Division of Materials Licensing

Subject: Application for Source Material License

Enclosures: (1) Form AEC-2 (4 copies)

1. Enclosed herewith are forms AEC-2 in application for modification of Source Material License STB-49 issued to the McDonnell Douglas Corporation.

2. McDonnell Douglas is presently authorized to possess only Thorium alloys and thoria. Programs and tests scheduled for the near future require that we be licensed to use depleted uranium as ballasts and counterweights in test missiles. Since these will not be actual flight vehicles there is no danger of loss of the licensed material.

3. Should you require any further information do not hesitate to contact us.

Very truly yours,

W. L. Kester

W. L. Kester
Scientist
Research Division

WLK:emc

A/274

ACKNOWLEDGED

Saint Louis, Missouri 63166

DOCKET NO. 40-29

Regulatory Suppl File Cy.

MCDONNELL DOUGLAS CORPORATION

11 OCT 1968

Ref: USAEC-220-5758

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

Attention: Don F. Harmon
Source & Special Nuclear Materials
Branch
Division of Materials Licensing

Subject: Withdrawal of Request for License Modification

Gentlemen:

1. In a letter dated 27 September 1968, application was made for modification of Source Material License STB-49 issued to McDonnell Douglas Corporation. The modification was to permit possession and use of depleted uranium counterweights in aircraft and missiles. Conversations with Mr. Ray Youngman of National Lead Co. reveal that the counterweights we wish to use have been manufactured under a specific license; therefore, we do not need the requested modification.

2. The authority for possession is detailed in Title 10 Code of Federal Regulations, Part 40, Paragraph 40.13 (c), (5), (i), (ii) and (iii).

3. Should you require any further information do not hesitate to contact us.

Very truly yours,

W. L. Kester
Scientist
Research Division

WLK:er

DOCKETED USAEC
OCT 14 1968
REGULATORY MAIL SECTION
DOCKET CLERK

ACKNOWLEDGED

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Saint Louis, Missouri 63166

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OCT 21 1968

DML:DFH
40-29

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

Attention: Dr. W. L. Kester, Scientist
Research Division

Gentlemen:

Thank you for your letter of October 11, 1968, in which you requested withdrawal of your application dated September 26, 1968, for amendment of License No. STB-49. As indicated in your letter, uranium counterweights, which meet the specifications of Section 40.13(c)(5) of the enclosed 10 CFR 40, are exempt from AEC licensing requirements insofar as your proposed activities are concerned.

Sincerely,
Original signed by
Don. F. Harmon

Don F. Harmon
Source & Special Nuclear Material Branch
Division of Materials Licensing

DISTRIBUTION:
Supplement
Document Room
Compliance, Region III
N. Doulos, DML
Branch Reading File
Division Reading File

OFFICE ▶	DML				A276	
SURNAME ▶	DFHarmon:sr					
DATE ▶	10/21/68					

Form AEC-318 (Rev. 9-53) AECM 0240 U.S. GOVERNMENT PRINTING OFFICE : 1968 O—890-617

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UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

REF:DML:ND
40-29

DEC 8 1969

McDonnell Douglas Corporation
Post Office Box 516
St. Louis, Missouri 63166

SUBJECT: NOTICE OF LICENSE EXPIRATION

Gentlemen: Attention: Mr. W. L. Kester

Notice is given that Source Material License Number STB-49 expires on March 31, 1970.

If you desire to continue your program using source material(s), an application for renewal of the license should be filed with this office. It is to your advantage to file such an application at least thirty (30) days before the expiration date of your existing license. The application should be submitted using Form AEC-2, enclosed, in accordance with the instructions provided with the form. Your program will then be covered by your existing license until action is taken on your application for license renewal. (Title 10, Code of Federal Regulations, Part 40, Section 40.43(b)). If an application is received less than 30 days prior to the expiration date of your license and cannot be processed before your existing license expires, this could result in your possessing source material without a valid license.

If you do not wish to renew your license, please complete the enclosed form "Certification of Status of Source Material Activities under United States Atomic Energy Commission Source Material License Number STB-49", and return it to this office.

If you have obtained an amendment which has extended the expiration date of the above license or if a new license has been issued which supersedes the above license, please disregard this notice.

This notice of your license expiration is sent for your convenience and it should not be interpreted that similar notices will be sent in the future. The responsibility for timely submission of an application for license renewal remains with the licensee.

File Copy 12/2/69

Very truly yours,

Donald A. Nussbaumer

Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Materials Licensing

Enclosures:
1. 10 CFR, 20 & 40
2. Form AEC-2
3. "Certification . . ."

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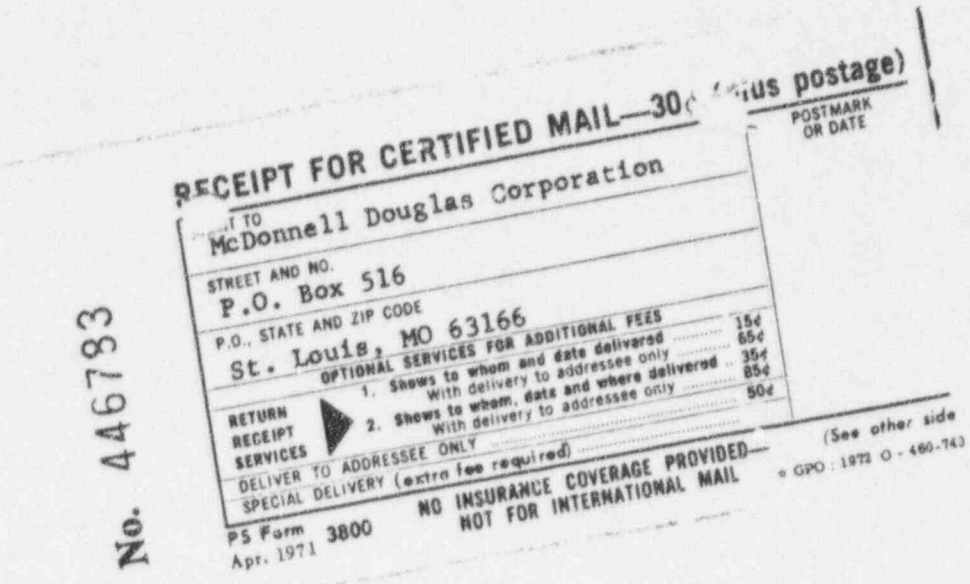

RECEIPT FOR CERTIFIED MAIL—30¢ (plus postage)

POSTMARK OR DATE

SENT TO
McDonnell Douglas Corporation

STREET AND NO.
P.O. Box 516

P.O., STATE AND ZIP CODE
St. Louis, MO 63166

RETURN RECEIPT SERVICES

OPTIONAL SERVICES FOR ADDITIONAL FEES
1. Shows to whom and date delivered ..... 15¢
With delivery to addressee only ..... 65¢
2. Shows to whom, date and where delivered .. 35¢
With delivery to addressee only ..... 85¢
DELIVER TO ADDRESSEE ONLY ..... 50¢
SPECIAL DELIVERY (extra fee required) .....

PS Form 3800 Apr. 1971

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See other side

GPO : 1972 O - 460-743

No. 446783

FORM AEC-2
(3-64)
Previous editions are obsolete.

DOCKET NO. 40-29

Regulatory File Cy.

FORM APPROVED
BUREAU OF BUDGET NO. 38-R002

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

1. (Check one)
- ☐ (a) New license
- ☐ (b) Amendment to License No. _____
- ☒ (c) Renewal of License No. STB-49
- ☐ (d) Previous License No. _____

2. NAME OF APPLICANT
McDonnell Douglas Corporation

3. PRINCIPAL BUSINESS ADDRESS
P. O. Box 516
St. Louis, Missouri 63166

4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
Same as Item 3

5. BUSINESS OR OCCUPATION
Mfr. of Aircraft and Spacecraft

6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP
Not Applicable

(b) AGE
N/A

7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED

SEE SUPPLEMENTAL SHEET

8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE

(a) TYPE	(b) CHEMICAL FORM	(c) PHYSICAL FORM (Including % U or Th.)	(d) MAXIMUM AMOUNT AT ANY ONE TIME (in pounds)
NATURAL URANIUM	SEE SUPPLEMENTAL SHEET		
URANIUM DEPLETED IN THE U-235 ISOTOPE			
THORIUM (ISOTOPE)			

(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds)

9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL RADIATION HAZARDS ASSOCIATED WITH EACH STEP OF THOSE PROCESSES

SEE SUPPLEMENTAL SHEET

10. DESCRIBE THE MINIMUM TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE THAT WILL BE REQUIRED OF APPLICANT'S SUPERVISORY AND OPERATING PERSONNEL, AUDITOR, PERSON RESPONSIBLE FOR RADIATION SAFETY PROGRAM, OR OF APPLICANT IF APPLICANT IS AN INDIVIDUAL.

SEE SUPPLEMENTAL SHEET

11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9. INCLUDE, (if appropriate, in the description of AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment and the description of radiation detection instruments should include the instrument characteristics such as type of radiation detected, window thickness, and the range(s) of each instrument).

SEE SUPPLEMENTAL SHEET

(b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE, INCLUDING AIR SAMPLING EQUIPMENT (for film badges, specify method of calibrating and processing, or name supplier).

SEE SUPPLEMENTAL SHEET

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11(c). VENTILATION EQUIPMENT WHICH WILL BE USED IN OPERATIONS WHICH PRODUCE DUST, FUMES, MISTS, OR GASES, INCLUDING PLAN VIEW SHOWING TYPE AND LOCATION OF HOOD AND FILTERS. MINIMUM VELOCITIES MAINTAINED AT HOOD OPENINGS AND PROCEDURES FOR TESTING SUCH EQUIPMENT.

SEE SUPPLEMENTAL SHEET

12. DESCRIBE PROPOSED PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND PROPERTY AND RELATE THESE PROCEDURES TO THE OPERATIONS LISTED IN ITEM 9; INCLUDE: (a) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS, SUCH AS FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS

SEE SUPPLEMENTAL SHEET

(b) EMERGENCY PROCEDURES IN THE EVENT OF ACCIDENTS WHICH MIGHT INVOLVE SOURCE MATERIAL.

SEE SUPPLEMENTAL SHEET

(c) DETAILED DESCRIPTION OF RADIATION SURVEY PROGRAM AND PROCEDURES.

SEE SUPPLEMENTAL SHEET

13. WASTE PRODUCTS: *If none will be generated, state "None" opposite (a), below. If waste products will be generated, check here* ☐ *and explain on a supplemental sheet:*

(a) Quantity and type of radioactive waste that will be generated. SEE SUPPLEMENTAL SHEET

(b) Detailed procedures for waste disposal.

14. IF PRODUCTS FOR DISTRIBUTION TO THE GENERAL PUBLIC UNDER AN EXEMPTION CONTAINED IN 10 CFR 40 ARE TO BE MANUFACTURED, USE A SUPPLEMENTAL SHEET TO FURNISH A DETAILED DESCRIPTION OF THE PRODUCT, INCLUDING:

(a) PERCENT SOURCE MATERIAL IN THE PRODUCT AND ITS LOCATION IN THE PRODUCT.

(b) PHYSICAL DESCRIPTION OF THE PRODUCT INCLUDING CHARACTERISTICS, IF ANY, THAT WILL PREVENT INHALATION OR INGESTION OF SOURCE MATERIAL THAT MIGHT BE SEPARATED FROM THE PRODUCT.

(c) BETA AND BETA PLUS GAMMA RADIATION LEVELS (*Specify instrument used, date of calibration and calibration technique used*) AT THE SURFACE OF THE PRODUCT AND AT 12 INCHES.

(d) METHOD OF ASSURING THAT SOURCE MATERIAL CANNOT BE DISASSOCIATED FROM THE MANUFACTURED PRODUCT.

CERTIFICATE

(*This item must be completed by applicant*)

15. *The applicant, and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 40, 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 2*)

Dated 16 January 1970

BY: Wm. L. Kester
(*Print or type name under signature*)

William L. Kester

Chairman, Isotope Committee
(*Title of certifying official authorized to act on behalf of the applicant*)

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.

U.S. GOVERNMENT PRINTING OFFICE: 1964—O-706-977 817-427-2

11(c). VENTILATION EQUIPMENT WHICH WILL BE USED IN OPERATIONS WHICH PRODUCE DUST, FUMES, MISTS, OR GASES, INCLUDING PLAN VIEW SHOWING TYPE AND LOCATION OF HOOD AND FILTERS, MINIMUM VELOCITIES MAINTAINED AT HOOD OPENINGS AND PROCEDURES FOR TESTING SUCH EQUIPMENT.

SEE SUPPLEMENTAL SHEET

12. DESCRIBE PROPOSED PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND PROPERTY AND RELATE THESE PROCEDURES TO THE OPERATIONS LISTED IN ITEM 9. INCLUDE: (a) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS, SUCH AS FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS.

SEE SUPPLEMENTAL SHEET

(b) EMERGENCY PROCEDURES IN THE EVENT OF ACCIDENTS WHICH MIGHT INVOLVE SOURCE MATERIAL.

SEE SUPPLEMENTAL SHEET

(c) DETAILED DESCRIPTION OF RADIATION SURVEY PROGRAM AND PROCEDURES.

SEE SUPPLEMENTAL SHEET

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(a) Quantity and type of radioactive waste that will be generated. SEE SUPPLEMENTAL SHEET

(b) Detailed procedures for waste disposal.

14. IF PRODUCTS FOR DISTRIBUTION TO THE GENERAL PUBLIC UNDER AN EXEMPTION CONTAINED IN 10 CFR 40 ARE TO BE MANUFACTURED, USE A SUPPLEMENTAL SHEET TO FURNISH A DETAILED DESCRIPTION OF THE PRODUCT, INCLUDING:

(a) PERCENT SOURCE MATERIAL IN THE PRODUCT AND ITS LOCATION IN THE PRODUCT.

(b) PHYSICAL DESCRIPTION OF THE PRODUCT INCLUDING CHARACTERISTICS, IF ANY, THAT WILL PREVENT INHALATION OR INGESTION OF SOURCE MATERIAL THAT MIGHT BE SEPARATED FROM THE PRODUCT.

(c) BETA AND BETA PLUS GAMMA RADIATION LEVELS (*Specify instrument used, date of calibration and calibration technique used*) AT THE SURFACE OF THE PRODUCT AND AT 12 INCHES.

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U.S. GOVERNMENT PRINTING OFFICE: 1964—O-706-977 617-427-2

FORM AEC-2

Item 7 Magnesium-Thorium alloys will be used as structural material in the construction of spacecraft.

Thorium oxide will be used in studies directed toward development of ceramics for use in re-entry systems and rockets.

Item 8a Thorium-232, as thoria in powdered form, and Thorium-232 as magnesium-thorium alloys not to contain over 4% (by weight) of thorium.

8b The maximum quantity of thorium on hand at any one time will be 500 pounds.

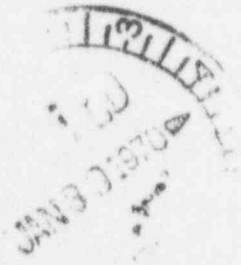
Item 9 Magnesium-thorium alloys will be in the form of extrusions and sheet. Operations upon the alloy will include machine and chemical milling, bending, filing and welding.

All filing and welding operations will be carried out in ventilated areas equipped with ducts that lead to the outside of the building. The vents will be positioned in such a manner that their effluent will be thoroughly mixed with outside air. Hi-Vol and Staplex air monitors will be used to determine the effectiveness of the contamination control.

Because of the fumes produced by the chem-milling process, all work of this nature is already performed in well ventilated areas. Waste material produced by chem-milling of thorium - containing materials will be collected, the sludge will be barrelled and transferred to an appropriately licensed company. Supernatant solutions will be diluted and flushed down sanitary sewers in accordance with provisions as set forth in 10 CFR 20, paragraph 20.303. Waste generated by machine milling or cutting will be collected in special barrels and sold to AEC licensed scrap dealers.

Thoria powders in quantities not to exceed 5 pounds will be mixed with binders, cast into rods and blocks, then fired in kilns to form ceramics. All mixing and forming operations will be carried out in vented chemical hoods fitted with disposable plastic liners. Operators will wear rubber gloves and face masks. Finished specimens will be tested for crushing and shattering properties. All operations will be monitored by air samplers to determine the extent of any airborne contamination. While not in actual use, all raw and waste materials will be sealed in cans which will be stored in a locked vault used for storage of radioisotopes.

Disposal will be by resale to AEC licensed vendors, burial at an AEC approved site, or burial in accordance with the provisions of 10 CFR 20, paragraph 20.304.



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FORM AEC-2

Item 10 Mr. Linck has served as McDonnell's medical supervisor for 10 years. During this period he has also acted as Radiation Safety Officer. He has been aided during the past year and a half by Mr. Holt who came to us from Mallinckrodt Chemical Works at Weldon Springs, Mo. Mr. Holt worked there for 9 years in Radiation Safety.

Previous use of large quantities (100,000 lbs.) of magnesium-thorium alloys in aircraft manufacturing has resulted in our acquiring extensive experience in the techniques for handling and storing of these materials.

Item 11a

Qty.	Manufacturer	Name and Model	Radiation Detected	Range
1	Tracerlab	Rad. Survey Meter, SUIH	β , γ	0-1.5 R/hr
1	Tracerlab	Rad. Survey Meter	β , γ	0-80 mr/hr
1	Tracerlab	Rad. Survey Meter SU-14	β , γ	0-20 mr/hr
1	Victoreen	Model 490 Survey Meter	β , γ	0-200 mr/hr
1	Victoreen	QTπ , 740A	β , γ	0-5 R/hr
1	RCL	2π Counter, Model 10200	α, β , γ	---
1	RIDL	4π Counter	α, β, γ	---
6	Cosmic Tennelec Hamner	Single Channel Analyzers		
1	Nuclear Data	4096 Channel Analyzer		

Assorted Scintillation crystals, geiger tubes, solid state detectors.

Item 11b Calibration of radiation monitors is accomplished at least quarterly and after any electronic repair. In addition, prior to use of any instrument, a check is made to insure proper operation. Major calibrations are made using a 3.5 millicurie cobalt-60 source.

Flow and scintillation counters are calibrated using Nuclear Chicago 5% β, γ standards. Pocket dosimeters and film badges are available, but not used for work involving thorium.

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FORM AEC-2

Item 11(c) Those operations involving magnesium-thorium which are likely to create airborne hazards include filing, welding and milling. All filing and welding operations are carried out in vented hoods. Machine milling, if it is done, will be performed on a unit having a liquid coolant system. This will serve to minimize airborne dusts and particles. Chem-milling is performed in a well ventilated area.

Item 12(a) and (b) Supervisors of those persons working with Thorium compounds and alloys are given special indoctrination in safe handling procedures. Personnel Safety and Medical Department performs inspections designed to insure compliance with established rules. The following information is abstracted from our operational procedures:

12.1 Heat forming, routing, hand filing and resistance welding operations are not expected to generate airborne dust or fume concentrations to an extent that exposures would be experienced in excess of the limits given in Title 10, Code of Federal Regulations, Part 20.

12.2 It is advisable, however, to use ventilation designed for local dust capture on operations involving wire brushing (or grinding), heliarc welding and chemical milling.

(1) Exposures during wire brushing can be minimized by use of ventilated hoods.

(2) Heliarc welding fumes can be controlled by properly designed exhausters with flexible ducts capable of being positioned within specified distances of points of welding -- discharge to outside of building.

(3) The normally provided ventilation for vapor removal from chemical milling operations is adequate when processing Th-Mg.

12.3 Cleanup of cuttings and area housekeeping should be accomplished by vacuum cleaning methods -- the dust collector section to be approved by Safety and Medical Department.

12.4 Dust concentrations in work areas will be measured during startup and thereafter, depending on initial results.

12.5 Emergency procedures in the event of Th-Mg fires shall be setup to include directions to: (1) evacuate all personnel not directly involved in control of the emergency; and, (2) utilize respiratory protection during control efforts and until fumes have cleared; Scott Air Paks, or AO R-5000 respirator with R-57 cartridge may be used to prevent thorium exposure.

FORM AEC-2

Item 12(a) and (b) continued

12.6 Each area, room, or container in which Th-Mg is stored or used shall be conspiciously posted or labeled with the radiation caution symbol and the words "Caution - Radioactive Material".

12.7 All Th-Mg material, including scrap, must be accounted for and transferred only in accordance with licensing requirements.

12.8 Safety and Medical Department shall be advised of final plan for control of radioactive material, and the installation reviewed and approved prior to startup.

Item 12(c) All operations involving source material are to be monitored by air samplers. Filters from these samplers are assayed by being ashed and counted in an RCL 2π counter. Once it has been established that an operation is hazard-free, no further routine monitoring will be performed. Whenever an operation is changed, air samples will again be taken as needed. At the conclusion of any operation, an area check will be made and decontamination procedures begun as needed.

Item 13 Very little magnesium-thorium scrap is anticipated. Any that is produced will be disposed of as described in Section 9 above.

Ultimately, all of the thorium oxide in use will be classed as scrap. It will be disposed of as described in Section 9 above.