

# REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

## REGULATORY GUIDE 10.4

### GUIDE FOR THE PREPARATION OF APPLICATIONS FOR LICENSES TO PROCESS SOURCE MATERIAL

#### 1. INTRODUCTION

##### 1.1 Purpose of Guide

This guide describes the information needed to evaluate an application for a specific license to process source materials. Examples of such processing activities are manufacture of depleted uranium and thorium-magnesium alloy products; manufacture of glass containing thorium; shaping, grinding, and polishing of lenses containing thorium; and the manufacture and distribution of other products containing source material.

##### 1.2 Applicable Regulations

The Commission's rules and regulations concerning licensing of source material are contained in Title 10, Code of Federal Regulations, Part 40, "Licensing of Source Material." Source material means (1) uranium or thorium, or any combination thereof, in any physical or chemical form or (2) ores that contain by weight 1/20 of one percent (0.05%) or more of uranium, thorium, or any combination thereof. Source material does not include special nuclear material. Other regulations pertaining to source material licenses are found in 10 CFR Part 19, "Notices, Instructions, and Reports to Workers; Inspections," 10 CFR Part 20, "Standards for Protection Against Radiation;" 10 CFR Part 71, "Packaging of Radioactive Material for Transport and Transportation of Radioactive Material Under Certain Conditions;" and 10 CFR Part 170, "Fees for Facilities and Materials Licenses Under the Atomic Energy Act of 1954, as Amended." The applicant should study carefully the regulations and this guide and submit all information requested.

\*Lines indicate substantive changes from previous issue.

##### 1.3 Items Requiring Separate Applications

Activities that are related to the reactor fuel cycle, such as uranium and thorium mill operation and uranium hexafluoride production, are not within the scope of this guide.

##### 1.4 As Low As Is Reasonably Achievable (ALARA)

Paragraph 20.1(c) of 10 CFR Part 20 states that "... persons engaged in activities under licenses issued by the Nuclear Regulatory Commission pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974 should, in addition to complying with the requirements set forth in this part, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable." Regulatory Guide 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable," provides the NRC staff position on this important subject. License applicants should give consideration to the ALARA philosophy, as described in Regulatory Guide 8.10, in the development of plans for work with licensed radioactive materials.

##### 1.5 General Licenses

Although this guide pertains to the filing of applications for specific licenses, the applicant should be aware of the existence of general licenses. General licenses are effective without the filing of an application or the issuance of specific documents. (Specific licenses require filing of an application and the issuance of licensing documents to specific persons.)

##### 1.5.1 General License to Receive Title to Source Material

#### USNRC REGULATORY GUIDES

Regulatory Guides are issued to describe and make available to the public methods acceptable to the NRC staff of implementing specific parts of the Commission's regulations to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants. Regulatory Guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience. This guide was revised as a result of substantive comments received from the public and additional staff review.

Comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Attention: Docketing and Service Section.

The guides are issued in the following ten broad divisions:

- |                                   |                        |
|-----------------------------------|------------------------|
| 1. Power Reactors                 | 6. Products            |
| 2. Research and Test Reactors     | 7. Transportation      |
| 3. Fuels and Materials Facilities | 8. Occupational Health |
| 4. Environmental and Siting       | 9. Antitrust Review    |
| 5. Materials and Plant Protection | 10. General            |

Copies of published guides may be obtained by written request indicating the divisions desired to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Attention: Director, Office of Standards Development.

A general license to receive title, only, to source material is provided by §40.21, 10 CFR Part 40. Under this general license, materials may be owned without regard to quantity but may not be physically possessed or used in any manner.

### 1.5.2 General License for Possession of Small Quantities

Section 40.22, 10 CFR Part 40, provides a general license for the use and transfer by certain persons for certain uses of up to 15 pounds of source material at any one time provided that no more than 150 pounds of source material are received in any calendar year. Note that the 15 pounds and 150 pounds of source material refer to contained source material. For example, 375 pounds of thorium-magnesium alloy containing 4% thorium could be transferred and used at any one time under the general license.

### 1.5.3 General Licenses to Export

The export of source material in certain forms and quantities is authorized by a number of general license provisions in §40.23, 10 CFR Part 40. If it is desired to export forms or quantities of source material that are not provided for in the general licenses of §40.23, it will be necessary to file an application for a specific license pursuant to §§40.31 and 40.33.

### 1.6 Exemptions

Paragraphs 40.13(a) and (b) provide certain exemptions from Commission rules and regulations and requirements for licensing. If the concentration by weight of source material in the materials being processed does not exceed 1/20th of one percent (0.05%) at any time during processing and use, such processing and use are exempt from licensing. The receipt, possession, use, and transfer and import of "unrefined and unprocessed" ore are also exempt from licensing.

## 2. LICENSE FEES

An application fee is required for most types of licenses. The applicant should refer to §170.31, "Schedule of Fees for Material Licenses," of 10 CFR Part 170 to determine the amount of the fee that must accompany the application. Review of the application will not begin until the proper fee is received by the NRC.

## 3. FILING AN APPLICATION

### 3.1 Application Form NRC-2\*

When the exemptions or general licenses described above do not meet the applicant's needs, an application should be filed on Form NRC-2. All items of the

\*Form NRC-2 was formerly designated Form AEC-2. Existing copies of Form AEC-2 may still be used. See Appendix to this guide.

application form should be completed in sufficient detail for the NRC to determine that the applicant's equipment, facilities, and radiation protection program are adequate to protect health and minimize danger to life and property.

Since the space provided on the application form is limited, the applicant should append additional sheets to provide complete information. Each separate sheet or document submitted with the application should be identified as to its purpose, e.g., response to an item of the application form, radiation safety instructions, etc.

Five copies of the application should be completed. The original and three copies should be mailed to: Radioisotopes Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. One copy should be retained by the applicant since the license will require that the institution adhere to the statements and representations made in the application and any supplement to it.

### 3.2 Proprietary Information

The applicant should not submit proprietary information unless it cannot be avoided in giving a complete description of the applicant's equipment, facilities, and radiation protection program. If the use of proprietary information cannot be avoided, the proprietary information should be separated from the rest of the application, and an application for withholding from public inspection should be submitted in conformance with the requirements of §2.790 of 10 CFR Part 2.

### 3.3 Environmental Information

A formal environmental report is not specifically required for the type of activities included in the scope of this document. However, the Commission has a responsibility to determine if the "conduct of any other activity" will significantly affect the quality of the environment when issuing new licenses or amendments and renewals of existing licenses. Certain large-scale processing operations and associated waste storage and disposal activities may require evaluation pursuant to 10 CFR Part 51, "Licensing and Regulatory Policy and Procedures for Environmental Protection," unless the information submitted clearly shows no significant impact on the environment from the proposed operations. The information concerning effluents submitted to show lack of impact should cover all aspects of the operation and include the technical basis and rationale that support the evaluation of potential environmental effects.

### 3.4 Safeguards

No safeguard information is required in an initial application for licenses covered by this guide.

The Commission uses an electronic data processing procedure to record certain types of information concerning source material. This system uses a three-letter Reporting Identification Symbol (RIS) to identify licensees who must submit material transfer reports and periodic material status reports in accordance with §40.64, 10 CFR Part 40. Applicants will be assigned a Reporting Identification Symbol and will be informed how it is to be used following issuance of the license. This information will be forwarded under separate cover following issuance of a license or license amendment authorizing greater than 1,000 kilograms of source material.

#### 4. CONTENTS OF AN APPLICATION

Many items on Form NRC-2 are self-explanatory. The following comments apply to the indicated items on Form NRC-2.

*Item 4.* Each site of use or storage should be identified by street address, city, and state.

*Item 7.* If the use of source material will include the performance of services for others or the production and distribution of products containing source material, a brief narrative description of services or products in which the source material will be used should be submitted.

*Item 8.* The physical form specification (Item 8(c)) should include percent by weight of source material. This is necessary to determine the amount of source material to be covered by the license. For example, 2,000 pounds of monazite ore containing 5% natural thorium would contain  $0.05 \times 2,000 = 100$  pounds of source material. In this case, "monazite ore, 5% thorium by weight" should be entered in Item 8(c) and "100 pounds" in 8(d). Percent specifications may be given as a range, but the "Maximum Amount" (Item 8(d)) should be based on the upper limit. The "Maximum Amount" (Item 8(d)) and the "Maximum Total Quantity to Be on Hand" (Item 8(e)) should include all source materials, i.e., raw materials, materials in process and storage, scrap materials, and wastes. The possession limit requested should be commensurate with the applicant's needs and facilities for safe handling and disposal.

*Item 9.* An evaluation of the potential external and internal radiation and uranium chemical\* hazards to workers and the public should be submitted. The evaluation should include a narrative description of the proposed possession and use of source materials from the time of receipt of raw materials to ultimate disposition of products and wastes. The chemical and physical form, percent by weight, and total batch size for each step in a processing operation should be es-

\*For soluble mixtures of U-238, U-234, and U-235 in air, chemical toxicity may be the limiting factor. See Footnote 3 to Appendix B, 10 CFR Part 20.

timated. (A sampling program may be required for raw materials and when changing or initiating new procedures to determine concentrations and quantities of source materials at each stage of a process.) Each stage of a process should be considered in evaluating potential hazards. For example, the processing of uranium may produce dust in the processing area, release radon daughter products, result in loose contamination from spills during transfers, and result in releases of dusts to the environment from ventilation system exhausts.

*Item 10.* A description of the training and experience of each person who will directly supervise the use of material or who will have responsibilities for radiological or uranium chemical safety should be submitted. Personnel qualifications should be commensurate with the use of the materials as proposed in the application.

The description should include the type (on-the-job or formal course work), location, duration, and nature (subject, depth, scope, etc.) of the training. Training should cover (a) principles and practices of radiation protection, (b) radioactivity measurements, standardization, and monitoring techniques and instruments, (c) mathematics and calculations basic to the use and measurement of radioactivity, (d) biological effects of radiation, and (e) principles and practices of protection against the chemical toxicity of source materials.

The description of the personal use of radioactive materials or equivalent experience (e.g., radiation-producing machines) should include the specific isotopes handled, the quantities of materials handled, the chemical and physical form of materials handled, where the experience was gained, the duration of experience, and the type of use.

The ability of appropriate personnel to use radiation measuring, monitoring, and surveying equipment effectively in assessing and controlling hazards from radiation and radioactive material should be established.

*Item 11.* The equipment, facilities, and instrumentation for each site of use should be described in detail. The proposed equipment and facilities for each operation must be adequate to protect health and minimize danger to life and property. Equipment and facilities descriptions should include:

a. The site. A description of the area surrounding each facility should be submitted establishing distances to, and the use of, neighboring buildings and facilities. A general site description should include storage, processing, and waste holding areas. Restricted areas and methods for controlling access to such areas should be described. Diagrams of the plant layout depicting process areas, storage

areas, laboratories, clothing change areas, offices, etc., should be submitted. Explanatory sketches, drawings, and process flow diagrams should be appended to the application, as appropriate.

b. Storage facilities. Consideration of shielding, containment, and security of material should be included.

c. General safety equipment. A description of protective clothing, general and personal air sampling equipment, fume hoods, waste receptacles, auxiliary shielding, waste holding tanks, firefighting and fire prevention equipment, vacuum systems, safety showers, and any other equipment that would contribute to safe use of materials should be described as appropriate.

d. Ventilation and containment systems, filters, dust collection devices, scrubbers, and discharge stacks and vents and effluent monitoring equipment. Ventilation and containment equipment should be described as it relates to the phase or type of processing of source material involved. Criteria and procedures for evaluating the performance of the equipment should be specified.

e. Respiratory protection program. Applicants are expected to consider means for reducing concentrations of airborne radioactive materials by employing modern process, containment, and ventilation engineering controls whenever possible. The use of respiratory protective equipment will not be considered an adequate substitute for engineered controls in a well-planned safety program for reduction of potential airborne contamination.

The Commission's regulations regarding exposures to radioactive materials in air in restricted areas are set forth in §20.103, 10 CFR Part 20. A formal respiratory protection program may be established, and a licensee may use respiratory protective equipment ("respirators") to limit the inhalation of airborne radioactive material pursuant to §20.103(b)(2), 10 CFR Part 20, provided such equipment is used as stipulated in Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection." This document provides guidance on acceptable methods of implementing the regulation, such as protection factors and references to acceptable equipment. Additional related technical information is provided in an associated "Manual of Respiratory Protection Against Airborne Radioactive Materials" (NUREG-0041). Paragraph 20.103(e) of 10 CFR Part 20 specifies that a licensee shall notify, in writing, the Director of the Inspection and Enforcement Regional Office listed in Appendix D to 10 CFR Part 20 at least 30 days before the date that respiratory protective equipment is first used under the provisions of §20.103.

The conditions where the use of respirators may be appropriate in routine, nonroutine, or emergency situations involving radioactive materials and those cases where protection against respiratory hazards other than airborne radioactive materials is needed are discussed in Regulatory Guide 8.15 and in Chapters 2 and 3 of NUREG-0041.

f. Radiation detection instruments to be used.

(1) The manufacturer's name, instrument model number, the number available, the type of radiation detected (alpha, beta, or gamma), the range (milliroentgens/hour or counts/minute), the window thickness in mg/cm<sup>2</sup>, and type of use should be specified for each instrument. The type of use would normally be monitoring, surveying, assaying, or measuring.

(2) Describe the instrument calibration procedure. State the frequency, and describe the methods and procedures for calibration of survey and monitoring instruments, as well as any other instruments and systems used in the radiation protection program, such as measuring instruments used to assay sealed-source leak-test samples, contamination samples (e.g., air samples, surface "smear test" samples), and bioassay samples.

An adequate calibration of survey instruments usually cannot be performed with built-in check sources. Electronic calibrations that do not involve a source of radiation are also not adequate to determine the proper functioning and response of all components of an instrument.

Daily or other frequent checks of survey instruments should be supplemented every six months with a two-point calibration on each scale of each instrument with the two points separated by at least 50 percent of the scale. Survey instruments should also be calibrated following repair. A survey instrument may be considered properly calibrated when the instrument readings are within  $\pm 10$  percent of the calculated or known values for each point checked. Readings within  $\pm 20$  percent are considered acceptable if a calibration chart or graph is prepared and attached to the instrument.

If the applicant proposes to calibrate his instruments, a detailed description of planned calibration procedures should be submitted. The description of calibration procedures should include, as a minimum:

- (a) The manufacturer and model number of the source(s) to be used,
- (b) The nuclide and quantity of radioactive material contained in the source,

- (c) The accuracy of the source(s) and the traceability of the source to a primary standard,
- (d) The step-by-step procedures for calibration including associated radiation safety procedures, and
- (e) The name(s) and pertinent experience of person(s) who will perform the calibrations.

If the applicant intends to contract out the calibration of instruments, the name, address, and license number of the calibration firm should be specified together with the frequency of calibration. The applicant should contact the firm that will perform the calibrations to determine if information concerning calibration procedures has been filed with the Commission. If information has not been filed, information concerning calibration procedures should be obtained and submitted.

Quantitative measuring instruments used to monitor the adequacy of containment and contamination control such as those used for measuring air samples, effluent releases, and surveys to evaluate alpha contamination of personnel (bioassays), work areas (smear tests), and equipment should usually be calibrated prior to use. The procedure(s) and frequency for calibration of such instruments should be submitted and should include:

- (a) The name(s) of the supplier(s) of the standard(s) to be used,
- (b) The nuclide and quantity of radioactive material in the standard source(s),
- (c) The accuracy of the source(s) (as a minimum  $\pm 5\%$  of the stated value and traceable to a primary standard such as that maintained by the National Bureau of Standards),
- (d) The name(s) and pertinent experience of person(s) who will perform the instrument calibrations.

g. Description of personnel monitoring equipment. The type of equipment (film badges, TLD, pocket dosimeters) to be used, the frequency of evaluation, and the purpose for which the devices are used (to evaluate whole body or extremity exposure) should be specified. A description of methods of calibrating and processing monitoring equipment or specification of the type of services to be obtained from a commercial supplier and the name of the supplier should be submitted.

*Item 12.* Radiological and uranium chemical\* safety procedures should be developed regarding all aspects of the radiation and uranium chemical safety

\*See footnote, p. 10.4-3.

program. These procedures should be established to ensure compliance with the provisions of 10 CFR Part 19, "Notices, Instructions, and Reports to Workers; Inspections," and 10 CFR Part 20, "Standards for Protection Against Radiation." Written radiation safety procedures and instructions specific to the activities for which a license is sought and covering all proposed activities at all proposed locations of use should be submitted. These should cover potential external radiation exposures to personnel; the possible production of gas, vapor, dust, or other airborne radioactivity; generation of liquids containing suspended or dissolved materials; and the generation of solids as fines, scrap, slag, etc., according to the process involved.

Applicants are expected to use all practicable means for reducing radiation level and concentrations of radioactive materials in ambient air and water and in effluents by employing modern process, containment, and ventilation engineering to avoid unnecessary exposures. The limits in 10 CFR Part 20 are not to be considered as design limits.

*Item 12(a).* Safety features and procedures. Safety and fire prevention aspects of the program such as storage of flammable or caustic reagents apart from source materials, temperature controls on dryers, use of inert atmospheres in thorium-magnesium machining, and measures taken to prevent and control spontaneous fires in finely divided depleted uranium metal should be described.

*Item 12(b).* Emergency and decontamination procedures. A copy of emergency procedures to be posted in all laboratory or work areas where radioactive materials are used should be submitted. These instructions should describe immediate action to be taken in case of an emergency in order to prevent release of radioactive material or further contamination of work areas and personnel. Actions to be taken in emergencies include sounding of alarms, turning off ventilation systems, containment of spills, evacuation of the area, re-entry for hazard assessment, and reporting to proper authorities. The instructions should specifically state the names and telephone numbers of responsible persons to be notified.

*Item 12(c)*

a. Radiation Survey Program. A survey means an evaluation of the radiation hazards incident to production, use, release, disposal, or presence of radioactive materials under a specific set of conditions. When appropriate, such evaluation includes a physical survey of the location of materials and equipment and measurements of levels of radiation or concentration of materials present.

A more extensive survey program may be needed for evaluation and verification of potential hazards associated with pilot studies and initial phases of a

full-scale production operation than is needed for day-to-day operations within an established program. Provisions for evaluation of all changes in operations should be made.

The proposed survey program should be designed to monitor the adequacy of containment and control provisions for radiological safety purposes. The areas of primary concern for source material operations are air sampling, monitoring releases to unrestricted areas, surveying for personnel contamination, and surveying to evaluate surface contamination. Gamma surveys of processing and storage areas may be required for operations involving concentrated or pure source materials. The types, methods, and frequency of surveys should be described in detail as they relate to the type of program involved.

(1) The survey program for evaluation of alpha contamination of personnel and plant surfaces should include provisions for monitoring protective clothing, hands, and feet of workers leaving restricted areas before breaks and at the end of shifts. Surveys of gloves and other protective clothing, equipment, or tools required during processing should be described.

The survey program associated with cleanup efforts where dust or loose materials may be involved should be described. Reasonable efforts should be made to remove all residual contamination.

Surface contamination evaluation should include unrestricted areas such as lunch rooms, offices, etc. Acceptable limits of fixed and removable contamination for all facilities and equipment should be established and submitted.

(2) Acceptable limits of fixed and removable contamination for facilities and equipment to be released for unrestricted use should also be established and submitted. For example, if, after reasonable efforts to remove all residual contamination, maximum alpha readings are 3,000 dpm/100 cm<sup>2</sup> or less and the average is 1,000 dpm/100 cm<sup>2</sup>, unrestricted use is permissible provided that removable alpha contamination does not exceed 200 dpm/100 cm<sup>2</sup>. These guidelines apply to natural thorium. For natural and depleted uranium, the levels may be a factor of 5 higher.

(3) A description of an air sampling program should define the areas where samples will be taken, the frequency of sampling, and appropriate spatial relationship between sampling locations and workers' breathing zones. The type (gross alpha, fluorimetric, etc.), justification for, and sensitivity of assays that will be performed to evaluate air samples should be described. The methods used to relate sample results to actual personnel exposure should be described. If air sampling instruments will not be

returned to the manufacturer for calibration, the methods, frequency, and standards used for calibration should be specified.

(4) The effluent monitoring program for releases to unrestricted areas should encompass all airborne and liquid releases. Calculational evaluations should be supplemented by stack monitoring, waste stream monitoring, water sampling, or other environmental monitoring as appropriate for the planned and potential releases of radioactive materials.

b. Specification of radiation safety responsibilities and duties. The responsibilities and duties of management, any radiation safety committees, and radiation safety officers should be established and clearly described. The specific role of any consultants should be described in detail including responsibilities and authority, availability, onsite visit schedule, onsite duties, and services to be rendered. Although the use of consultants for radiation safety purposes may be acceptable, a full-time employee of the applicant, appropriately trained in radiation safety, should be assigned responsibility for the day-to-day radiation safety function. Individuals having radiation safety responsibilities, including consultants, should be identified by name, and each individual's pertinent training and experience should be described. Assignment of duties should cover all aspects of the radiation safety program.

c. Bioassay Program. Regulatory Guide 8.11, "Applications of Bioassay for Uranium," outlines the information to be submitted concerning a bioassay program. Regulatory Guide 8.11 specifically deals with depleted, natural, and enriched uranium; however, some of the methods and concepts are applicable to thorium.

d. Records management. Provisions for keeping and reviewing records of surveys, material inventories, personnel exposures, and receipt, use, and disposal of materials should be described.

e. Materials control provisions. Procedures for ordering materials, for notification of responsible persons upon receipt, and for safely opening packages should be submitted. Section 20.205, 10 CFR Part 20, requires monitoring of certain packages upon receipt depending on the quantity of contained material and its form. Monitoring of external package surfaces for contamination is required upon receipt of packages containing more than 1 millicurie of source materials (greater than 3.3 pounds of natural uranium). If removable contamination in excess of 0.01 microcuries/100 cm<sup>2</sup> is found on the external surfaces of the package, notification of the shipper and the Commission is required by §20.205, 10 CFR Part 20.

f. Procedures for training personnel. A description of the training programs for all personnel who are involved in or associated with the use of materials should be submitted. The description should include the form of training (formal course work, lectures, on-the-job instruction, written instruction, or manuals), duration of training, retraining provisions, and the subject matter to be covered. Copies of training instructions and manuals should be submitted.

*Item 13.* The description of the waste disposal program should specify the quantities and types of radioactive waste products generated by all phases of each operation. Consideration should be given to the disposal of contaminated equipment such as filters, tools, process equipment, scrap, fines, and any wastes generated from molding, grinding, or machining operations. Airborne wastes released from processing facilities, ventilation systems, or dust collection systems, and liquids and solids from chemical processing and melting should be considered where such processes are involved.

Wastes generated as a result of operations involving source materials should be disposed of in a safe manner. Sections 20.301 through 20.305, 10 CFR Part 20, deal with waste disposal. The applicant should specifically describe waste disposal methods and procedures.

Wastes that are soluble or readily dispersible in water may be disposed of to a sanitary sewer system subject to the concentration and the daily, monthly, and annual limits specified in §20.303, 10 CFR Part 20. For example, up to one millicurie of natural uranium may be disposed of daily provided the concentration does not exceed  $1 \times 10^{-3}$  microcuries/ml when diluted by the licensee's average daily quantity of sewage. Sewer disposal of radioactive materials by a licensee is limited to a total of one curie/year and average monthly concentrations not exceeding restricted area water concentrations (Appendix B, Table I, Column 2, 10 CFR Part 20).

Wastes may be buried in soil. Such burials are subject to the four-foot depth, six-foot separation, and 12-per-year limitations of §20.304, 10 CFR Part 20. The quantity per burial is limited to 100 millicuries for source materials (330 pounds of natural uranium).

The most commonly used method of disposal is transfer to a commercial firm licensed to accept such wastes. Lists of such firms are available from the Commission upon request. In dealing with such firms, prior contact is recommended to determine specific services provided.

If other methods of disposal are requested, the information specified in §20.302, 10 CFR Part 20, should be submitted. The information should include

the quantities and kind of materials, levels of radioactivity, a description of the manner and conditions of disposal, and evaluation of environmental effects and control procedures.

Any long-range disposal plans for large volumes of low concentration source material waste should be described. Applications for processing operations, such as rare earth extraction, that generate large volumes of wastes should include detailed specific plans for ultimate disposal of such materials.

When such wastes are to be held for significant periods of time on site in basins, etc., adequate provisions for containment, security, and long-term control should be made. Plans for any interim type of storage should be described in detail.

*Item 14.* If distribution of products containing source material is planned, the detailed description of the products outlined in Item 14 of Form NRC-2 should be supplemented, as appropriate, with the following:

a. A description of the quality assurance program, including process control measures, sampling plans, product examination and testing, acceptance criteria, and testing and examination of prototype or production products, which establishes that the products will consistently have the radiation safety characteristics described to the Commission and that these characteristics will not be significantly degraded over the expected lifetime of each product.

b. If appropriate, a description of labeling, including label materials, content, location on the product, and method of attachment.

c. Estimates of radiation doses to users of the products and others who may be exposed to radiation or radioactive materials from the products and the basis for these estimates.

## 5. AMENDMENTS TO LICENSES

Licensees are required to conduct their programs in accordance with statements, representations, and procedures contained in the license application and supportive documents. The license must therefore be amended if the licensee plans to make any changes in facilities, equipment (including monitoring and survey instruments), procedures, personnel, or source material to be used.

Applications for license amendments may be filed either on the application form or in letter form. The application should identify the license by number and should clearly describe the exact nature of the changes, additions, or deletions. References to previously submitted information and documents should be clear and specific and should identify the pertinent information by date, page, and paragraph.

## **6. RENEWAL OF A LICENSE**

An application for renewal of a license should be filed at least 30 days prior to the expiration date. This will ensure that the license does not expire until final action on the application has been taken by the NRC as provided for in paragraph 40.43(b) of 10 CFR Part 40.

Renewal applications should be filed on Form NRC-2, appropriately supplemented, and should

contain complete and up-to-date information about the applicant's current program.

In order to facilitate the review process, the application for renewal should be submitted without reference to previously submitted documents and information. If such references cannot be avoided, they should be clear and specific and should identify the pertinent information by date, page, and paragraph.



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) <input type="checkbox"/> (a) New license <input type="checkbox"/> (b) Amendment to License No. _____ <input type="checkbox"/> (c) Renewal of License No. _____ <input type="checkbox"/> (d) Previous License No. _____		2. NAME OF APPLICANT <hr/> 3. PRINCIPAL BUSINESS ADDRESS <hr/>	
4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED			
5. BUSINESS OR OCCUPATION		6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP	(b) AGE
7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED			
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			
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.			
10. DESCRIBE THE MINIMUM TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE THAT WILL BE REQUIRED OF APPLICANT'S SUPERVISORY PERSONNEL INCLUDING PERSON RESPONSIBLE FOR RADIATION SAFETY PROGRAM (OR OF APPLICANT IF APPLICANT IS AN INDIVIDUAL).			
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: (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment as appropriate. 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).			
(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).			

# Appendix

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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.

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.

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

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

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.

(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.*

\_\_\_\_\_  
*(Applicant named in Item 2)*

Dated \_\_\_\_\_

BY: \_\_\_\_\_  
*(Print or type name under signature)*

\_\_\_\_\_  
*(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.

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