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Docket No. 40-7102
40-8948

Mr. Craig R. Rieman
Radiological Safety Manager
Shieldalloy Metallurgical Corporation
West Boulevard
P. O. Box 768
Newfield, New Jersey 08344

Dear Mr. Rieman:

As requested by you during our phone conversation on November 4, 1991,
I am enclosing a draft version of the document titled "Guide for the
Preparation of License Renewal Applications for Processors of Source Material
for Elements other than Uranium and Thorium." Even though this document has
not been finalized, it contains very useful information related to the
contents of an application to renew a source material license.

Sincerely,

Original Signed By

Yawar H. Faraz, Project Manager
Advanced Fuel and Special
Facilities Section
Fuel Cycle Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Enclosure:
As stated

cc: Michael A. Finn
Jay E. Silberg, Esq.

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GUIDE FOR THE PREPARATION OF LICENSE
RENEWAL APPLICATIONS FOR PROCESSORS
OF SOURCE MATERIAL FOR ELEMENTS OTHER
THAN URANIUM OR THORIUM

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TABLE OF CONTENTS

	<u>Page</u>
Introduction.....	v
Part 1 - License Conditions	
Chapter 1. Standard Conditions for Special Authorizations..	1-1
1.1 Name, Address, and Corporate Information.....	1-1
1.2 Site Location(s).....	1-1
1.3 License Number and Period of License.....	1-1
1.4 Possession Limits.....	1-1
1.5 Authorized Activities.....	1-1
1.6 Exemptions and Special Authorizations.....	1-2
Chapter 2. General Organizational and Administrative Requirements.....	2-1
2.1 Organizational Responsibilities and Authority....	2-1
2.2 Personnel Education and Experience Requirements..	2-1
2.3 ALARA Policy.....	2-1
2.4 Safety Review Committees.....	2-2
2.5 Training.....	2-2
2.6 Procedures.....	2-2
2.7 Audits and Inspections.....	2-3
2.8 Records.....	2-3
Chapter 3. Radiation Protection.....	3-1
3.1 Restricted Areas - Access Control.....	3-1
3.2 Radioactivity Measurement Instrumentation.....	3-1
3.3 Occupational Exposure Control.....	3-1
3.4 Ventilation.....	3-2
3.5 Work-Area Air Sampling.....	3-2
3.6 Surface and Personnel Contamination.....	3-2
3.7 Bioassay.....	3-3
3.8 Radioactive Waste Management.....	3-3
Chapter 4. Environmental Protection.....	4-1
Chapter 5. Decommissioning Plan.....	5-1
Chapter 6. Emergency Plan.....	6-1
Part 2 - Descriptive Information	
Chapter 7. General Information.....	7-1
7.1 Corporate Information.....	7-1
7.2 Financial Qualification.....	7-1
7.3 Summary of Operating Objective and Process.....	7-1

DRAFT

TABLE OF CONTENTS (Continued)

	<u>Page</u>
7.4 Site Description.....	7-1
7.5 Location of Buildings Onsite.....	7-1
7.6 Maps and Plot Plans.....	7-2
7.7 License History.....	7-2
Chapter 8. Safety Demonstration.....	8-1
8.1 Education and Experience of Key Personnel.....	8-1
8.2 Process Description.....	8-1
8.3 Radiation Protection.....	8-1
8.4 Shipping and Receiving.....	8-3
8.5 Chemical Systems.....	8-3
8.6 Fire Protection.....	8-4
8.7 Ventilation Systems.....	8-5
Chapter 9. Performance Demonstration.....	9-1
9.1 Exposure History.....	9-1
9.2 Survey History.....	9-1
9.3 Environmental Monitoring Program and History.....	9-1
9.4 Inspection History.....	9-2
Chapter 10. Radioactive Waste Handling.....	10-1
10.1 Liquid Wastes	10-1
10.2 Solid Wastes	10-1
Chapter 11. Decommissioning Plan.....	11-1
Appendix A Potential Topics for Trend Analysis	
Appendix B Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Materials	

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INTRODUCTION

Section 40.43, "Renewal of Licenses," of 10 CFR Part 40 "Domestic Licensing of Source Material," specifies that applications for renewal of specific licenses should be filed in accordance with § 40.31, "Applications for specific licenses." Section 40.31 identifies the general information required. This "Guide for the Preparation of License Renewal Applications for Processors of Source Material for Elements Other than Uranium or Thorium" (hereinafter referred to as Standard Format) was prepared to provide more specific guidance for the preparation of the health and safety sections of renewal applications. The Environmental Report is submitted separately.

The NRC staff suggests the use of this Standard Format for renewal applications to facilitate preparation by licensees and timely and uniform review by the NRC staff. Information contained in previous submittals, statements, or reports filed with the Commission under the license may be incorporated by reference provided such references are clear and specific. Information called for in this regulatory guide that is incorporated by reference to a previous application should be summarized.

A renewal application should be filed in proper form not less than 30 days prior to expiration of the existing license (see 10 CFR § 40.43(b)).

The renewal application for the health and safety section of the license consists of two major parts. The first part contains the proposed license conditions stating the performance requirements to which the applicant proposes to commit. The second part contains additional detailed safety information and descriptive information demonstrating the applicant's adherence to the conditions of the first part. The Standard Format is designed to separate the requirements in Part I (license conditions) from the descriptive information in Part II (demonstration and performance record). The information in Part I is of major importance to the NRC inspection and enforcement staff and should be written so as to be inspectable and verifiable. The information in Part II is of major importance to the NRC licensing staff during the review of the renewal application and should be written to provide the basis for licensing decisions. The

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Standard Format is acceptable to the NRC staff, but conformance is not required. Renewal applications with different formats are acceptable if they provide an adequate basis for the findings required for the issuance of a license.

The Commission's requirements for information needed in its review of applications for licenses to possess and use source materials for extraction of chemicals and compounds other than uranium or thorium may change. The contents of the Standard Format will be revised to reflect rule changes. Revisions of the Commission's needs for the information in connection with licensing will be conveyed to the industry and the public in the following principal ways: (1) by revisions to the Standard Format, (2) by the issuance of new or revised regulatory guides, (3) by public announcements, and (4) by direct communications to the applicant from the NRC staff as needed.

Purpose and Applicability

The Standard Format has been prepared to identify the type and quality of information needed in an application for license renewal. It is recognized that the physical size, process scope (chemical or mechanical), and plant capacity all have a bearing on the complexity and level of license application detail. Therefore, some sections of the Standard Format in part or entirety will not be applicable to all applications. If additional guidance is required, the applicant is invited to confer with the NRC staff prior to or during the preparation of the application.

In the renewal application, the applicant should analyze the plant in terms of potential hazards and the means, including appropriate margins of safety, employed to protect against these hazards. Sufficient information should be included in Part II to allow the NRC licensing staff to perform independent analyses to confirm conclusions reached by the applicant. These analyses should include but are not limited to:

- (1) the site and its relationship to accidents from natural phenomena,
- (2) operations involving radiation exposures, releases to the environment, and the application of the principle of as low as is reasonably achievable (ALARA),

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- (3) operations involving hazardous chemicals,
- (4) confinement and control of radioactive materials and hazardous chemicals,
- (5) projected effluent quantities and concentrations and effluent treatment,
- (6) reliability of the systems essential to safety,
- (7) prevention and control of fire and explosion,
- (8) emergency planning, and
- (9) environmental impact associated with normal operations, abnormal conditions, and accidents.

The renewal application should demonstrate the degree of skill, care, and effort used by the applicant in production activities. To this end, the applicant may provide in-depth analyses as supplemental reports incorporated in the application by clear and specific references. Common literature or references that are readily available need not be supplied with the application.

Proprietary Information

Proprietary information, if necessary, must be submitted separately. When submitted, it should be clearly identified and accompanied with the applicant's justifications for requesting its being withheld from public disclosure, as specified by §2.790, "Public inspections, exemptions, requests for withholding," of 10 CFR Part 2, "Rules of Practice for Domestic Licensing Proceedings." The NRC staff's review of the safety analysis should depend as much as possible on nonproprietary information.

Style and Composition

The applicant should strive for clear, concise presentation of the information provided in the application.

Where numerical values are stated, the number of significant figures given should reflect the accuracy or precision to which the number is known. Where appropriate, estimated limits of errors or uncertainty should be given.

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Abbreviations should be consistent throughout the application and should be consistent with generally accepted usage. Any abbreviations, symbols, or special terms not in general usage or unique to the plant should be defined when they first appear in the application or should be presented in a separate "Glossary" of terms and definitions.

References used should appear either as footnotes to the page where referenced or at the end of each chapter.

Graphical Presentations

Graphical presentations such as drawings, maps, diagrams, sketches, and tables should be employed where the information may be presented more adequately or conveniently by such means. Due concern should be taken to ensure that all information so presented is legible, that symbols are defined, and that scales are not reduced to the extent that visual aids are necessary to interpret pertinent items of information. These graphical presentations should be located in the section where they are primarily referenced.

Physical Specifications

Paper size.

Text pages: 8-1/2 x 11 inches

Drawings and graphics: 8-1/2 x 11 inches; however, a larger size is acceptable provided the finished copy when folded does not exceed 8-1/2 x 11 inches.

Paper stock and ink. Suitable quality in substance, paper color, and ink density for handling and reproduction by microfilming or image-copying equipment.

Page margins. A margin of no less than 1 inch should be maintained on the top, bottom, and binding side of all pages submitted.

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Printing.

Composition: text pages should be single spaced.

Type face and style: should be suitable for microfilming or reproduction by image-copying equipment.

Reproduction: may be mechanically or photographically reproduced. All pages of text should be printed on both sides and the image printed head-to-head. A minimum of eight copies of the application should be provided to the Commission at the time the renewal is requested.

Binding. Pages should be punched for standard three-hole loose-leaf binders.

Page numbering. Pages should be numbered with the digits corresponding to the chapter followed by a hyphen and a sequential number, e.g., the third page of Chapter 4 should be numbered 4-3. Do not number the entire report sequentially.

Table of Contents. A table of contents and an index of key items should be included in each volume of the renewal application.

Procedures for Updating or Revising Pages

Data and text should be updated or revised by replacing pages. The changed or revised portion on each page should be highlighted by a "change indicator" mark consisting of a bold vertical line drawn in the margin opposite the binding margin. The line should be of the same length as the portion actually changed. All pages submitted to update, revise, or add pages to the application should show the date of change and a revision or amendment number. A guide page listing the pages to be inserted and the pages to be removed should accompany the revised pages. Where major changes or additions are made, a revised Table of Contents should be provided.

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PART I LICENSE CONDITIONS

Part I of the application contains the proposed license conditions stating performance requirements to which the licensee proposes to commit. This Part I should not contain the detailed descriptive material that is more appropriate in Part II. This part should be written to permit inspection and verification of the stated performance requirements.

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Chapter 1. STANDARD CONDITIONS AND SPECIAL AUTHORIZATIONS

1.1 Name, Address, and Corporate Information

The licensee should furnish the full name and address. If the address of the plant facilities is different from that of the licensee, it should also be given. The State where the licensee is incorporated or organized, and the location of the principal office should be indicated.

1.2 Site Location(s)

The location(s) of the plant site, i.e., State, county, and municipality, should be given. Also describe the site, plant boundaries, buildings, and other areas and facilities where licensed activities will be conducted.

1.3 License Number and Period of License

The licensee should state the applicable license number and the period of time for which the license is requested.

1.4 Possession Limits

The maximum quantity (kilograms) of source material to be possessed and used under the license should be identified. The chemical and physical forms should also be provided. The possession limits requested should cover the maximum anticipated inventory including materials in process, stored materials, and wastes temporarily remaining onsite.

1.5 Authorized Activities

A summary of all activities, locations, and types of processes in which source material subject to this license is to be used should be provided.

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1.6 Exemptions and Special Authorizations

Any specific exemptions and special authorizations, such as a request for disposal of radioactive waste by incineration in accordance with 10 CFR 20.305, should be listed in this section. A description and justification for any exemptions or authorizations should be provided in the Demonstration Section.

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Chapter 2. GENERAL ORGANIZATIONAL AND ADMINISTRATIVE REQUIREMENTS

2.1 Organizational Responsibilities and Authority

Key positions with safety-related responsibilities (production line management as well as staff safety positions) should be identified, and those responsibilities should be fully described. The lines of authority from radiation safety to top management should be indicated on an organizational chart and should be clearly separate from the production function. The position responsible for personnel selection for safety-related positions should be stated. The names of the incumbents should be reserved for the demonstration sections.

The authority for the Radiation Safety Officer or his designee to halt any operation which he believes threatens the health or safety of personnel or the public should be explicitly stated. Clearly state the position authorized to resume any suspended operation.

2.2 Personnel Education and Experience Requirements

The minimum educational, training, and experience requirements for all safety-related positions including production line management and for membership on the Safety Review Committee should be specified in this section. The names of the incumbents should be reserved for the demonstration sections.

2.3 ALARA Policy

The licensee should state its commitment to ensuring that exposures to radiation will be maintained "As Low As Reasonably Achievable" (ALARA). A description of how this policy will be implemented should be included.

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As part of the ALARA program, the licensee should analyze data from surveillance and monitoring programs for trends that may indicate an increasing trend in radiation exposures or radioactivity in effluents. Appendix A provides a listing of some events that should be considered for analysis. A periodic report summarizing employee exposures and effluent release data should be made to senior management. Regulatory Guide 8.10, "Operating Philosophy for Monitoring Occupational Radiation Exposures As Low As Is Reasonably Achievable," may be useful in developing the ALARA program.

2.4 Safety Review Committees

The application should contain a list of all safety committees (e.g., ALARA). The function and responsibility of each committee should be described. The description should include the purpose, charter of responsibilities, frequency of meeting, members necessary to constitute a quorum, membership (by position), and reporting and recordkeeping requirements.

2.5 Training

The application should contain a commitment for training users of the licensed material, and radiation safety and emergency personnel. A description should be provided of the content and methodology of the program, the evaluation used to assess understanding, recordkeeping to be assured that all new personnel are trained, and the retraining program to provide refresher or upgraded information. The interval between retraining sessions should be stated. Regulatory Guides 8.13, "Instruction Concerning Prenatal Exposure," and 8.29, "Instruction Concerning Risks From Occupational Radiation Exposure," may be useful in preparing training materials.

In addition, the license should describe the general safety and emergency training and retraining programs provided for all site personnel.

2.6 Procedures

The licensee should conduct activities involving licensed materials in accordance with approved written procedures. The review and approval process

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should be described which ensures that prior to implementation all procedures will be evaluated and approved by the Radiation Safety Officer and the appropriate Safety Review Committee, where applicable. The range of procedures should encompass operations, radiation safety, maintenance, and emergency planning. The frequency of review and the approval process for these procedures to assure adequacy should be specified.

There should be a provision for analysis of unusual or unplanned activities which are not covered by established procedures. This analysis should result in a formal document, such as a "Radiation Work Permit" (RWP), which records the proposed activity, the analysis, and any safety requirements necessary. The criteria and procedures for initiating, evaluating, approving, and terminating these documents should be described.

2.7 Audits and Inspections

The licensee should state requirements for, and the frequency of, audits and inspections to determine if operations are conducted in accordance with written procedures and satisfy applicable regulations, license conditions, and the licensee's policies. The licensee should clearly distinguish the two functions. Audits are formal examinations made to verify that facility operations, the radiation safety, environmental monitoring, and training programs, as well as the procedure review and approval process are being conducted in accordance with established criteria. Inspections are routine reviews to observe that operations and the radiation safety program are being conducted according to approved procedures. The staff positions responsible for audits and inspections, the documentation of results and corrective actions, and the level of management to which results are reported should be specified. Staff positions should not be charged with performing audits and inspections in their areas of responsibility.

2.8 Records

The application should include a description of the system for maintaining records relating to health and safety. Such records should include but are not limited to changes related to safety made under internal review and approval,

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unusual operational incidents and events associated with radioactivity releases, instrument calibration, ALARA findings, employee training and retraining, audits and inspections, personnel exposures, routing radiation surveys, and environmental surveys. Retention time for these records should be specified. The regulations specify a retention time for some safety-related records. When no time period is specified, a minimum of two years is recommended.

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Chapter 3. RADIATION PROTECTION

3.1 Restricted Areas - Access Control

The application should identify the restricted areas and the means used to control entry and exit. The description should include:

1. Posting of signs, labels, notices, and other items as required by 10 CFR 19.11 and 20.203.
2. Identification of the physical limits of the restricted areas and the means of controlling access.
3. The policy on use of protective clothing and decontamination equipment as well as the types of protective clothing and equipment available for use. (In areas where there is a potential for personnel contamination with source material, workers should be provided with protective clothing such as coveralls and shoes or shoe covers.)
4. The provisions for area cleanup and personnel decontamination.

3.2 Radioactivity Measurement Instrumentation

The licensee should identify the types of instrumentation used for measuring radioactivity. The purpose (e.g., radiation surveys, personnel monitoring), number, range, sensitivity, alarm set point(s), calibration method and frequency, and testing should be described. A list of the instruments actually used by the licensee to fulfill the above requirements should be included in the demonstration section.

3.3 Occupational Exposure Control

The application should contain a description of the program for determining, validating, and controlling external occupational exposures. The description should include the type(s) of equipment used, the frequency of data collection and evaluation, and the administrative action levels for individual exposure.

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Regulatory Guides 8.21, "Health Physics Surveys for Byproduct Material at NRC-Licensed Processing and Manufacturing Plants," and 8.24, "Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication," may be useful in establishing appropriate programs.

3.4 Ventilation

The application should contain the requirements for ventilation systems, including minimum flow velocities, maximum differential pressure across filters, and the frequency of system checks.

3.5 Work-Area Air Sampling

When operations are conducted with source materials in a dispersible form, the application should contain a commitment to conduct programs for determining airborne radioactivity (including radon progeny) in work areas. The frequency of sample collection, minimum detectable activity, action levels, and actions to be taken should be specified. When fixed samplers are used, the description should include how placement of the samplers is determined to be representative of the worker's breathing air.

Regulatory Guides 8.24, "Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication," 8.25, "Calibration and Error of Air Sampling Instruments for Total Volume of Air Sampled," and 8.30, "Health Physics Surveys in Uranium Mills," may be useful in developing an air sampling and analysis program.

3.6 Surface and Personnel Contamination

The licensee should describe the program for surface contamination control. The description should include the controlled areas established to prevent the spread of contamination, the frequency of surface contamination surveys, allowable limits and actions levels for removable and fixed contamination in clean (uncontrolled) areas, intermediate areas (e.g., change rooms and personnel monitoring areas), and controlled areas, as well as the time interval allowed before commencing decontamination.

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Regulatory Guides 8.24, "Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication," and 8.30, "Health Physics Surveys in Uranium Mills," are used by the staff when evaluating programs for surface and personnel contamination control and surveillance programs.

The licensee should commit to specific criteria for the release of equipment and materials from the restricted areas to unrestricted areas. The licensee may commit to, or use as a guide, Appendix B, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Materials," August 1987.

The personnel contamination control and survey programs, including survey frequency, action levels, and actions to be taken, should be discussed.

3.7 Bioassay

A description of the bioassay program to detect and monitor for any significant deposition of radioactive material in the body should be provided. The description should include the criteria for initiation, selecting participants, technique used (e.g., urinalysis), frequency, and interpretation of results. Dose action level limits and actions to be taken should also be presented. Regulatory Guide 8.9, "Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program," and 8.11, "Applications of Bioassay for Uranium," should be consulted for details on an acceptable bioassay program.

3.8 Radioactive Waste Management

The application should contain a brief description of processes and systems used for handling, storing, and disposing of liquid and solid radioactive wastes. If radioactive wastes are stored onsite, methods of containment and monitoring of containment should be described.

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Chapter 4. ENVIRONMENTAL PROTECTION

Radioactivity levels in gaseous and liquid effluents that require a commitment to action should be specified. The action levels should be selected to meet regulatory limits and ALARA commitments. The application should contain a description of the proposed corrective actions to be taken when these action levels are exceeded. Levels at which an operation will be shut down should be specified.

The application should contain a description of sampling frequency, analysis, lower limit of detection, instrumentation, calibration and testing, method of reporting, and responsibility (by position) for control of all effluents at their point of discharge.

The environmental (radiological) monitoring program should be described. When applicable, the description should include provisions for sampling and analyses of air, soil, vegetation, surface-water, and the groundwater to evaluate radioactivity and/or other effluents released from the facility. The application should include evaluation and reporting commitments for the monitoring program.

The application should also contain a description of the nonradiological monitoring program used to meet State and Federal requirements, including sampling of stack gases, soil, vegetation, surface water, and ground water for chemical pollutants. List and give the status of all licenses, permits, and other approvals of plant operations required by Federal, State, local, or regional authorities.

The following regulatory guides may be of assistance in developing acceptable environmental protection and monitoring programs.

3.56 General Guidance for Designing, Testing, Operating, and Maintaining Emission Control Devices at Uranium Mills

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- 4.15 Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment

- 4.16 Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Plants

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Chapter 5. DECOMMISSIONING PLAN

The licensee should make a commitment to decommission the facility and the site at the end of its operation in a manner that will protect the health and safety of the public. Furthermore, the licensee must comply with the requirements for financial assurance as set forth in the rule "General Requirements for Decommissioning Nuclear Facilities" published in the Federal Register (53 FR 24018-24056) on June 27, 1988.

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Chapter 6. EMERGENCY PLAN

The application should include a description of the licensee's emergency procedures for fires, accidental release or loss of radioactive and/or hazardous materials, contamination of personnel, etc. These procedures should be posted in all restricted areas and should include instructions for:

1. Initial response to provide immediate safety precautions for people and property,
2. Securing the area,
3. Notifications,
4. Requesting assistance.

Only properly qualified people should conduct decontamination and recovery operations. After the area is secure, the cleanup and recovery operations should be planned by the RSO or other qualified individuals on a case-by-case basis.

In the descriptive information, the applicant should state the locations and quantities of hazardous chemicals which, if involved in a fire, spill, or explosion, could result in the release or loss of control of licensable material. The application should include a description of the licensee's emergency procedures for postulated incidents involving these hazardous chemicals.

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PART II DESCRIPTIVE INFORMATION

Part II of the application contains detailed information demonstrating the applicant's adherence to the license conditions. This information submitted in this part should be written to provide a basis for licensing decisions.

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Chapter 7. GENERAL INFORMATION

7.1 Corporate Information

The application should contain a description of the corporate organization. If the corporation is made up of two or more persons, the relationship and responsibilities of each should be explained.

7.2 Financial Qualification

The licensee should provide sufficient information to demonstrate financial capability for operating and decommissioning the plant. A copy of the latest corporate annual report may satisfy this requirement.

7.3 Summary of Operating Objective and Process

The application should contain a summary description of the production activities involving source material, such as the function and operation, process capacity, feed and products, and processes used. In particular, identify any processing changes or additions made since the last license renewal.

7.4 Site Description

The application should contain information on the location of the plant and a description of the geographical, demographical, meteorological, hydrological, seismological, and geological characteristics of the site and surrounding area. The objective is to indicate what, if any, site characteristics influenced plant design and mode of operation.

7.5 Location of Buildings Onsite

The application should contain descriptive information on the buildings and other installed features of the plant and their location on the site. In particular, identify any changes or additions made since the last license renewal.

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7.6 Maps and Plot Plans

A map of the site should be included in the application and should be of suitable scale to clearly define the boundary of the site and the distance from significant facility features to the site boundary. A general location map encompassing at least an 80-km (50-mi) radius should also be provided. The application should show any unusual hazard, such as a dam upriver from the plant, failure of which could cause flooding at the plant site. Additional maps and site plots should be provided to present details near the plant and to establish orientation of buildings, streams, ponds, and neighboring structures. The location of the site relative to prominent natural and man-made features and the distance and direction to the nearest population centers should be stated.

7.7 License History

The original license issue date and subsequent renewal dates should be provided. A listing of amendments since issuance of the original license or the last renewal should also be provided.

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Chapter 8. SAFETY DEMONSTRATION

8.1 Education and Experience of Key Personnel

The resumes of personnel employed in safety-related positions should be presented. Identify individuals by position and title and, as a minimum, describe their formal education, training, and experience.

8.2 Process Description

The types of operations involving source materials should be described. Particular attention should be given to the safety implications of operations, such as grinding, milling, blending, dissolving, smelting, extraction, as well as the handling and storage of raw materials and wastes. The description of operations should include the total quantity of source material processed per year, amount of raw material stockpiled onsite, the storage of waste materials, and the chemical compounds in which source material is present. Provide a flow chart for the products and source materials.

8.3 Radiation Protection

Provide additional descriptive information related to the radiation safety program commitments made in Chapter 3. Information should be supplied here which demonstrates the licensee's abilities and capabilities to monitor and protect against exposures of workers and members of the public. Such information might include the instruments which are used to meet the requirements of Chapter 3.2, a detailed description of the ventilation systems used, and a description of radiological support facilities such as professional consultants or lab analyses which are available to the licensee.

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8.3.1 Instrumentation

The application should justify the criteria for selecting radiation measurement instruments for:

- 1) Performing radiation and contamination surveys,
- 2) Sampling airborne radioactivity (including radon progeny),
- 3) Monitoring area radiations,
- 4) Monitoring personnel, and
- 5) Radiation analyses.

Instruments and related equipment and the quantities of such equipment provided for the plant operations should be described. Also describe the instrument storage, calibration, and maintenance facilities; the health physics facilities; and the laboratory facilities for radioactivity analyses.

8.3.2 Air Sampling and Internal Exposure Program

The application should contain a description of air sampling and analysis program used for monitoring the concentrations of radioactivity in work-areas and detecting the presence of elevated concentrations. The description should include the location of sampling types of equipment (for routine and special use), calibration, frequency of sampling, analytical methods, and program quality controls. Action levels and actions to be taken if these levels are exceeded should be specified. Methods used to correlate work-area radioactivity concentrations in air samples with personal exposure calculations, including averaging and time-weighting techniques, should be explained. Methods used to corroborate personal dose evaluations, e.g., urine and/or fecal bioassay sampling, should be explained. Supply a list of types and numbers of instruments used for measuring radioactivity in air. Describe conditions under which air sampling instruments (e.g., work-area samplers, continuous air monitors, lapel air samplers) will be used.

8.3.3 Respiratory Protection

Respiratory protective equipment may be needed to limit the inhalation of airborne radioactive materials as well as hazardous dusts and chemicals. The respiratory protection program should be described. Information on respiratory protection is contained in the regulations of the Department of Labor, Occupational Safety and Health Administration, in 29 CFR 1910.134, "Respiratory Protection," and NUREG-0041, "Manual of Respiratory Protection Against Airborne Radioactive Materials." Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection," and 10 CFR 20.103 are used by the staff when evaluating programs for protection against airborne radioactive materials.

8.4 Shipping and Receiving

The application should contain a description of methods for contamination control associated with receipt, storage, handling, and shipping of containers of source and other nuclear materials. The following regulatory guides may be used for guidance:

- 7.3 - Procedures for Picking Up and Receiving Packages of Radioactive Material
- 7.4 - Leakage Tests on Packages for Shipment of Radioactive Materials
- 8.24 - Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication
- 8.30 - Health Physics Surveys in Uranium Mills

8.5 Chemical Systems

The major components and operating characteristics of facilities used for nonradioactive chemical supply, storage, and distribution should be described. If hazardous chemicals or materials are involved, provisions that mitigate or prevent accidents should be described. Itemize the chemicals and materials that are used, list their quantities, and identify where they are used.

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8.6 Fire Protection

The codes and standards considered and used for the design of the buildings and the fire protection systems, including published standards of the National Fire Protection Association, should be listed. Provide evidence of the adequacy of the fire protection program for the facility through liability and property insurance coverage and inspection reports.

The licensee should describe the following:

- (1) Operational hazards including processes, combustible and flammable materials used in processes, and locations of source material relative to the combustible and flammable materials. List plant areas of greatest operational hazards including combustible and flammable materials other than process materials both installed (e.g., power cables) and transient. Provide estimates of heat content, where applicable.
- (2) Procedures for the storage of combustible and flammable materials as well as waste contaminated with these materials.
- (3) Fire detection installations including types, manufacturers, and frequencies of inspection and testing.
- (4) Fire suppression devices installed including equipment, manufacturers, capacity (e.g., gpm of pump), and frequencies of inspection and testing.
- (5) Fire drills, fire fighting training, and qualifications and training of individual responsible for commanding the fire fighting team.
- (6) Qualifications of the fire protection engineer (or consultant) who was responsible for the design of the fire protection systems.

DRAFT

- (7) Personnel by position responsible for inspecting and maintaining the fire detection and suppression equipment.

8.7 Ventilation Systems

The ventilation systems and other confinement features should be described. Emphasis should be placed on provisions for coping with releases and the accumulation of licensed materials.

DRAFT

Chapter 9. PERFORMANCE DEMONSTRATION

9.1 Exposure History

Provide an analysis of exposures (internal and external) covering at least the past two years of operations for each area and type of activity performed. The analysis should identify the sources and locations where most exposures occurred as related to job category and work activities. Any trends in exposure that can be identified should be discussed. Abnormal occurrences should be reviewed and categorized by such aspects as frequency, operations being performed, and the magnitude of the resulting exposure. The analysis of internal exposure should consider air sampling data, as well as bioassay data (including in vivo counting). The analysis should conclude with a description of any steps or measures taken to reduce exposure, the effectiveness of these measures, and any additional actions planned.

9.2 Survey History

Provide an analysis of routine radiation and surface contamination surveys covering at least the past two years of operations by location. Describe the type of activity performed in the vicinity of each location.

9.3 Environmental Monitoring Program and History

The environmental monitoring programs should be described. The location of sampling points and monitoring stations, including radiation background stations, should be shown on maps or plot plans. The lower limit of detection for the appropriate radionuclides should be included.

Using radiation measurements obtained from the environmental monitoring program (including sampling and analysis of surface water, groundwater, air, soil, and vegetation and the deterioration of gamma dose levels at points around the plant) during at least the past two years, the maximum annual dose equivalent

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to the whole body or any other organ of any member of the public should be determined. The nonradiological environmental impacts of gaseous and liquid effluents from the plant during the past two years of normal operation should be summarized.

9.4 Inspection History

Provide inspection reports generated by Federal (excluding NRC), State, local, or regional authorities since issuance of the original license or the last renewal.

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Chapter 10. RADIOACTIVE WASTE HANDLING

10.1 Liquid Wastes

Sources of contaminated liquid wastes and the liquid waste treatment systems used to process these wastes should be described. Items such as process and maintenance wastes, laboratory wastes, liquid spills, and cleanup and decontamination solutions should be included. The discussion should relate process and equipment to radioactivity and hazardous chemical concentrations, volumes, and quantities. Provisions for storage and identification of those streams that are processed to achieve volume reduction or solidification should be described. The description should be accompanied by appropriate engineering drawings to show locations of equipment and flow paths. Special systems and handling techniques included in the systems to ensure the safety of the operation should be described.

10.2 Solid Wastes

Solid wastes that are produced as a result of plant operation should be identified, and the systems used to treat and contain these solid wastes should be described. These descriptions should include the following information:

1. The methods and equipment selected for the safe management of the solid waste that is generated.
2. The equipment and associated features that are used for volume reduction, containment or packaging, storage, and disposal.
3. The physical, chemical, and thermal characteristics of the solid wastes, including an estimate of concentrations and volumes generated.

DRAFT

For solid wastes that are to be retained on the site, the containment and storage methods should be described. Corrosion aspects and monitoring of the containment should be discussed. Describe in Chapter 11 how these wastes will be disposed of at the time the plant is decommissioned.

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Chapter 11. DECOMMISSIONING PLAN

Plans for decontaminating the facility, the site, and the grounds at the end of plant operations for unrestricted use should be provided. The application should include an updated estimate of the costs involved and a description of the financial arrangements made to ensure that adequate funds will be available to cover these costs at the time of decommissioning. The plans should indicate the types of decommissioning and decontamination work which is expected in light of the criteria for release given in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Material," August 1987, the staff's Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations" (46 FR 52061-52063). The following outline indicates the type and scope of the information required.

I. Statement of Purpose

This statement should include a commitment to decontaminate the facilities and grounds so that they can be released for unrestricted use.

II. Conceptual Decommissioning Plan

A. Procedure

1. Removal of radioactive materials (bulk cleaning prior to decontamination).
2. Pre-survey (prior to start of decontamination).
3. Equipment disposal (decontamination or burial).
4. Facility surface cleaning (methods for decontaminating walls and structural surfaces).

DRAFT

5. Liquid effluent system (plans for decontamination or disposal).
 6. Floors (decontamination or removal).
 7. Ventilation System (decontamination or burial).
- B. Final Report to NRC requesting release.

The plan should include all of the assumptions that were made in arriving at cost estimates.

i.e., whether equipment and facilities would be decontaminated or buried. If burial, whether on site or commercial, etc.

The conceptual decommissioning plan should contain a statement that prior to the start of decontamination a detailed decommissioning plan including a proposed closeout survey plan will be submitted to the NRC for review and approval.

III. Estimated Costs for Decontamination

The licensee should provide a breakdown of the estimated costs for decontaminating the facilities and grounds, i.e., labor, material, transportation, burial, etc.

IV. The Financial Assurance

Information on financial assurance requirements can be found in the final rule "General Requirements for Decommissioning Nuclear Facilities" published in the Federal Register (53 FR 24018-24056) on June 27, 1988.

DRAFT

APPENDIX A

POTENTIAL TOPICS FOR TREND ANALYSIS

1. Personnel exposures.
2. Concentrations of airborne radioactive and hazardous chemical contamination in plant areas and effluents.
3. Radioactive contamination in areas and on equipment not normally contaminated.
4. Failure of required radiation measurement instrumentation to operate properly.
5. Failure of respiratory protective equipment to work properly.
6. Failure of effluent filters to meet specifications.
7. Calculated or measured offsite exposure to any member of the public.

APPENDIX B

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE, OR SPECIAL MATERIAL

The instructions in this guide, in conjunction with Table 1, specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control is considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.
2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.
3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.

4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:
 - a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.
 - b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment, or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the Division of Industrial and Medical Nuclear Safety, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and also the Administrator of the NRC Regional Office having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:
 - a. Identify the premises.
 - b. Show that reasonable effort has been made to eliminate residual contamination.
 - c. Describe the scope of the survey and general procedures followed.
 - d. State the findings of the survey in units specified in the instruction.

Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

TABLE 1
ACCEPTABLE SURFACE CONTAMINATION LEVELS

Nuclides ^a	Average ^{b,c,f}	Maximum ^{b,d,f}	Removable ^{b,e,f}
U-nat, U-235, U-238, and associated decay products	5,000 dpm a/100 cm ²	15,000 dmp a/100 cm ²	1,000 dmp a/100 cm ²
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm ²	300 dpm/100 cm ²	20 dpm/100 cm ²
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm ²	3,000 dpm/100 cm ²	200 dpm/100 cm ²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000 dpm bq/100 cm ²	15,000 dpm bq/100 cm ²	1,000 dpm bq/100 cm ²

^aWhere surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

^bAs used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

^cMeasurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

^dThe maximum contamination level applies to an area of not more than 100 cm².

^eThe amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

^fThe average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.