



DRAFT REGULATORY GUIDE

Contact: M.L. Thomas (301)492-3886

DRAFT REGULATORY GUIDE DG-3006

STANDARD FORMAT AND CONTENT FOR
FIRE PROTECTION SECTIONS OF LICENSE APPLICATIONS FOR
FUEL CYCLE FACILITIES

INTRODUCTION

Section 70.22, "Contents of Applications," of 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," states that an application must contain, among other things, a description of equipment and facilities that will be used by the applicant to protect health and minimize danger to life or property, proposed procedures to protect health and minimize danger to life or property, and information on the technical qualifications, including training and experience of the applicant's staff members to engage in the proposed activities in accordance with NRC regulations. Section 70.23, "Requirements for the Approval of Applications," states that an application will be approved if the Commission determines that, among other things, the applicant's proposed equipment and facilities are adequate to protect health and minimize danger to life or property. In addition, 10 CFR Part 40, "Domestic Licensing of Source Material," in paragraphs 40.31(j)(2)(i, ii, and iii), 40.32(b and c), and 40.41(e)(2), states similar requirements for the possession and use of source and byproduct material, including uranium milling and the production of uranium hexafluoride.

This regulatory guide has been developed to provide guidance to applicants and licensees with respect to the information needed for the preparation of the fire protection sections (or chapters) of an application for a new license or for renewal of or amendments to an existing license for a

This regulatory guide is being issued in draft form to involve the public in the early stages of the development of a regulatory position in this area. It has not received complete staff review and does not represent an official NRC staff position.

Public comments are being solicited on the draft guide (including any implementation schedule) and its associated regulatory analysis or value/impact statement. Comments should be accompanied by appropriate supporting data. Written comments may be submitted to the Regulatory Publications Branch, DFIPS, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Copies of comments received may be examined at the NRC Public Document Room, 2120 L Street NW., Washington, DC. Comments will be most helpful if received by July 9, 1993.

Requests for single copies of draft guides (which may be reproduced) or for placement on an automatic distribution list for single copies of future draft guides in specific divisions should be made in writing to the U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Office of Administration, Distribution and Mail Services Section.

fuel cycle facility (see the attached Glossary). The guide also presents a standard format for submitting this information. The NRC staff suggests the use of this standard format to facilitate timely and uniform review of the application by the NRC staff. Information contained in previous submittals, statements, and reports filed with the NRC under an existing license may be incorporated by reference, provided that such references are clear and specific. For additional information regarding fire protection at facilities operated by persons licensed under 10 CFR Parts 40 or 70, the licensee may refer to the branch technical position (BTP) on "Fire Protection for Fuel Cycle Facilities," published in the Federal Register on August 10, 1992 (57 FR 35607-13).

This regulatory guide is being issued in draft form to involve the public in the early stages of the development of a regulatory position in this area. It has not received complete staff review and does not represent an official NRC staff position. 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.

Any information collection activities mentioned in this draft regulatory guide are contained as requirements in 10 CFR Part 70 or Part 40, which provide the regulatory bases for this guide. The information collection requirements in 10 CFR Part 70 have been approved by the Office of Management and Budget, Approval No. 3150-0009. The information collection requirements in 10 CFR Part 40 have been approved by the OMB, Approval No. 3150-0120.

DISCUSSION

In order to protect health and minimize threat to life or property, the NRC staff considers information regarding a fire protection program and the description of equipment and facilities associated with that program to be important parts of the content of a license application under 10 CFR 70.22(a) or 40.31. This information is also integral to the development of the

emergency plan under 10 CFR 70.22(i)(1)(ii) or 10 CFR 40.31(j)(1)(ii). In addition, an adequate fire protection program should address the fire protection design features and systems available at the facility.

Prior to developing a fire protection program, an applicant will usually need to develop an understanding of the equipment and the hazards presented by their operations. This often takes the form of a fire hazard analysis. This analysis will help the applicant identify and estimate the extent of the potential hazards and evaluate the adequacy of the fire protection measures to mitigate the potential effects of those hazards. The analysis should form the basis for the commitments and descriptions contained in the application, but it does not need to be submitted as part of the application. Appendix A to this guide contains information on the scope of a fire hazard analysis.

Consistent with Revision 1 of Regulatory Guide 3.52, "Standard Format and Content for the Health and Safety Sections of License Renewal Applications for Uranium Processing and Fuel Fabrication," the portions related to fire safety of the application submitted under 10 CFR 70.22 or 10 CFR 40.31 are to be in two parts. Part I should contain the proposed performance requirements for the fire protection program, while Part II should contain descriptions of the equipment, facilities, and procedures that would be adequate to implement the commitments in Part I.

An applicant may reference information contained in an emergency plan that has been submitted by the licensee under 10 CFR 70.22 (i)(1)(ii) or 10 CFR 40.31(j)(1)(ii). Applicants are encouraged to show a clear connection between the fire protection program and the emergency response plan for the facility.

STANDARD FORMAT

This Standard Format has been prepared to identify the type and quality of information needed in an application. 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 detail in the license application. 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 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), (3) nuclear criticality safety, (4) operations involving hazardous chemicals, (5) confinement and control of radioactive materials, (6) projected effluent quantities and concentrations and effluent treatment, (7) reliability of the systems essential to safety, (8) prevention and control of fire and explosion, (9) radiological contingency planning, and (10) environmental impact associated with normal operations, abnormal conditions, and accidents.

The application should demonstrate the degree of skill, care, and effort used by the applicant in the uranium processing and fuel fabrication 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 should be submitted separately. When submitted, it should be clearly identified and accompanied by the applicant's justifications for requesting its being withheld from public disclosure, as specified by Section 2.790, "Public Inspections, Exemptions, Requests for Withholding," of 10 CFR Part 2, "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders." 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.

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: A4 or 8-1/2 x 11 inches

Drawings and graphics: A4 or 8-1/2 x 11 inches; however, a larger size is acceptable provided the finished copy when folded does not exceed A4 paper size or 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 2.5 centimeters or 1 inch should be maintained on the top, bottom, and binding side of all pages submitted.

Printing

Composition: Test 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.

Binding. Pages should be punched for standard 3-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 report 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.

PART I
LICENSE COMMITMENTS FOR FIRE PROTECTION

The fire protection portion of Part I of the license application should contain the applicant's proposed commitments for the fire protection program. These sections should not contain the detailed descriptive material that is more appropriate in Part II. If the requested information is contained in a previous submittal, clear and specific reference to that submittal is acceptable.

This regulatory guide provides guidance on component sections or chapters on fire protection in Part I of the license application, which is outlined in Revision 1 of Regulatory Guide 3.52.

1. FIRE HAZARD ANALYSIS

The applicant should propose to update and revalidate the initial fire hazard analysis on a periodic basis or whenever there are changes to the facility and processes that may affect fire protection.

2. FIRE PROTECTION PROCEDURES

The applicant should propose to establish and implement fire protection procedures. These procedures should cover (1) maintaining the facility and process equipment in proper condition to prevent fires from occurring, (2) maintaining the fire protection equipment in readiness to suppress and mitigate the consequences of a fire should one occur, (3) training for employees on fire safety procedures, (4) suppressing and mitigating the consequences of a fire, and (5) control of all procedures, equipment, and features important to fire safety.

3. FIRE PROTECTION FEATURES

The applicant should propose to use fire protection features and systems to minimize the risk of a release of radioactive material resulting from a fire. The following should be considered and addressed where applicable: (1) building design, (2) process design and operation, and (3) fire protection systems.

4. PRE-FIRE PLAN

The applicant should propose to develop and maintain a Pre-Fire Plan that is kept current and ready to be put into operation in a fire emergency. The plan should address the information needed to enable the fire fighting personnel to control the fire efficiently and safely. This information may be submitted as a part of the emergency plan submitted under 10 CFR 70.22(i).

5. TRAINING

The applicant should propose to provide training for its employees to ensure compliance with its fire protection procedures. A description of the subjects and procedures in the training program should be submitted as part of the training commitments for other portions of the facility, in particular, as part of the training commitments for the emergency plan submitted under 10 CFR 70.22(i).

6. PROGRAM MANAGEMENT

The applicant should propose to ensure timely and effective management and supervisory attention to fire protection. The applicant should specify the authority and responsibilities of personnel responsible for implementing measures relating to fire protection throughout the facility. The minimum functions, responsibilities, and qualifications of these persons should be stated.

7. FIRE SAFETY REVIEW COMMITTEE

The applicant should propose to establish a standing committee to review the administration of the fire protection program. The minimum composition, functions, and responsibilities of this committee should be described. If there is no separate fire safety review committee (FSRC) whose sole purpose and function is centered on fire safety, other established committees, such as the radiological safety committee, may also be used. A description should be provided of how this other committee will perform the fire safety functions.

PART 2

SAFETY DEMONSTRATION

The fire protection portion of Part II of the license application should contain detailed information describing the applicant's facilities, programs, and personnel and should demonstrate how the applicant will be able to adhere to the commitments proposed in Part I. If the requested information is contained in a previous submittal, clear and specific reference to that submittal is acceptable.

The information contained in this section of the regulatory guide is an elaboration of the more general information outlined in Section 10.5 of Revision 1 of Regulatory Guide 3.52. This information should form component sections or chapters on fire protection in Part II of the license application.

A description of the fire protection features of the facility (or parts of the facility where licensed operations are performed) should be included. This description should include information on the buildings, on the design, location, and operation of the process equipment, and on the fire protection systems. This description should be aided with site plans and detailed drawings where applicable.

1. BUILDING DESIGN

The firesafe construction and layout for the buildings and yards, including the materials of construction of the walls, roofs, floors, joists, and other structural members, should be described. The firesafe construction and layout of any planned modifications should be included in the description.

The fire protection features of the building to be described should include, but not necessarily be limited to, the following:

- The use of noncombustible or, where appropriate, limited combustible materials of construction.
- Compartmentalization, by using barriers having sufficient fire resistance, of processes involving fire risk (e.g., solvent handling and incineration), or separation of such processes by locating them in separate buildings.
- Location of bulk storage areas for flammable liquids and gases away from the process buildings and storage areas for hazardous chemicals, in accordance with industry codes,
- Ventilation systems that (1) permit isolation of an affected area and (2) exhaust, through filters if necessary, the fire products to the atmosphere without routing them through other areas of the facility.
- Measures to eliminate, as much as possible, combustible materials from areas where moderation control is used for criticality safety.

2. PROCESS DESIGN AND OPERATION

Aspects of the manufacturing processes that are significant in preventing or extinguishing fires should be described. Such features include, but are not necessarily limited to, the following:

- Capability for quick manual interruption of flammable liquid and gas supply lines.
- Capability, such as a flame supervision system, for audible and visible alarm or automatic interruption of the flammable gas supply lines in the event of the loss of flame in high-temperature furnaces.
- Dikes to contain spills of flammable or combustible liquids.

3. FIRE PROTECTION SYSTEMS

The fire protection systems available at the facility should be described. The fire protection water system, automatic and manual fire suppression systems, fire extinguishers, and fire alarm signaling systems should be included in the discussion. These systems should cover all areas of the facility where a fire accident could cause release of radioactive material, and thus present a danger to life or property. Areas where nuclear criticality safety is a concern should be identified, and fire suppression equipment that uses an extinguishing medium other than water should be specified for these areas.

3.1 Fire Protection Water System

The water system for fire protection should be described. The normal and alternative sources of water, the details of the pumping and water main installations, compatible connectors to outside fire department equipment, and the components installed to ensure a reserve fire protection water capacity should be included in the description.

3.2 Fire Suppression System

The type, capacity, coverage, and location of the fixed automatic or manually operated fire suppression system should be described.

3.3 Fire Alarm Signaling System

The fire alarm signaling system should be described, including whether the fire alarm signaling system has automatic actuation (e.g., actuated by fire detectors, flammable gas detectors, or by sprinkler systems) or manual actuation, or both, and whether the signals are transmitted automatically to a central annunciator panel. The description should also state whether the central panel is under constant manned or electronic surveillance, whether an audible or visible alarm is actuated (or both), and whether the alarm is actuated locally, at the central panel, or both.

3.4 Fire Protection Equipment Maintenance

The maintenance program for fire protection equipment should be described. The discussion should include, but not necessarily be limited to:

- Procedures for inspection, testing, and maintenance for the major equipment, stating whether these procedures are in accordance with industry codes such as those of the National Fire Protection Association, and
- Schedules for inspection, testing, and maintenance.

4. PRE-FIRE PLAN

The pre-fire plan should supplement the emergency plan with details of the emergency procedures and sufficient information on the facility and its fire protection systems, especially the constraints on fire suppression methods and media in certain areas of the facility, to enable the fire-fighting personnel to control the fire efficiently and safely. To the extent possible, it should be developed in consultation with the offsite fire department.

The following elements should be contained in a typical pre-fire plan:

- Assignment to specific persons of responsibility for specific actions, such as shutting down processes, securing controlled areas, calling for offsite assistance, fighting fires, and personnel evacuation. Call sequences for responsible persons and alternates should be established.
- Standing agreements with the offsite fire departments that may be called upon to assist in an emergency and a listing of their major resources, e.g., fire engines.
- Standing agreements with the nearby police stations, hospitals, and medical teams that may be called upon to assist. It should be indicated whether the hospitals have the capability to assist persons exposed to radioactivity. Copies of any written agreements for such assistance should be enclosed, if not already included in the emergency plan.
- A site plan showing the major fixed fire suppression equipment at the facility, such as the fire pumps, fire mains, hydrants, valves, fire department compatible connections, and sprinkler and other automatic fire suppression systems.
- A site plan showing areas of concentrations of radioactive materials such as fuel storage vaults, flammable and combustible liquids, and flammable and reactive chemicals. The areas that have restrictions on fire suppression methods or media should also be indicated on the site plan.
- Emergency equipment belonging to the facility, such as fire engines, emergency vehicles, and breathing apparatus, and their locations.
- Emergency first aid capability.

5. TRAINING

A fire protection training program that includes periodic refresher training and drills should be established. The fire safety training program for all employees should be discussed. Any additional training that the applicant proposes for employees who are assigned duties related to a fire emergency response should also be discussed.

6. PROGRAM MANAGEMENT

The management organization for the fire protection program should be described. The description should include the position titles and responsibilities of each member of this management. A resume for each individual in the management organization should be provided that demonstrates his or her qualifications for the particular position held.

7. FIRE SAFETY REVIEW COMMITTEE (FSRC)

The organization of a fire safety review committee should be described. The description should include the following:

- The function of the FSRC committee.
- The position titles and responsibilities of the chairman and each member of the FSRC committee.
- A list of each individual's qualifications for the positions held.
- The frequency of the FSRC committee meetings.
- The FSRC Report distribution.
- Procedures, including a checklist, used to identify and correct deficiencies listed in the FSRC report.

8. CREDIBLE ACCIDENT SCENARIOS

The applicant should discuss credible scenarios for fires that involve the potential release of radioactive material, fires that involve a consequential criticality, and hazardous chemical release accidents that could pose a threat to the life and health of facility personnel and the public if not suppressed in a reasonable time. The scenarios should be based upon those identified in the fire hazard analysis. The discussion of each scenario should describe how the aforementioned facilities, equipment, and procedures would affect mitigation of the fire.

IMPLEMENTATION

The purpose of this section is to provide information to applicants regarding the NRC staff's plans for using this regulatory guide.

This draft guide has been released to encourage public participation in its development. Except in those cases in which an applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the methods to be described in the active guide reflecting public comments will be used in the evaluation of applications for new licenses, license renewals, and license amendments and for evaluating compliance with 10 CFR 70.22-70.23 and 10 CFR 40.31.

Appendix A. FIRE HAZARD ANALYSIS

For this analysis, the facility is divided into "fire areas" along logical lines, such as process areas protected by different fire protection systems or functional areas separated by fire-rated barriers, location in separate buildings, or distance. For each fire area, the analysis would include consideration of the following items, which are important to fire protection and safety:

1. The construction and fire rating of the perimeter walls, inside divider walls, roofs, floors, fire doors, and penetrations bounding the area.
2. The processes performed in the area or the purpose for which the area is used.
3. The process and other equipment installed in the area, identifying equipment that uses heat or flame, with information on the heating rates, highest temperatures, and fuel used.
4. Any contents of the area, during performance of the process and at other times, that are classified as radioactive material, process and nonprocess combustible materials, flammable or combustible liquid, flammable gas, hazardous chemical, etc. The estimated quantity, rate of flow, and heat value of each of the contents that may contribute to the fire hazard is to be considered.
5. Occupancy of the area and the egress routes.
6. Credible scenarios by which accidental fires may start. For each scenario, the potential for release of radioactive material, for criticality, or for a hazardous chemical release that could pose a threat to the life and health of facility personnel and the public, if the postulated fire is not suppressed in a reasonable time, is to be described.

7. Fire detection and alarm systems, classifying the type of detector and the type of alarm (e.g., audible and visible) and stating whether the alarm system will automatically transmit a signal to an area that is continuously manned, such as the guard house.
8. Fire suppression systems (portable extinguishers, sprinkler systems, etc.) available in the area or that may be brought into the area.

For each fire area, the adequacy of the fire protection measures is to be demonstrated with the aid of the above information and consideration of the credible fire accident scenarios.

GLOSSARY

Audit -- A formal, often periodic, examination and checking of operations, procedures, and records conducted by the licensee to verify correctness and completeness.

Fuel Cycle Facility -- Facilities that are indirectly or directly involved in the production of fuel for power and nonpower nuclear reactors.

Pre-Fire Plan -- A plan that contains information that can have an impact on decisions or actions taken during a fire, such as building layout, points of access, processes within and contents of buildings, fire-related construction details, and types and locations of built-in fire protection systems. Further information on pre-incident planning is found in the "Fire Protection Handbook," 17th edition, 1991, available from the National Fire Protection Association (NFPA), Quincy, Massachusetts.

DRAFT VALUE/IMPACT STATEMENT

1. PROPOSED ACTION

1.1 Description

The proposed action is to issue a regulatory guide, titled "Standard Format and Content for Fire Protection Sections of License Applications for Fuel Cycle Facilities." On August 10, 1992, the NRC published a Branch Technical Position, "Fire Protection for Fuel Cycle Facilities" in the Federal Register (57 FR 35607). This proposed action would provide guidance for fuel cycle facilities with respect to establishing fire protection plans and programs and thus ensure that the fire protection sections of license applications would be more complete.

1.2 Need for Proposed Action

According to 10 CFR Parts 40 and 70, licensees must have procedures, equipment, and facilities adequate to protect health and minimize danger to life or property. The proposed action would provide guidance on fire protection at fuel cycle facilities. The proposed action is timely and would expedite the licensing of fuel cycle facilities.

1.3 Value/Impact of Proposed Action

The proposed action would provide a standard format for setting forth information needed by the NRC staff for reviewing a license application for a fuel cycle facility with respect to the fire protection section.

1.3.2 Other Government Agencies

The guidance would be applicable to a license application if submitted by DOE, or any other government agency, for fire protection at fuel cycle facilities. The value and impact would be similar to that for industry (see Section 1.3.3).

1.3.3 Industry

The proposed action would be useful to industry because it would facilitate the preparation of fire protection plans and programs. It would also ensure that

the information submitted would be more complete, and it would facilitate NRC's review and approval of the license application.

1.3.4 Workers

The proposed action should result in more effective fire protection plans and programs and, therefore, be of benefit to workers.

1.3.5 Public

The proposed action could result in cost reduction to the public as taxpayers and consumers because it could improve the efficiency of the licensing process.

1.4 Decision on Proposed Action

Guidance should be furnished with respect to fire protection plans and programs at fuel cycle facilities.

2. TECHNICAL APPROACH

The proposed action is consistent with established NRC policy and practice and should be issued for comment.

3. PROCEDURAL APPROACH

A regulatory guide is considered to be the most appropriate procedural approach for the issuance of the proposed guidance on the format and content of fire protection sections of license applications for fuel cycle facilities.

4. STATUTORY CONSIDERATIONS

4.1 NRC Authority

Authority for this proposed action is derived from the Atomic Energy Act of 1954, as amended, and from the Energy Reorganization Act of 1974, as amended, and implemented through the Commission's regulations.

4.2 Need for NEPA Assessment

Issuance or amendment of guides for implementing regulations in Title 10, Chapter 1, of the Code of Federal Regulations is a categorical exclusion under paragraph 51.22(c)(16) of 10 CFR Part 51. Thus, an environmental impact statement or assessment is not required for this action.

5. RELATIONSHIP TO OTHER EXISTING PROPOSED REGULATIONS OR POLICIES

This proposed action is not directly related to any proposed regulations or policy. The proposed guidance would be consistent with existing regulations concerning license applications as well as license renewal applications.

6. SUMMARY AND CONCLUSIONS

A regulatory guide suggesting National Fire Protection Association standards should be prepared that also provides guidance on the format and content for license applications for fuel cycle facilities.

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