

## 4 RADIATION PROTECTION

### 4.1 PURPOSE OF REVIEW

The purpose of this review is to determine whether the applicant's radiation protection program is adequate to protect the radiological health and safety of workers and to comply with the regulatory requirements in 10 CFR Parts 19, 20, and 70.

The content and level of detail in this chapter are more detailed because this chapter provides acceptance criteria for evaluating compliance with 10 CFR Part 20, which has very specific requirements. Nevertheless the applicant is expected and the NRC reviewer should accept insights gained from the conduct of the Integrated Safety Analysis (ISA) and information contained in the ISA Summary in developing and reviewing the acceptability of the applicant's radiation protection program. Review procedures and acceptance criteria for the applicant's program for protecting members of the public and controlling effluent releases are presented in Chapter 9, "Environmental Protection," of this SRP. In Chapter 3, "Integrated Safety Analysis (ISA) and ISA Summary," there are criteria for performing a comprehensive ISA at a fuel cycle facility. In performing an ISA, an applicant will evaluate and rank the radiological risks posed by potential accident sequences throughout the facility and assess the adequacy of the items relied on for safety (IROFS) to ensure that the radiation exposure performance criteria of 10 CFR 70.61(b) and (c) are met.

### 4.2 RESPONSIBILITY FOR REVIEW

Primary: Health Physicist

Secondary: Licensing Project Manager, Environmental Reviewer

Supporting: Fuel Cycle Facility Inspector

### 4.3 AREAS OF REVIEW

The radiation protection program must address the occupational radiation protection measures in 10 CFR Parts 19, 20, and 70. Specifically, licensees must develop, document, and implement a radiation protection program in accordance with 10 CFR 20.1101. Additionally, 10 CFR 20.2102 requires licensees to keep records of the radiation protection program, including a description of the program components, audits, and other aspects of program implementation. The reviewer should also review the ISA Summary to identify those facility operations, analyzed in the ISA, that have radiological consequences, and the IROFS and the management measures implemented to prevent or mitigate such radiological risks.

The staff will review an applicant's commitments to:

- (1) establish, maintain, and implement a radiation protection program
- (2) keep occupational exposures to radiation as low as reasonably achievable (ALARA)
- (3) appoint radiological protection staff who are suitably qualified and trained in radiation protection procedures
- (4) prepare written radiation protection procedures and radiation work permits (RWPs)

- (5) train employees in radiation protection, including the health protection problems associated with exposure to radiation, precautions and procedures to minimize exposure, and the purposes and functions of protective devices employed
- (6) design and implement programs to control airborne concentrations of radioactive material by using ventilation systems, containment systems, and respirators
- (7) conduct radiation surveys and monitoring programs to document radiation levels, concentrations of radioactive materials in the facility, and occupational exposures to radiation by workers
- (8) maintain additional programs including (a) a records maintenance program, (b) a corrective action program, and (c) a program for reporting to the NRC in accordance with requirements in 10 CFR Parts 20 and 70

#### **4.4 ACCEPTANCE CRITERIA**

##### **4.4.1 Commitment to Radiation Protection Program Implementation**

###### **4.4.1.1 Regulatory Requirements**

Regulations applicable to establishment of a radiation protection program are presented in 10 CFR 20.110, Subpart B, "Radiation Protection Programs."

###### **4.4.1.2 Regulatory Guidance**

The NRC regulatory guide applicable to the commitment to design and implement a radiation protection program is Regulatory Guide 8.2, "Guide for Administrative Practice in Radiation Monitoring," February 2, 1973.

###### **4.4.1.3 Regulatory Acceptance Criteria**

The applicant's radiation protection program is acceptable if the applicant provides data and information in the license application that meets each of the following commitments to:

- (1) design and implement a radiation protection program that meets the regulatory requirements of 10 CFR Part 20, Subpart B
- (2) outline the radiation protection program structure and define the responsibilities of key program personnel
- (3) staff the radiation protection program with suitably trained people, provide sufficient resources, and implement the program
- (4) commit to the independence of the radiation protection function from the facility's operations
- (5) review, at least annually, the content and implementation of the radiation protection program as required by 10 CFR 20.1101(c)

The review should consider facility changes, new technologies, or other process enhancements that could improve the overall program effectiveness.

#### **4.4.2 Commitment to an ALARA Program**

##### **4.4.2.1 Regulatory Requirements**

Regulations applicable to the ALARA program are presented in 10 CFR 20.1101, "Radiation Protection Programs."

##### **4.4.2.2 Regulatory Guidance**

NRC regulatory guides applicable to the ALARA program are:

- Regulatory Guide 8.2, February 2, 1973 "Guide for Administrative Practice in Radiation Monitoring"
- Regulatory Guide 8.13, Rev. 3, Draft DG 8014, October 1994 "Instructions Concerning Prenatal Radiation Exposure"
- Regulatory Guide 8.29, February 1996 "Instructions Concerning Risks From Occupational Radiation Exposure"

##### **4.4.2.3 Regulatory Acceptance Criteria**

The applicant's ALARA program is acceptable if the applicant provides data and information in the license application that meet each of the following commitments to:

- (1) establish a comprehensive, effective, and written ALARA program
- (2) prepare policies and procedures to ensure occupational radiation exposures are maintained ALARA and that such exposures are consistent with the requirements of 10 CFR 20.1101
- (3) outline specific ALARA program goals, establish an ALARA program organization and structure, and have written procedures for its implementation in the facility design and operations
- (4) establish an ALARA Committee, or equivalent organization, with sufficient staff, resources, and clear responsibilities to ensure that the occupational radiation exposure dose limits of 10 CFR Part 20 are not exceeded under normal operations<sup>1</sup>

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<sup>1</sup> The ALARA Committee should meet at least annually and the membership should include management, radiation protection, environmental safety, industrial safety, production, etc. personnel or representatives. The ALARA Committee will review the ALARA program and the review should include an evaluation of the results of audits made by the radiation protection organization, reports of radiation levels in the facility, contamination levels, employee exposures, and effluent releases, etc. The review should determine if there are any upward trends in personnel exposure for identified categories of workers and types of operations. The review should identify any upward trends in effluent releases and contamination levels. Finally, the review should determine if exposures, releases and contamination levels are in accordance

- (5) use the ALARA program as a mechanism to facilitate interaction between radiation protection and operations personnel
- (6) regularly review and revise, when appropriate, the ALARA program goals and objectives and to incorporate, when appropriate, new approaches, technologies, operating procedures or changes that could reduce potential radiation exposures at a reasonable cost

#### **4.4.3 Organization and Personnel Qualifications**

##### **4.4.3.1 Regulatory Requirements**

Regulations applicable to the organization and qualifications of the radiological protection staff are presented in 10 CFR 70.22, "Contents of Applications."

##### **4.4.3.2 Regulatory Guidance**

NRC regulatory guides applicable to the organization and personnel qualifications of radiation protection program staff are:

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| • Regulatory Guide 8.2,<br>February 1973       | "Guide for Administrative Practice in Radiation<br>Monitoring"   |
| • Regulatory Guide 8.10,<br>Rev. 1-R, May 1977 | "Operating Philosophy for Maintaining Occupational<br>Radiation Exposures As Low As Is Reasonably<br>Achievable" |

##### **4.4.3.3 Regulatory Acceptance Criteria**

The applicant's commitment to organize and staff a radiation protection program is acceptable if the applicant provides data and information in the license application that meet each of the following commitments to:

- (1) appoint suitably trained radiation protection personnel and to identify their authority and responsibilities
- (2) establish clear organizational relationships among the individual positions responsible for the radiation protection program and other line managers
- (3) appoint a suitably trained radiation protection program director (typically referred to as the radiation safety officer) who has direct access to the facility manager, who is skilled in the interpretation of data and regulations pertinent to radiation protection, who is familiar with the operation of the facility and radiation protection concerns of the site, who is used as a resource in radiation safety management decisions, and who will be responsible for establishing and implementing the radiation protection program

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with the ALARA concept. Recommendations of the ALARA Committee should be documented and tracked to completion.

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- (4) assign responsibility to the radiation protection program staff for implementation of the radiation program functions
- (5) describe the minimum training requirements and qualifications for the radiation protection staff

#### **4.4.4 Commitment to Written Procedures**

##### **4.4.4.1 Regulatory Requirements**

The regulations applicable to radiation protection procedures and RWPs are presented in 10 CFR 70.22(8), "Contents of Applications."

##### **4.4.4.2 Regulatory Guidance**

Regulatory guidance applicable to procedures and RWPs is Regulatory Guide 8.10, Rev. 1-R, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable" May 1977.

##### **4.4.4.3 Regulatory Acceptance Criteria**

The applicant's commitment to prepare written radiation protection procedures and RWPs is acceptable if the applicant provides data and information in the license application that meet each of the following commitments to:

- (1) prepare written, approved radiation protection procedures to carry out activities related to the radiation protection program
- (2) specify how the radiation protection procedures will be prepared, authorized, approved, and distributed<sup>2</sup>
- (3) specify written, approved RWPs for activities involving licensed material that are not covered by written radiation protection procedures<sup>3</sup>

#### **4.4.5 Training**

An applicant's commitments to employee training are addressed in SRP Chapters 4 and 11. Chapter 4 addresses corporate radiation protection training programs. Chapter 11 addresses training which serves as a management control for ensuring that an administrative control IROFS is available and reliable when required.

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<sup>2</sup> These procedures should be reviewed and revised as necessary, to incorporate any facility or operational changes or changes to the facility's ISA. Approval of the procedures should be made by the radiation safety officer, or an individual who has the qualifications of the radiation safety officer.

<sup>3</sup> RWPs should define the authorized activities, the level of approval required (a radiation specialist as a minimum), information requirements, period of validity, expiration and termination times, and the recordkeeping requirements.

#### **4.4.5.1 Regulatory Requirements**

The following regulations apply to the radiation safety training program:

1. 10 CFR 19.12 "Instructions to workers"
2. 10 CFR 20.2110 "Form of records"

#### **4.4.5.2 Regulatory Guidance**

NRC regulatory guides and American Society for Testing and Materials (ASTM) standards pertaining to radiation protection training are:

- Regulatory Guide 8.10, Rev. 1-R, May 1977 "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable"
- Regulatory Guide 8.13, Draft DG-801 proposed R-3, October 1994 "Instructions Concerning Prenatal Radiation Exposure"
- Regulatory Guide 8.29, Draft DG-8012 proposed R-1, December 1994 "Instructions Concerning Risks From Occupational Radiation Exposure"
- ASTM C986-89, reapproved 1995 "Developing Training Programs in the Nuclear Fuel Cycle"
- ASTM E1168-95 "Radiological Protection Training for Nuclear Facility Workers"

#### **4.4.5.3 Regulatory Acceptance Criteria**

The applicant's commitment to train its employees in radiation protection is acceptable if the applicant provides data and information in the license application that meets each of the following commitments to:

- (1) design and implement an employee radiation protection training program that complies with the requirements of 10 CFR Parts 19 and 20
- (2) provide training, to all personnel and visitors entering restricted areas, that is commensurate with the health risk to which they may be exposed, or to provide trained escorts who have received training
- (3) provide a level of training based on the potential radiological health risks associated with that employee's work responsibilities
- (4) incorporate, in the radiation protection training program, the provisions in 10 CFR 19.12 and topics such as:
  - correct handling of radioactive materials
  - minimization of exposures to radiation and/or radioactive materials

- access and egress controls and escort procedures
  - radiation safety principles, policies, and procedures
  - monitoring for internal and external exposures
  - monitoring instruments
  - contamination control, including protective clothing and equipment
  - ALARA and exposure limits
  - radiation hazards and health risks
  - emergency response
- (5) review the radiation protection training programs at least every 3 years and to conduct refresher training at least every 3 years to address changes in policies, procedures, requirements, and the facility ISA
- (6) evaluate the effectiveness and adequacy of the training program curriculum and instructors

#### **4.4.6 Ventilation and Respiratory Protection Programs**

##### **4.4.6.1 Regulatory Requirements**

Regulations applicable to the ventilation and respiratory protection programs are presented in 10 CFR Part 20, Subpart H, "Respiratory Protection and Controls to Restrict Internal Exposure in Restricted Areas."

##### **4.4.6.2 Regulatory Guidance**

The following NRC regulatory guides, American National Standard Institute (ANSI) standards, and National Council on Radiation Protection and Measurements (NCRP) report are applicable to the design of the ventilation and respiratory protection programs:

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| • Regulatory Guide 8.24,<br>Rev. 1, October 1979 | "Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication" |
| • ANSI N510-1980                                 | "Testing of Nuclear Air Cleaning Systems"  |
| • ERDA 76-21                                     | "Nuclear Air Cleaning Handbook" by C. A. Burchsted, A. B. Fuller, and J. E. Kahn     |
| • NCRP Report No. 59,<br>December 15, 1978       | "Operational Radiation Safety Program"   |
| • Regulatory Guide 8.15                          | "Acceptable Programs for Respiratory Protection"                                     |
| • ANSI Z88.2-1992                                | "Practices for Respiratory Protection"   |

##### **4.4.6.3 Regulatory Acceptance Criteria**

The applicant's commitment to have ventilation and respiratory protection programs is acceptable if the applicant provides data and information in the license application that meet each of the following commitments to:

- (1) install appropriately sized ventilation and containment systems in areas of the facility identified in the ISA Summary as having potential airborne concentrations of radionuclides that could exceed the occupational, derived air concentration values specified in 10 CFR Part 20, Appendix B, during normal operations
- (2) describe management measures, including preventive and corrective maintenance and performance testing, to ensure that the ventilation and containment systems designated as IROFS operate when required, and are within their design specifications
- (3) describe the design criteria for the ventilation and containment systems, including minimum flow velocity at openings in these systems, maximum differential pressure across filters and types of filters to be used
- (4) describe the frequency and types of tests to measure ventilation and containment system performance, the acceptance criteria, and the actions to be taken when the acceptance criteria are not satisfied
- (5) establish a respiratory protection program that meets the requirements of 10 CFR Part 20, Subpart H
- (6) prepare written procedures for the selection, fitting, issuance, maintenance, testing, training of personnel, monitoring, and recordkeeping for individual respiratory protection equipment, and for specifying when such equipment is to be used
- (7) revise the written procedures for use of individual respiratory protection equipment as applicable, when processing, facility, or equipment changes are made
- (8) maintain records of the respiratory protection program, including training for respirator use, and maintenance

#### **4.4.7 Radiation Surveys and Monitoring Programs**

Radiation surveys are conducted for two purposes: (1) to ascertain radiation levels, concentrations of radioactive materials, and potential radiological hazards that could be present in the facility; and (2) to detect releases of radioactive material from facility equipment and operations. Radiation surveys will focus on those areas of the facility identified in the ISA Summary where the occupational radiation dose limits could potentially be exceeded. Measurements of airborne radioactive material and/or bioassays are used to determine that internal occupational exposures to radiation do not exceed the dose limits specified in 10 CFR Part 20, Subpart C.

##### **4.4.7.1 Regulatory Requirements**

NRC regulations in 10 CFR Part 20 are applicable to radiation surveys and monitoring programs:

1. Subpart F "Surveys and Monitoring"
2. Subpart C "Occupational Dose Limits"
3. Subpart L "Records"



#### 4. Subpart M "Reports"

##### 4.4.7.2 Regulatory Guidance

The following NRC regulatory guides, NUREGs, and ANSI standards are applicable to radiation surveys and monitoring programs:

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| • Regulatory Guide 8.2,<br>February 1973         | "Guide for Administrative Practice in Radiation<br>Monitoring"                          |
| • Regulatory Guide 8.4,<br>February 1973         | "Direct-Reading and Indirect-Reading Pocket<br>Dosimeters"                              |
| • Regulatory Guide 8.7,<br>Rev. 1, June 1992     | "Instructions for Recording and Reporting<br>Occupational Radiation Exposure Data"      |
| • Regulatory Guide 8.9,<br>Rev. 1, July 1993     | "Acceptable Concepts, Models, Equations, and<br>Assumptions for a Bioassay Program"     |
| • Regulatory Guide 8.24,<br>Rev. 1, October 1979 | "Health Physics Surveys During Enriched<br>Uranium-235 Processing and Fuel Fabrication" |
| • Regulatory Guide 8.25, Rev. 1,<br>June 1992    | "Air Sampling in the Workplace"   |
| • Regulatory Guide 8.34,<br>July 1992            | "Monitoring Criteria and Methods To Calculate<br>Occupational Radiation Doses"          |
| • NUREG-1400,<br>September 1993                  | "Air Sampling in the Workplace"   |
| • ANSI N13.1-1969,<br>reaffirmed 1993            | "Guide to Sampling Airborne Radioactive Materials<br>in Nuclear Facilities"             |
| • ANSI N328-1978                                 | "Radiation Protection Instrumentation Test and<br>Calibration"                          |
| • ANSI N13.11-1983                               | "Dosimetry-Personnel Dosimetry Performance-<br>Criteria for Testing"                    |
| • ANSI N13.15-1985                               | "Radiation Detectors-Personnel<br>Thermoluminescence Dosimetry Systems-<br>Performance" |
| • ANSI.HPSN 13.22, 1995                          | "Bioassay Program for Uranium"  |
| • ANSI N13.27-1981 "                             | "Performance Requirements for Pocket-Sized Alarm<br>Dosimeters and Alarm Ratemeters"    |
| • ANSI.HPSN 13.30, 1996                          | "Performance Criteria for Radiobioassay"  |
| • ANSI N13.6-1966,<br>reaffirmed 1989            | "Practice for Occupational Radiation Exposure<br>Records Systems"                       |

#### 4.4.7.3

#### Regulatory Acceptance Criteria

The applicant's commitment to implement radiation surveys and monitoring programs is acceptable if the applicant provides data and information in the license application that meet each of the following commitments to:

- (1) have radiation surveys and monitoring programs consistent with the requirements of 10 CFR Part 20, Subpart F
- (2) prepare written procedures for the radiation survey and monitoring program that include an outline of the program objectives, sampling procedures, data analysis methods, types of equipment and instrumentation to be used, frequency of measurements, recordkeeping and reporting requirements, and actions to be taken when measurements exceed 10 CFR Part 20 occupational dose limits or administrative levels established by the applicant
- (3) design and implement a personnel monitoring program for external occupational radiation exposures that outlines methods or procedures to:
  - identify the criteria for worker participation in the program
  - identify the types of radiation to be monitored
  - specify how exposures will be measured, assessed, and recorded
  - identify the type and sensitivity of personal dosimeters to be used, when they will be used, and how the collected data will be processed and evaluated
  - identify the facility's administrative exposure levels or action levels at which actions are taken to investigate the cause of exposures exceeding these levels
- (4) design and implement a personnel monitoring program, for internal occupational radiation exposures, based on the requirements of 10 CFR 20.1201, 20.1204, and 20.1502(b), that outlines methods or procedures to:
  - identify the criteria for worker participation in the program
  - identify the type of sampling to be used, the frequency of collection and measurement, and the minimum detection levels
  - specify how worker intakes will be measured, assessed, and recorded
  - specify how the data will be processed, evaluated, and interpreted
  - identify the facility's administrative exposure levels or the levels at which actions are taken to investigate the causes of exposures exceeding these levels
- (5) comply with the requirements of 10 CFR 20.1202 for summation of external and internal occupational radiation exposures through the use of procedures such as those outlined in Regulatory Guide 8.7 or 8.34
- (6) design and implement an air sampling program in areas of the facility identified as potential airborne radioactivity areas, to conduct air surveys, and to calibrate and maintain the airborne sampling equipment in accordance with the manufacturers' recommendations
- (7) implement additional procedures, as may be required by 10 CFR Part 20 and the ISA Summary, to control the concentration of airborne radioactive material (e.g., control of access, limitation of exposure times to licensed materials, and use of respiratory protection equipment)

- (8) conduct a contamination survey program in areas of the facility identified in the ISA Summary most likely to be radiologically contaminated (the program must include the types and frequencies of surveys for various areas of the facility and the action levels and actions to be taken when contamination levels are exceeded)
- (9) implement the facility's corrective action program when the results of personnel monitoring or contamination surveys exceed the applicant's administrative personnel contamination levels
- (10) implement the facility's corrective action program when any incident results in airborne occupational exposures to radiation exceeding the facility's administrative limits, or the dose limits in 10 CFR Part 20, Appendix B, or 10 CFR 70.61
- (11) use equipment and instrumentation with sufficient sensitivity for the type or types of radiation being measured and to calibrate and maintain equipment and instrumentation in accordance with the manufacturers' recommendations
- (12) establish policies to ensure equipment and materials removed from restricted areas to unrestricted areas are not contaminated above the specified release levels in NRC Branch Technical Position, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," April 1993
- (13) leak-test all sealed sources in accordance with the following NRC Branch Technical Positions: (1) "License Condition for Leak-Testing Sealed Byproduct Material Sources," April 1993, (2) "License Condition for Leak-Testing Sealed Plutonium Sources," April 1993, (3) "License Condition for Plutonium Alpha Sources," April 1993, (4) "License Condition for Leak-Testing Sealed Source Which Contains Alpha and/or Beta-Gamma Emitters," April 1993, and (5) "License Condition for Leak-Testing Sealed Uranium Sources," April 1993
- (14) establish and implement an access control program that ensures that (a) signs, labels, and other access controls are properly posted and operative, (b) restricted areas are established to prevent the spread of contamination and are identified with appropriate signs, and (c) step-off pads, change facilities, protective clothing facilities, and personnel-monitoring instruments are provided in sufficient quantities and locations
- (15) have a radiation reporting program consistent with the requirements of 10 CFR Parts 19 and 20

#### **4.4.8 Additional Program Commitments**

##### **4.4.8.1 Regulatory Requirements**

The following 10 CFR Part 20 regulations are applicable to the additional program commitments:

1. Subpart L "Records"
2. Subpart M "Reports"

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| 3. | Section 70.61 | "Performance Requirements"          |
| 4. | Section 70.74 | "Additional Reporting Requirements" |

#### **4.4.8.2 Regulatory Guidance**

There are no NRC regulatory guidelines applicable to these additional program commitments.

#### **4.4.8.3 Acceptance Criteria**

The applicant's commitment to implement additional program features is acceptable if the applicant provides data and information in the license application that meet each of the following commitments to:

- (1) maintain records of the radiation protection program (including program provisions, audits, and reviews of the program content and implementation), radiation survey results (air sampling, bioassays, external-exposure data from monitoring of individuals, internal intakes of radioactive material), and results of corrective action program referrals, RWPs and planned special exposures
- (2) establish a program to report to the NRC, within the time specified in 10 CFR 20.2202 and 10 CFR 70.74, any event that results in an occupational exposure to radiation exceeding the dose limits in 10 CFR Part 20
- (3) prepare and submit to the NRC an annual report of the results of individual monitoring, as required by 10 CFR 20.2206(b)
- (4) refer to the facility's corrective action program any radiation incident that results in an occupational exposure that exceeds the dose limits in 10 CFR Part 20, Appendix B, or is required to be reported per 10 CFR 70.74, and to report to the NRC both the corrective action taken (or planned) to protect against a recurrence and the proposed schedule to achieve compliance with the applicable license condition or conditions

### **4.5 REVIEW PROCEDURES**

#### **4.5.1 Acceptance Review**

The primary reviewer should evaluate the license application to determine whether it addresses the areas of review discussed in Section 4.3. If significant deficiencies are identified, the applicant should be requested to submit additional material before the reviewer(s) start the safety evaluation.

#### **4.5.2 Safety Evaluation**

The primary reviewer will perform a safety evaluation with respect to the acceptance criteria in Section 4.4. For existing facilities, the reviewer will consult with the cognizant radiation protection NRC inspector to identify and resolve any issues of concern related to the licensing review. The primary reviewer will prepare an SER on the licensing action for the Licensing Project Manager.

## 4.6 EVALUATION FINDINGS

The reviewer will write an SER that addresses each topic reviewed and explains why the NRC staff has reasonable assurance that the radiation protection part of the application is acceptable and that the health and safety of the workers is adequately protected. License conditions may be proposed to impose requirements where the application is deficient. The following kinds of statements and conclusions will be included in the staff's SER:

The applicant has committed to an acceptable radiation protection program that includes (1) an effective documented program to ensure that occupational radiological exposures are ALARA; (2) an organization with adequate qualification requirements for the radiation protection personnel; (3) approved written radiation protection procedures and RWPs for radiation protection activities; (4) radiation protection training for all personnel who have access to restricted areas; (5) a program to control airborne concentrations of radioactive material with engineering controls and respiratory protection; (6) a radiation survey and monitoring program that includes requirements for controlling radiological contamination within the facility and monitoring of external and internal radiation exposures; and (7) other programs to maintain records, report to the NRC in accordance with 10 CFR Parts 20 and 70, and correct for upsets at the facility.

The NRC staff concludes that the applicant's radiation protection program is adequate and meets the requirements of 10 CFR Parts 19, 20, and 70. Conformance to the license application and license conditions will ensure safe operation.

## 4.7 REFERENCES

U.S. Code of Federal Regulations, Title 10, Part 70, "Domestic Licensing of Special Nuclear Material," U.S. Government Printing Office, Washington, DC.

U.S. Code of Federal Regulations, Title 10, Part 20, "Standards for Protection Against Radiation," U.S. Government Printing Office, Washington, DC.

U.S. Nuclear Regulatory Commission, Branch Technical Position, "License Condition for Leak-Testing Sealed Plutonium Sources," April 1993.

U.S. Nuclear Regulatory Commission, Branch Technical Position, "License Condition for Plutonium Alpha Sources," April 1993.

U.S. Nuclear Regulatory Commission, Branch Technical Position, "License Condition for Leak-Testing Sealed Source Which Contains Alpha and/or Beta-Gamma Emitters," April 1993.

U.S. Nuclear Regulatory Commission, Branch Technical Position, "License Condition for Leak-Testing Sealed Uranium Sources," April 1993.

U.S. Nuclear Regulatory Commission, Branch Technical Position, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," April 1993.

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