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Safety Evaluation Report for the Renewal of SNM-1107 Columbia Fuel Fabrication Facility in Columbia, South Carolina

Docket No. 70-1151
Westinghouse Electric Company

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Division of Fuel Cycle Safety & Safeguards
Office of Nuclear Material Safety & Safeguards
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Enclosure 2

ABSTRACT

The report documents the U.S. Nuclear Regulatory Commission (NRC) staff review and safety and safeguards evaluation of the Westinghouse Electric Company (WEC) application for renewal of a license to possess and use special nuclear material (SNM) and byproduct material at their Columbia Fuel Fabrication Facility (CFFF), located in Columbia, South Carolina. The facility will continue to possess natural and enriched uranium up to a maximum of five weight percent uranium-235 for the manufacture of fuel assemblies for commercial nuclear power plants (both pressurized water reactors and boiling water reactors). The license was issued by the Atomic Energy Commission in 1969, and was most recently renewed in November 1995 for a ten-year term, expiring November 30, 2005. Because WEC submitted the license renewal application more than 30 days in advance of the expiration date, it has continued to operate under the provisions of 10 CFR 70.38(a).

The objective of this review is to evaluate the potential adverse impacts of continued operation of the facility to the worker and public health and safety, under both normal operating and accident conditions. The review also considers physical protection of SNM, material control and accounting of SNM, and the management organization, administrative programs, and financial qualifications provided to ensure the safe design and operation of the facility.

The NRC staff concludes, in this Safety Evaluation Report, that the licensee's descriptions, specifications, and analyses provide an adequate basis for the safety and safeguards of facility operations, and that continued operation of the facility does not pose an undue risk to worker and public health and safety.

A notice of opportunity to request a hearing on the renewal application was published in the Federal Register on December 29, 2005. No requests for hearing were received. A notice of availability of Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) was published in the Federal Register on May 22, 2007.

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EXECUTIVE SUMMARY

On September 29, 2005, Westinghouse Electric Company (WEC) submitted, to the U.S. Nuclear Regulatory Commission (NRC), an application requesting renewal of license SNM-1107, under 10 CFR Part 70, to possess and use special nuclear material (SNM) and byproduct material at WEC's Columbia Fuel Fabrication Facility (CFFF) in Columbia, South Carolina. WEC supplemented that application with additional submittals dated October 5 and December 16, 2005; January 10, May 12, July 28, and September 8, 2006; and January 24, March 23, June 27, and July 18, 2007. WEC proposes that the CFFF maintain continued authorization to possess and use a specified quantity of uranium-235 enriched to up to a maximum of 5 percent uranium-235. WEC requested a 20-year renewed license term. WEC submitted a revised license renewal application on June 27, 2007.

A notice of opportunity to request a hearing on the renewal application was published in the Federal Register on December 29, 2005 (70 FR 77195). No requests for a hearing were received.

The NRC staff conducted its safety review in accordance with 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations. The NRC staff used guidance in NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility" (NUREG-1520) to conduct the review. The staff's safeguards review involved reviews of WEC's Fundamental Nuclear Material Control Plan (FNMCP) and Physical Security Plan, which includes transportation security. The staff also reviewed WEC's Emergency Plan. Where WEC's safety programs should be supplemented, the NRC staff has identified license conditions to provide assurance of safe operation.

WEC also submitted an Environmental Report, which was used to prepare, in a separate document, an Environmental Assessment (EA) and finding of not significant impact (FONSI) for the license renewal. The EA and FONSI were published in the Federal Register on May 22, 2007 (72 FR 28715).

A summary of the NRC's review and findings in each of the review areas is provided below:

General Information

WEC provided an adequate description of the facility and processes so that the staff has an overall understanding of the relationships of the facility features as well as the function of each feature. Financial qualifications were properly explained and outlined in the application. The description of the site included important information about regional hydrology, geology, meteorology, the nearby population, and potential effects of natural phenomena at the facility.

[redacted]

Organization and Administration

WEC adequately described the responsibilities and associated resources for the operation of the facility. The plans and commitments described in the application provide reasonable assurance that an acceptable organization, administrative policies, and sufficient competent resources have been established or committed for the safe operation of the facility.

Integrated Safety Analysis and Integrated Safety Analysis Summary

WEC adequately described the process for performing integrated safety analyses (ISA) for design and operation changes at the CFFF. The plans and commitments provide reasonable assurance that an acceptable process has been established and will be followed to maintain WEC's compliance with the performance requirements of 10 CFR 70.61 and the integrated safety analysis requirements of 10 CFR 70.62(b). WEC submitted an ISA Summary for the CFFF on October 15, 2004. The NRC staff reviewed this ISA Summary and approved it in a letter dated August 20, 2007.

Radiation Protection

WEC provided sufficient information to evaluate the Radiation Protection Program. The application adequately describes: (a) the qualification requirements; (b) written radiation protection procedures; (c) the radiation work permit (RWP) program; (d) the program for ensuring that worker and public doses are as low as is reasonably achievable (ALARA); and (e) the necessary training for all personnel who have access to radiologically restricted areas. The radiation survey and monitoring program is adequate to protect workers and members of the public who may potentially be exposed to radiation.

Nuclear Criticality Safety

WEC provided adequate information to evaluate the Nuclear Criticality Safety (NCS) program. WEC committed to having an adequate group of qualified staff to develop, implement, and maintain the NCS program in accordance with the facility organization and administration and management measures. The program meets the regulatory requirements.

Chemical Process Safety

WEC adequately described and assessed accident consequences that could result from the handling, storing, or processing of licensed materials, and that could potentially have significant chemical consequences and effects. WEC performed hazard analyses that identified and evaluated those chemical process hazards and potential accidents, and established safety controls that meet the regulatory requirements.

[redacted]

[redacted]

Fire Safety

WEC committed to reasonable engineered and administrative controls to minimize the risk of fires and explosions. The items relied on for safety (IROFS) and defense-in-depth protection discussed in WEC's ISA Summary, along with safety basis assumptions and the planned programmatic commitments in the application, meet safety requirements and provide reasonable assurance that the facility is protected against fire hazards.

Emergency Management

WEC provided an adequate Emergency Plan that meets the regulatory requirements. WEC commits to maintaining and executing an Emergency Plan for responding to the radiological and chemical hazards that would result from a potential release of radioactive or chemically hazardous materials. The requirements of the Emergency Plan are implemented through approved written procedures.

Environmental Protection

WEC committed to adequate environmental protection measures, including, environmental and effluent monitoring, and effluent controls to maintain public doses ALARA as part of the radiation protection program. WEC's proposed controls are adequate to protect the environment and the health and safety of the public, and that comply with the regulatory requirements.

Decommissioning

WEC provided a Decommissioning Funding Plan demonstrating that adequate funding will be available for decommissioning and decontamination of the CFFF, and can be accomplished even if the licensee is unable to meet its financial obligations. WEC will update the site-specific cost estimate at least every three years, to reflect inflation and changes in site inventories and conditions that could affect the cost of decommissioning.

Management Measures

WEC provided information about management measures that will be applied to safety significant controls (SSCs) and IROFS. The information describes: (a) the configuration management program; (b) the maintenance program; (c) the quality assurance program; (d) procedures, training, and qualification; (e) human factors; (f) audits and assessments; (g) incident investigations; (h) corrective action process; and (i) recordkeeping and reporting. The proposed management measures are acceptable and meet the regulatory requirements in 10 CFR 70.62(d).

[redacted]

[redacted]

Material Control and Accountability

WEC provided information describing the Fundamental Nuclear Material Control Plan (FNMCP) for the facility. The FNMCP describes the programs to be used to control and account for the SNM at the facility. The program meets the applicable regulatory requirements in 10 CFR Part 74.

Physical Protection

WEC provided information regarding the policies, methods, and procedures to be implemented to protect SNM of low strategic significance, used and possessed at the facility. This information is acceptable and meets the requirements in 10 CFR Part 73.

Exemptions and Special Authorizations

WEC requested a number of special authorizations and exemptions. These requests are in accordance with NRC regulations, and are acceptable.

[redacted]

LIST OF ACRONYMS AND ABBREVIATIONS

ADU	Ammonium diuranate
ALARA	As low as is reasonably achievable
ANS	American Nuclear Society
ANSI	American National Standards Institute
AOA	Area of applicability
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
Bq	Becquerel
CAA	Controlled access area
CAAS	Criticality accident alarm system
CAP	Corrective Action Program
CEDE	Committed Effective Dose Equivalent
CFFF	Columbia Fuel Fabrication Facility
CFR	Code of Federal Regulations
cm	centimeter
CM	Configuration management
CSE	Criticality safety analysis
DAC	Derived airborne concentration
DFP	Decommissioning Funding Plan
dpm	disintegrations per minute
EA	Environmental Assessment
EH&S	Environmental Health and Safety
EP	Emergency Plan
EPA	U.S. Environmental Protection Agency
ERPG	Emergency Response Planning Guidelines
FNMCP	Fundamental Nuclear Material Control Plan
FONSI	Finding of No Significant Impact
ft	feet
ft/s	feet per second
gpm	gallons per minute

HAZOP	Hazard and operability
HEPA	High efficiency particulate air
HF	Hydrogen fluoride
in	inch
IROFS	Items relied on for safety
ISA	Integrated safety analysis
kg	kilogram
km	kilometer
kPa	kiloPascals
kPa/s	kiloPascals per second
lb	pound
LTL	Lower tolerance limit
m	meter
m^3	cubic meter
MC&A	Material control and accounting
mg	milligram
mi	mile
mm	millimeter
mrem	millirem
mSv	milliSievert
m/s	meter per second
MT	metric ton
NCS	Nuclear criticality safety
NCSIP	Nuclear criticality safety improvement plan
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NRC	Nuclear Regulatory Commission
OSHA	U.S. Occupational Safety and Health Administration

PM	Preventive maintenance
psf	pounds per square foot
psf/s	pounds per square foot per second
psi	pounds per square inch
psia	pounds per square inch absolute
psig	pounds per square inch gauge
PSM	Process safety management
PSP	Physical security plan
PWR	Pressurized Water Reactor
QA	Quality assurance
QAPD	Quality Assurance Program Description
QMS	Quality Management System
RAI	Request for additional information
RASCAL	Radiological Assessment System for Consequence Analysis
rem	Roentgen equivalent man
RMP	Risk management program
RP	Radiation protection
RWP	Radiation Work Permit
SER	Safety Evaluation Report
SNM	Special Nuclear Material
SSC	Safety significant controls
Sv	Sievert
µg	microgram
UF_6	Uranium hexafluoride
UO_2F_2	Uranyl fluoride
USL	Upper subcritical limit
WEC	Westinghouse Electric Company
wt	weight

1.0 GENERAL INFORMATION

1.1 INSTITUTIONAL INFORMATION

The purpose of the NRC's review of institutional information is to establish whether the license renewal application (application) includes adequate information identifying Westinghouse Electric Company, LLC (WEC), WEC's characteristics, and the proposed activity.

1.1.1 REGULATORY REQUIREMENTS

The regulations in 10 CFR 70.22(a)(1) require each application for a license to contain the state where the corporation is incorporated; the location of the principal office; the names, addresses, and citizenship of the principal officers; and information concerning the control or ownership exercised over the corporation by any alien, foreign corporation, or foreign government.

1.1.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria applicable to the NRC's review of the facility and process description section of the application are contained in Section 1.2.4.3 of the "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," NUREG-1520 (NRC, 2002).

1.1.3 STAFF REVIEW AND ANALYSIS

In Section 1.1.5 of the application, WEC provided information on the corporate ownership and organization. The CFFF is owned and operated by WEC. WEC is owned and controlled by Toshiba Corporation, through an intermediate holding company called Toshiba Nuclear Energy Holdings (USA). WEC is incorporated in the state of Delaware. The principal office is located in Monroeville, Pennsylvania. The President and Chief Executive Officer is Stephen R. Tritch; the Senior Vice President, Nuclear Fuel, is Dr. Aris Candris, a citizen of the United States; the Vice President, U. S. Fuel, is Sandy Rupprecht; and the CFFF Site Manager is Cary Alstadt.

1.1.4 EVALUATION FINDINGS

The NRC staff has determined that WEC provided sufficient information concerning Westinghouse's identity and ownership to adequately address the requirements of 10 CFR 70.22(a). WEC also adequately described information related to foreign ownership, control, or influence. The staff concludes that WEC has met the requirements of 70.22(a)(1).

1.2 AUTHORIZED ACTIVITIES

The purpose of the NRC's review of WEC's facility and process description is to determine whether the application meets the requirements of 10 CFR 70.22(a)(2), (3), and (4). A more detailed description of the facility and its processes are contained in the "Integrated Safety Analysis (ISA) Summary: Site and Structures."

1.2.1 REGULATORY REQUIREMENTS

The regulations in 10 CFR 70.22(a)(2) require the application to contain a description of the activity for which the SNM will be used, the place at which the activity is performed, and the general plan for carrying out the activity.

The regulations in 10 CFR 70.77(a)(3) require the application to contain the period of time for which the license is requested.

The regulations in 10 CFR 70.22(a)(4) require the application to contain the name, amount, and specifications (including the chemical and physical form and isotopic content) of the SNM to be used.

In addition, the regulations in 10 CFR 70.65 require each application to include a general description of the facility, with emphasis on those areas that could affect safety, including identification of the controlled area boundaries.

1.2.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria applicable to the NRC's review of the facility and process description section of the application are contained in Section 1.1.4.3 of NUREG-1520 (NRC, 2002).

1.2.3 STAFF REVIEW AND ANALYSIS

In Sections 1.1.1 and 1.1.2 of the application, WEC provides a summary description of the CFFF site and facility. This description includes discussion of site utilities and services. WEC provided additional site information in the Site and Structures Integrated Safety Analysis and in the Emergency Plan. In the ISA Summary, WEC described the facility site, including nearby highways, railways, military installations, and bodies of water. WEC described nearby public facilities, historic and cultural landmarks, and land use. WEC described the site meteorology, including wind, precipitation, and severe weather. WEC described local surface water and ground water hydrology, including water quality and water use. WEC described regional and local geology. WEC described seismology, including geologic and tectonic conditions, seismic history, and seismicity in the area. Extensive details of the site characterization were presented in the 1975 Environmental Evaluation Report, described in Chapter 10 of the application and in subsequent updates.

[redacted]

In Section 1.1.3, WEC provides a description of the facility processes. This description includes the major chemical and mechanical processes used in the facility. WEC will use SNM in the production of fuel for commercial nuclear power plants. Byproduct material would be used in instrument-calibration sources and may be present as contamination, as a consequence of the historical feed of recycled uranium at other enrichment facilities. Enriched UF_6 supplied to the facility will meet American Society for Testing and Materials (ASTM) ASTM C787, *"Standard Specification for Uranium Hexafluoride for Enrichment*" (ASTM, 2003), and periodic audits of suppliers will be performed to ensure that these conditions are met.

Table 1.2-1
Proposed Possession Limits

Source or SNM	Physical and Chemical Form	Maximum Amount to be Possessed at Any One Time
U-233	Any chemical or physical form, limited to laboratory use as individual 1-gram maximum quantities in ventilated hoods, glove boxes, or other enclosures	[redacted]
U-235 in uranium of any enrichment	Any chemical or physical form	[redacted]
Uranium enriched in isotope U-235 up to 5 percent by weight and uranium daughter products	Any chemical or physical form except metal	[redacted]
Pu-238/239	Sealed sources	[redacted]
Transuranic elements and fission products	Any	[redacted]

[redacted]

[redacted]

In Section 1.1.4 of the application, WEC specified material possession limits and constraints, including the chemical and physical form of the material and its isotopic content. The quantities of transuranic elements and fission products from residual contamination as a consequence of the historical feed of recycled uranium at other facilities are expected to have no significant radiological impact.

In Section 1.1.5 of the application, WEC requested that the license be renewed for a period of 20 years.

1.2.4 EVALUATION FINDINGS

In accordance with 10 CFR 70.22(a)(2), WEC has adequately described the activity for which the SNM is possessed and used, the place at which the activities are performed, and the general plan for carrying out the activity. In accordance with 70.23(a)(1), the NRC staff has determined that the SNM will be used in activities licensed by the Commission under Section 103 of the Atomic Energy Act. The staff reviewed the site description for the WEC CFFF according to Section 1.3 of NUREG-1520. WEC has adequately described and summarized general information pertaining to the site location, demographics, meteorology, hydrology, geology, and seismology of the site. The NRC staff verified that the site description is consistent with the information used as the basis for the Environmental Report, Emergency Plan, and ISA Summary; and that it demonstrates compliance with the regulatory requirements in 10 CFR 70.22(a)(2), and 70.65(b)(1).

In accordance with 10 CFR 70.22(a)(3), WEC adequately specified the length of time for which the license renewal is requested. WEC requested that the license be renewed for a period of 20 years. In 2006, the NRC gave notice that the maximum license term for 10 CFR Part 70 fuel cycle licensees who are required to submit ISA summaries for approval would be increased from a 10-year term to a 40-year term, at the next license renewal (71 FR 70441, December 4, 2006). This policy change was linked to the implementation of the requirements of Subpart H of 10 CFR Part 70 and consistency with the NRC's strategic goals for safety and effectiveness. Because of this policy change, the NRC allowed Westinghouse to request up to a 40-year renewal term. WEC declined extending their request to 40 years because of the potential delay to the environmental review schedule. Based on the EA (prepared for a 20-year period), the FONSI, and WEC's ISA commitments, the NRC finds the 20-year license term acceptable.

In accordance with 10 CFR 70.22(a)(4), WEC adequately described the name, amount, and specifications (including the chemical and physical form and isotopic content) of the SNM to be used.

[redacted]

[redacted]

1.3 REFERENCES

(ASTM, 2003) American Society for Testing (ASTM). ASTM C787, “Standard Specification for Uranium Hexafluoride for Enrichment,” 2003.

(NRC, 2002) U.S. Nuclear Regulatory Commission (NRC). NUREG-1520, “Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility,” 2002.

[redacted]

2.0 ORGANIZATION AND ADMINISTRATION

The purpose of the review of WEC's organization and administration is to assure that WEC management and staff are qualified by reason of training and experience to use the material for the purpose requested in accordance with 10 CFR 70.22(a)(6) and 70.23(a)(2). This review ensures that the WEC management policies provides reasonable assurance that the licensee plans, implements, and controls site activities in a manner that ensures the safety of workers, the public, and the environment. The review also ensures that WEC has identified and provided adequate qualification descriptions for key management positions.

2.1 REGULATORY REQUIREMENTS

10 CFR 70.22(a)(6) requires that an application contain the technical qualifications, including training and experience of the licensee and members of its staff to engage in the proposed activities, in accordance with the regulations.

10 CFR 70.23(a)(2) states that an application will be approved if the Commission determines that the licensee is qualified by reason of training and experience to use the material for the purpose requested, in accordance with the regulations.

2.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria applicable to the NRC's review of the organization and administration section of the application are contained in Section 2.4.3 of NUREG-1520.

2.3 STAFF REVIEW AND ANALYSIS

In Chapter 2 of WEC's application, WEC provides a description of the CFFF management organization structure, responsibilities, and authorities, including organizational operating units, positions and activities within organizational operating units, position accountability and requirements, and management of organization changes.

In accordance with 10 CFR 70.22(a)(1), the license renewal application included information that WEC is majority owned and controlled by Toshiba Corporation, a Japanese company. Toshiba completed its acquisition of WEC from British Nuclear Fuels (BNFL) in October 2006, following a review of its bid by several federal agencies. The U.S. Department of Treasury's Committee on Foreign Investment in the US approved the transaction in July 2006. And, the NRC consented to the indirect change of control of WEC from BNFL to Toshiba Corporation in September 2006 (ML062560377). In the Toshiba Corporation business structure, WEC is maintained as an independent business entity, headquartered in the United States. An Owners

[redacted]

Board represents the views of Toshiba's partner companies. In addition, WEC maintains its own Board of Directors. In support of both the Owners Board and the WEC Board of Directors, a WEC Coordination Office identifies and develops business opportunities for the WEC shareholders and assists in identifying synergies between WEC and Toshiba. The President and Chief Executive Officer of WEC is the chairman of the WEC Board of Directors.

In Section 2.1.1 of the application, WEC describes organizational responsibilities and authorities. WEC is comprised of several businesses. One of these, Westinghouse Nuclear Fuel, encompasses commercial activities directly relating to the development, manufacturing, and marketing of products contributing to the use of nuclear reactors for generation of nuclear power. The Senior Vice President of Westinghouse Nuclear Fuel reports to the President and Chief Executive Officer of WEC.

In Section 2.1.1.1 of the application, WEC describes the organization and operating units within WEC. In Section 2.1.1.2, WEC describes the positions and activities within organizational operating units. In Section 2.1.1.3, WEC describes the responsibilities and qualifications for key positions, including the Plant Manager, CFFF managers, and regulatory component managers and engineering functions. In Section 2.1.1.4, WEC describes how organizational changes are managed.

2.4 EVALUATION FINDINGS

WEC described its organization and management policies for providing adequate safety management for the safe operation of the CFFF. The staff reviewed WEC's organization, management position summaries and qualifications, and management controls. These organizational and administrative elements describe clear responsibilities and associated resources for the safe operation of the facility. The staff reviewed this information and concludes that WEC has an acceptable organization, administrative policies, and sufficient competent resources to provide for the safe operation of the CFFF, under both normal and abnormal conditions.

[redacted]

3.0 INTEGRATED SAFETY ANALYSIS AND INTEGRATED SAFETY ANALYSIS SUMMARY

The purpose of this review is to ensure that WEC commitments for the ISA and ISA Summary meet the regulatory requirements specified in 10 CFR 70.65.

3.1 REGULATORY REQUIREMENTS

The following regulatory requirements are applicable to the ISA and ISA Summary content:

1. 10 CFR 70.62 specifies the requirement to establish and maintain a safety program, including the performance of an ISA that demonstrates compliance with the performance requirements of 10 CFR 70.61;

2. 10 CFR 70.62(c) specifies requirements for conducting an ISA, including a demonstration that credible high-consequence and intermediate-consequence events meet the safety performance requirements of 10 CFR 70.61;

3. 10 CFR 70.64 specifies requirements for baseline design criteria and facility and system design and facility layout; and

4. 10 CFR 70.65(b) specifies the contents of an ISA Summary.

The regulations in 10 CFR 70.62, require a licensee to establish and maintain a safety program that demonstrates compliance with the performance requirements of 10 CFR 70.61. The safety program is required to contain three elements; they are: (1) process safety information; (2) an ISA; and (3) management measures. The ISA must be conducted and maintained by WEC, and must identify the following:

- Radiological hazards related to possessing or processing licensed material;

- Chemical hazards of licensed material and hazardous chemicals produced from licensed material;

- Facility hazards that could affect the safety of licensed materials and thus present an increased radiological risk;

- Potential accident sequences caused by process deviations or other events internal to the facility and credible external events, including natural phenomena;

[redacted]

- The consequence and likelihood of occurrence of each potential accident sequence identified and the methods used to determine the consequences and likelihood; and

- Each IROFS identified pursuant to 10 CFR 70.61, the characteristics of its preventive, mitigative, or other safety function(s), and the assumptions and conditions under which the item is relied upon to support compliance with 10 CFR 70.61.

The regulations in 10 CFR 70.61 require that the ISA evaluate compliance with performance requirements. Those requirements specify that the risk of each credible high-consequence event must be limited such that the likelihood of occurrence is highly unlikely, and the risk of each credible intermediate-consequence event must be limited such that the likelihood of occurrence is unlikely.

The application must include a description of the safety program under 10 CFR 70.65(a). In addition, WEC is required to submit, to the NRC, an ISA Summary. The Summary is required to contain:

- A general description of the site, with emphasis on those factors that could affect safety;

- A general description of the facility, with emphasis on those areas that could affect safety;

- A description of each process analyzed in the ISA, in sufficient detail to understand the theory of operation and, for each process, the hazards identified in the ISA and a general description of the types of accident sequences;

- Information that demonstrates compliance with the performance requirements of 10 CFR 70.61, including a description of the management measures, requirements for criticality monitoring and alarms, and the information regarding the baseline design criteria and defense-in-depth practices set forth in 10 CFR 70.64;

- A description of the team, qualifications, and the methods used to perform the ISA;

- A list briefly describing each IROFS, in sufficient detail to understand their functions in relation to the performance requirements of 10 CFR 70.61;

- A description of the proposed quantitative standards used to assess consequences to an individual from acute chemical exposure to licensed material or chemicals produced from licensed material;

- A descriptive list that identifies all IROFS that are the sole item preventing or mitigating an accident sequence that exceeds the performance requirements of 10 CFR 70.61; and

[redacted]

[redacted]

- A description of the definitions of unlikely, highly unlikely, and credible, as used in the evaluations in the ISA.

3.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria used during the NRC's review of WEC's ISA and ISA Summary are outlined in Sections 3.4.3.1 and 3.4.3.2 of NUREG-1520 (NRC, 2002).

3.3 STAFF REVIEW AND ANALYSIS

Chapter 4.0 of the application contains commitments to develop and maintain an ISA for the site. In accordance with 10 CFR 70.62(c)(3)(i), WEC submitted an ISA Plan for the CFFF, dated October 18, 2000, (ML003762441); WEC submitted a revised ISA Plan, dated February 28, 2002 (ML020630157), which was approved by the NRC by License Amendment 33, dated August 8, 2002 (ML022200482). In the application, WEC commits to perform an ISA for any new processes at the CFFF and to maintain the ISA for the existing processes, following the NRC-approved ISA Plan.

In accordance with 10 CFR 70.62(c)(3)(ii), WEC submitted a site-wide ISA Summary by letter dated October 15, 2004 (ML043090182, ML043080218, ML043080220, ML043090187, ML043090192, ML043080245, and ML043080247), and supplemented through letters dated November 20, 2005; January 9, February 17, March 2, May 27, June 13, and August 2, 2006 and January 24 and March 8, 2007. NRC staff reviewed this ISA summary and approved it in a letter dated August 20, 2007 (ML070960206).

3.4 EVALUATION FINDINGS

WEC committed to perform ISAs for new processes at the CFFF and to maintain the ISAs for the existing processes, and for any new facilities following the NRC-approved ISA Plan.

WEC's commitments for each of the three elements of the safety program, defined in 10 CFR 70.62(a), include the following:

(1) Process Safety Information

a. WEC commits to compile and maintain process safety information. Written process safety information is used in updating the ISA and in identifying and understanding the hazards associated with the processes. The compilation of written process safety information includes information pertaining to:

[redacted]

[redacted]

i. The hazards of all materials used or produced in the process, including information on chemical and physical properties such as toxicity, acute exposure limits, reactivity, and chemical and thermal stability.

ii. Technology of the process, including a black flow diagram or simplified process flow diagram, a brief outline of the process chemistry, safe upper and lower limits for controlled parameters, and evaluation of the health and safety consequences of process deviations.

iii. Equipment used in the process including general information on topics such as the materials of construction, piping and instrumentation diagrams, ventilation, design codes and standards employed, material and energy balances, IROFS, electrical classification, and relief system design and design basis.

b. WEC included procedures and criteria for changing the ISA, along with a commitment to implement a facility change mechanism that meets the requirements of 10 CFR 70.72. These procedures and criteria include evaluation of a facility change within the ISA framework, and include procedures and responsibilities for updating the ISA.

c. WEC committed to engage personnel with appropriate experience and expertise in engineering and process operations to maintain the ISA. The ISA team for a process consists of individuals who are knowledgeable in the CFFF's ISA methods and the operations, hazards, and safety design criteria of the particular process.

(2) ISA

a. WEC committed to conduct an ISA of appropriate complexity for each process, such that it identifies: (1) radiological hazards; (2) chemical hazards that could increase radiological risk; (3) facility hazards that could increase radiological risk; (4) potential accident sequences; (5) consequences and likelihood of each accident sequence; and (6) IROFS, including the assumptions and conditions under which they support compliance with the performance requirements of 10 CFR 70.61. The application is acceptable in that it sufficiently describes specific methods and criteria that would be effective in accomplishing each of these tasks.

b. WEC committed to maintain the ISA and its supporting documentation so that it is accurate and up-to-date by means of a suitable configuration management system and to submit changes to the ISA Summary, to the NRC, in accordance with 10 CFR 70.72(d)(1) and (3).

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c. WEC committed to train personnel in the CFFF's ISA methods and to use suitably qualified personnel to update and maintain the ISA and ISA Summary.

d. WEC committed to evaluate proposed changes to the CFFF, or its operations, by means of the ISA methods and to designate new or additional IROFS and appropriate management measures, as required. WEC agreed to promptly evaluate the adequacy of existing IROFS and associated management measures and to make any required changes that may be impacted by changes to the CFFF or its processes. If a proposed change results in a new type of accident sequence or increases the consequences, or likelihood of a previously analyzed accident sequence within the context of 10 CFR 70.61, WEC commits to promptly evaluate the adequacy of existing IROFS and associated management measures and to make necessary changes, if required.

e. WEC committed to address any IROFS' unacceptable performance deficiencies that are identified through updates to the ISA.

f. WEC committed to maintain written procedures on site.

g. WEC committed to establish all IROFS and to maintain them so they are available and reliable when needed.

(3) Management Measures

WEC established management measures that comprise the principal mechanism by which the reliability and availability of each IROFS are ensured. These management measures are described in Chapter 3, "Conduct of Operations," of the application. The NRC staff review of the management measures is contained in Section 11 of this Safety Evaluation Report.

3.5 REFERENCES

(NRC, 2002) U.S. Nuclear Regulatory Commission (NRC). NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," 2002.

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4.0 RADIATION PROTECTION

The purpose of this review is to determine whether the licensee's Radiation Protection (RP) program is adequate to protect the radiological health and safety of workers and to comply with the associated regulatory requirements in 10 CFR Parts 19, 20, and 70.

4.1 REGULATORY REQUIREMENTS

4.1.1 RADIATION PROTECTION PROGRAM IMPLEMENTATION

Regulations applicable to the establishment of an RP program are presented in Part 20, Subpart B, "Radiation Protection Programs."

4.1.2 AS LOW AS IS REASONABLY ACHIEVABLE PROGRAM

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

4.1.3 ORGANIZATION AND PERSONNEL QUALIFICATIONS

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

4.1.4 WRITTEN PROCEDURES

The regulation applicable to RP procedures and Radiation Work Permits (RWPs) are presented in 10 CFR 70.22, "Contents of applications."

4.1.5 TRAINING

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"

4.1.6 VENTILATION AND RESPIRATORY PROTECTION PROGRAMS

Regulations applicable to the ventilation and respiratory protection programs are presented in Part 20, Subpart H, "Respiratory protection and controls to restrict internal exposure in restricted areas."

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4.1.7 RADIATION SURVEY AND MONITORING PROGRAMS

The following NRC regulations in Part 20 are applicable to radiation surveys and monitoring programs:

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

4.1.8 ADDITIONAL PROGRAM REQUIREMENTS

The following Part 20 regulations are applicable to the additional program requirements:

1. Subpart L "Records"
2. Subpart M "Reports"
3. Section 70.61 "Performance requirements"
4. Section 70.74 "Additional reporting requirements"

4.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria for NRC's review of the RP program are outlined in Sections 4.4.1.3; 4.4.2.3; 4.4.3.3; 4.4.4.3; 4.4.5.3; 4.4.6.3; 4.4.7.3; and 4.4.8.3 of NUREG-1520 (NRC, 2002).

4.3 STAFF REVIEW AND ANALYSIS

4.3.1 RADIATION PROTECTION PROGRAM IMPLEMENTATION

In Chapter 5 of the WEC application, the licensee describes the RP program for the facility. The RP program at WEC is called the Environmental Health and Safety (EH&S) program. The RP program develops radiation control procedures, evaluates effluents for contamination, implements ALARA, and maintains records to document RP program activities. The RP program is developed, documented, and implemented commensurately with the risk posed by a fuel manufacturing operation.

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The RP program's organizational structure and the responsibilities of key program personnel are outlined in Section 2.1.1.3 of the WEC application (WEC 2005). The RP program consists of managers, engineers, technicians, and contract employees. The Plant Manager is responsible for the protection of all persons against radiation exposure resulting from facility operations and material, and for compliance with applicable NRC regulations and the facility license. The Regulatory Component Manager (EH&S Manager) is responsible for implementing the RP program and, in matters involving RP, will have direct access to the Plant Manager. The Regulatory Component and his/her staff is also be responsible for:

- Establishing and maintaining the RP program including the procedures, manuals, and plans associated with the program;
- Training in, and effectiveness of, environmental and radiation protection, nuclear criticality safety, occupational safety and health, and emergency planning;
- Establishing and maintaining the ALARA program and ensuring it is practiced by all personnel;
- The development of procedures to control contamination, exposure of individuals to radiation, and integrity and reliability of radiation detection instruments;
- Calibration and quality assurance of all radiological instrumentation, including verification of required Lower Limits of Detection;
- Review and assessment of EH&S programs and performance;
- Reviewing and auditing the efficacy of the program in complying with NRC and other governmental regulations, and applicable Regulatory Guides;
- Review of regulatory violations and assurance of implementation of corrective actions; and
- The maintenance of required records and reports to document RP program activities.

WEC staffs the facility with suitably trained RP personnel including Regulatory Component Managers (Operations Managers), Regulatory Function Engineers, and First Line Managers/Technicians. The Regulatory Component implements the RP program to ensure safety and health requirements have been incorporated into the CFFF facilities, equipment, and procedures prior to the use and processing of licensed material.

The licensee ensures that the RP program remains independent of the facility's routine operations, and that it maintains its objectivity and is focused only on implementing sound RP principles, necessary to achieve ALARA goals. The licensee reviews the content and

implementation of the RP program at least annually, in accordance with 10 CFR 20.1101. In addition, constraints on atmospheric releases are established to ensure compliance with 10 CFR 20.1101(d).

As described above, the licensee will maintain the RP program in accordance with the acceptance criteria in NUREG-1520 (NRC, 2002).

4.3.2 ALARA PROGRAM

The ALARA program is implemented using written policies and procedures, to ensure that occupational radiation exposures are maintained ALARA and that such exposures are consistent with the requirements of 10 CFR 20.1101. Goals of the ALARA program include maintaining occupational exposures, as well as environmental releases, as far below regulatory limits as is reasonably achievable. This is accomplished by including ALARA goals in procedures for manufacturing, configuration change, training, and inspections.

The licensee states that the Regulatory Component is responsible for implementing the ALARA program. The Regulatory Component also prepares an annual report on ALARA progress, tracked against the performance indicators listed in Section 3.6.2.3 of the application (WEC 2005). This report will be submitted to the Plant Manager and the ALARA committee.

The Regulatory Component is responsible for monitoring and reporting the effectiveness of the ALARA program to the Senior Component Manager, who provides oversight. The first level managers are given the responsibility and authority to implement the program. The licensee establishes an ALARA committee, whose membership will consist of Radiation Protection, Environmental Safety, EH&S personnel, and operations managers, as needed. The ALARA committee meets at least annually to track ALARA progress against specified performance indicators.

The responsibilities of the ALARA committee include: (1) determining if trends in exposures, environmental releases, and contamination levels are in accordance with the ALARA concept; (2) ensuring that the occupational radiation exposure dose limits of Part 20 are not exceeded under normal operations; and (3) reviewing program audits made by the radiation protection organization and inspection staff.

The licensee will maintain an ALARA program in accordance with the acceptance criteria as described above.

4.3.3 ORGANIZATION AND PERSONNEL QUALIFICATIONS

The licensee employs only suitably trained RP personnel at the facility. Information for personnel requirements for the most relevant positions in the plant are contained in Section 2.1.1.3 of the application (WEC 2005). The RP program consists of three primary groups:

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Regulatory Component Manager (Operations Manager), Regulatory Function Engineer, and First Line Manager/Technician.

The Regulatory Component has, as a minimum, a bachelor's degree (or equivalent) in an engineering or scientific field and two years of responsible nuclear experience associated with the implementation of a RP program. The Regulatory Component is responsible for establishing and implementing the RP program. The Regulatory Component has direct access to the Plant Manager regarding all matters involving RP, is skilled in the interpretation of RP data and regulations, and is familiar with the operation of the facility and RP concerns of the site.

The Regulatory Function Engineer has, as a minimum, a baccalaureate degree, or equivalent, with a science or engineering emphasis and two years of experience in nuclear business with assigned function activities. A Regulatory Function Engineer has knowledge in the quality execution and administration of function programs.

The First Line Manager/Technician has, as a minimum, a High School diploma or equivalent. Specific on the job training, or prior experience, is the basis for qualification of each technician for their respective job assignments.

Persons who do not meet the minimum requirements in their program will be assigned an individual, by management, to provide direct advice and consultation until the minimum requirements prescribed in the training checklist are fully met.

The licensee has organized and staffed a RP program in accordance with the acceptance criteria.

4.3.4 WRITTEN PROCEDURES

Written procedures will be used for all operations involving licensed materials. Plant procedures are established by first line management and prepared, reviewed, and approved by cognizant staff groups. The Regulatory Component reviews and approves all procedures, specifically related to environmental and radiation protection, nuclear criticality safety, occupational safety and health, and emergency planning.

The licensee issues RWPs for all jobs where radiation protection requirements are not covered by operating procedures. RWPs will also be issued if contamination outside the radiation controlled area is possible, or if the air born contamination is likely to exceed 50 percent of the Derived Air Concentration (DAC), 100 mrem of the Deep Dose Equivalent, or 10 percent of the Total Effective Dose Equivalent in 10 CFR Part 20.

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The RWP procedure requires EH&S Operations to review each request to determine the risk associated with the job. RWPs will contain: (1) personal qualification forms; (2) a procedure list; (3) an approved personnel list; (4) operations surveillance forms; (5) a configuration control form; (6) an installation package; and (7) specific protection requirements. The RWP will be posted at the work site and have a predetermined period of validity, with a specified expiration or termination time.

The following criteria are used for RWPs:

- Only personnel who have completed the required safety training may be assigned to work under an RWP;
- RWPs are made available to personnel working under the permit;
- RWPs clearly define and limit the work activities to which they apply; and
- RWPs are retained as record based on the evaluation of custodians who classify documents as “permanent” or “nonpermanent” in agreement with the management approved Records Flow Schedule.

The licensee prepares a written procedures and RWPs in accordance with these acceptance criteria.

4.3.5 TRAINING

An RP training program is designed and implemented to provide training to all personnel and visitors, unless accompanied by trained escorts, who enter Contamination Controlled Areas, commensurate with the radiological hazard to which they may be exposed. The level of training is based on the potential radiological health risks associated with the individual’s work responsibilities.

The licensee has incorporated the provisions of 10 CFR 19.12 into the radiation training program, as outlined in Section 3.4 (WEC, 2005). The requirements in 10 CFR 19.12 addresses the required health physics information the licensee must make available to workers likely to receive exposures greater than 1 mSv (100 mrem) per year.

The RP staff receives annual refresher training, which requires each employee to successfully pass an examination. Retraining is performed for personnel who require unescorted access to Contamination Controlled Areas, on an annual basis and as necessary, to address changes in policies, procedures, requirements, and the facility ISA. Component Managers are responsible for ensuring effective and adequate training of personnel. The Regulatory Component reviews

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[redacted]

and updates the contents of the formal RP training program at least once every two years. The Regulatory Component also reviews training for all procedures involving SNM.

The licensee trains its employees in RP in accordance with the acceptance criteria.

4.3.6 VENTILATION AND RESPIRATORY PROTECTION PROGRAMS

The design criteria, including flow velocity at openings, for the ventilation systems, are described in Sections 5.2.12 through 5.2.22 of the application (WEC, 2005). Filters used in the systems include pre-filters for dust removal, exhaust from hoods, glove boxes, and similar enclosures. The exhaust is passed through High-Efficiency Particulate Air (HEPA) filters and monitored on a routine basis. Differential pressure across HEPA filters, in potentially contaminated exhaust systems, is routinely checked and automatically monitored. Filters are replaced when differential pressure exceeds the manufacturers' ratings or they fail to function properly.

Air flow rates at ventilation systems, servicing primary enclosures provide minimum face velocities of 100-linear feet per minute, and are checked quarterly. Gloveboxes are operated at negative pressure, and the differential pressure is monitored by system alarms.

The containment of uranium hexafluoride (UF_6) is maintained by the process equipment. Air flows are typically maintained from non-chemical process areas to chemical process areas. Adequacy of containment and ventilation controls is determined by continuous air sampling.

To meet the respiratory protection requirements in 10 CFR Part 20, Subpart H, the licensee will prepare written procedures for the selection, fitting, issuance, maintenance, testing, training of personnel, monitoring, and record-keeping for individual respiratory protection equipment, in accordance with 10 CFR 20.1703(c)(4). These procedures require employees to pass a medical exam before being permitted to wear a respirator. Employees are fit tested prior to being allowed to wear a respirator and retested at least annually. Employees are permitted to leave the work area when their respirator is impeding their ability to work.

The licensee will revise respiratory protection procedures, as necessary, whenever changes are made to the facility, process, or equipment. The records of the respiratory protection program, including training for respirator use and maintenance, are maintained in accordance with the Records Flow Schedule, which is described in Section 3.9.2 of the application (WEC, 2005).

The licensee has established ventilation and respiratory protection programs in accordance with the acceptance criteria, and satisfies the regulatory requirements of Part 20, Subpart H.

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4.3.7 RADIATION SURVEY AND MONITORING PROGRAMS

The licensee has a radiation survey and monitoring program. The program uses prepared written procedures that include an outline of the program objectives, sampling procedures, data analysis methods, types of equipment and instrumentation used, frequency of measurements, and record-keeping and reporting requirements. The program defines actions taken when measurements exceed 10 CFR Part 20 occupational dose limits, or the administrative levels established by the licensee.

Personal dosimeters that are sensitive to beta, gamma, and neutron radiation, supplied by a vendor holding dosimetry accreditation from the National Voluntary Laboratory Accreditation Program, are required to be worn by all adults likely to receive greater than 0.5 rem in a year. Personnel dosimeters are evaluated on a frequency not greater than quarterly or as specified by the Radiation Safety Function.

The licensee established an annual administrative limit imposed on individuals who receive 80% of the Annual Limit on Intake. The primary method of determining Committed Effective Dose Equivalent (CEDE) is by measuring the concentration of radioactive material in the work area air. Work restrictions and diagnostic evaluations are initiated when air sample results indicate an individual may have received a single significant intake, 20 or 40 DAC Hours exposure transportable or non-transportable, respectively.

The licensee performs air sampling, consistent with the guidance provided in Regulatory Guide 8.25 (NRC, 1992a). Diagnostic evaluations, based on air samples, are augmented by bioassay measurements, which conform to guidance provided in Regulatory Guide 8.9 (NRC, 1993a). In-vitro bioassay samples (urinalysis and lung burden) are collected and evaluated, at least once annually, to track and evaluate retention of radioactive material in individuals. The licensee sums the internal and external exposure values in accordance with 10 CFR 20.1202, using procedures based on the guidance in Regulatory Guides 8.7 (NRC, 2005) and 8.34 (NRC, 1992b).

All areas where exposure to airborne radioactive material is a risk are monitored, using air sampling. Whenever fixed air samples exceed the action limits specified in Section 5.2.26 (WEC, 2005), an investigation is initiated to identify and correct the elevated airborne concentration. Air samplers used to monitor individual CEDEs are changed out once every shift unless conditions warrant a modified schedule. Lapel samples are used to supplement and/or test the fixed samples.

The licensee provides routine contamination survey monitoring consistent with the guidance in Regulatory Guide 8.24 (NRC, 1979). The surveys are conducted in all UF_6 process areas, with routine, periodic checks of non-UF_6 process areas, including those areas that are normally free of contamination. Contamination Controlled Areas are surveyed at least biweekly, and lunch rooms and change rooms are surveyed weekly. Monitoring includes measurements of fixed and

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removable surface contamination, with extent and frequency based on the potential for contamination in each area and operational experience. Removable surface contamination is considered to be uranium that can be transferred to a dry smear paper with moderate pressure.

The licensee has defined a contamination controlled area as an area where uncontained radioactive material is processed and the probability of contamination on floors and accessible surfaces is high. The licensee initiates clean-up of contamination within three working shifts if levels exceed 83.3 Bq/100 cm^2 (5000 dpm/100 cm^2) alpha and immediately if contamination exceeds 250 Bq/100 cm^2 (15,000 dpm/100 cm^2) alpha. The licensee implements an investigation and/or special sampling if the radioactivity concentration outside containment structures exceeds 250 percent of DAC or the monthly average exceeds 100 percent DAC.

The facility corrective action process, which is described in Section 3.4.1.4, 3.7, and 3.8 (WEC, 2005) will be implemented if:

1. Current procedures are determined to be inadequate.

2. Personnel dose monitoring results or personnel contamination levels exceed the administrative limits;

3. The dose limits in Part 20, Appendix B, or 10 CFR 70.61 are exceeded.

The licensee will meet surface contamination guidelines for the transfer of material and equipment to unrestricted areas and release for unrestricted use. The contamination levels are contained in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" (NRC, 1993b).

Sealed sources are leak tested in accordance with the procedures contained in section 12.1.2 of the application (WEC, 2005). Each sealed plutonium source in use is leak-tested at least semi-annually. Unless the source is certified by the supplier within six month of use, the sealed plutonium source will not be put into use until leak-tested. Stored sources are leak-tested prior to any use in, or transfer from, the licensed activity unless tested within the previous six months. The leak-test is capable of detecting the presence of 0.005-microcuries, or more, of alpha contamination on a smear-test sample. Records of leak-test results are maintained for review by the NRC staff.

The licensee has an access control program that ensures: (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

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sufficient quantities and locations. The licensee has established action levels of 3.3 Bq/100cm^2 (200 dpm/100cm^2) alpha contamination (corrected for background) at points of egress from Contamination Controlled Areas.

The licensee has established radiation survey and monitoring programs in accordance with the acceptance criteria.

4.3.8 ADDITIONAL PROGRAM REQUIREMENTS

The licensee has established a program to maintain records of the RP program, radiation survey results, and the results of corrective action program referrals, RWPs, and planned special exposures. The facility identifies, preserves, controls and destroys records in accordance with the guidelines, procedure, and practices set forth by WEC in accordance with the regulations, Section 3.9 (WEC, 2005).

The licensee reports, to the NRC, any event that results in an occupational exposure to radiation exceeding the dose limits in Part 20, within the time specified in 10 CFR 20.2202 and 10 CFR 70.74. A detailed listing of reports required by NRC regulations will be maintained and followed. The licensee will prepare and submit, to the NRC, an annual report of the results of individual monitoring, as required by 10 CFR 20.2206(b).

The licensee will refer, to the facility's corrective action program, any radiation incident that results in an occupational exposure that exceeds the dose limits in Part 20, Appendix B, or is required to be reported pursuant to 10 CFR 70.74. The reports to the NRC should include both the corrective actions taken (or planned) to protect against a recurrence, and the proposed schedule to achieve compliance.

4.4 EVALUATION FINDINGS

The licensee has established and will maintain an acceptable RP 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 RP personnel;

3. Approved written RP procedures and RWPs for RP activities;

4. RP 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;

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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 Parts 20 and 70, and correct for upsets at the facility.

The licensee's RP program meets the requirements of Parts 19, 20, and 70. Conformance to the application will ensure safe operation.

4.5 REFERENCES

(NRC, 1979) U.S. Nuclear Regulatory Commission (NRC). Regulatory Guide 8.24, "Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication," 1979.

(NRC, 1992a) U.S. Nuclear Regulatory Commission (NRC). Regulatory Guide 8.25, "Air Sampling in the Workplace," 1992.

(NRC, 1992b) U.S. Nuclear Regulatory Commission (NRC). Regulatory Guide 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses," 1992.

(NRC, 1993a) U.S Nuclear Regulatory Commission (NRC). Regulatory Guide 8.9, "Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program," 1993.

(NRC, 1993b) U.S. Nuclear Regulatory Commission (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," 1993.

(NRC, 2002) U.S. Nuclear Regulatory Commission (NRC). NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," 2002.

(NRC, 2005) U.S. Nuclear Regulatory Commission (NRC). Regulatory Guide 8.7, "Instructions for Recording and Reporting Occupational Radiation Exposure Data," 2005.

(WEC, 2005) Westinghouse Electric Company (WEC). "Application for Renewal of a Special Nuclear Material License for the Columbia Fuel Fabrication Facility," Revision 0.0, 2005.

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5.0 NUCLEAR CRITICALITY SAFETY

The purpose of this review is to determine whether WEC's nuclear criticality safety (NCS) program is adequate to support safe operation of the facility, as required by 10 CFR Part 70.

The NCS programmatic review determines whether: (1) WEC provided for the appropriate management of the NCS program; (2) WEC identified, and committed to, the responsibilities and authorities of individuals for developing and implementing the NCS program; (3) the facility management measures described in 10 CFR 70.62 have been committed to and will support implementing and maintaining the NCS program; and (4) an adequate NCS program is described, which includes identifying and committing to the NCS methods, and NCS technical practices used to ensure the safe operation of the facility, as required by Part 70.

5.1 REGULATORY REQUIREMENTS

The NCS review of WEC's NCS program verified that the information WEC provided meets the requirements of 10 CFR 70.22 and 70.65, which, respectively, specify the general and additional content of a application. In addition, the NCS review verifies compliance with the regulatory requirements in 10 CFR 70.24; 70.52; 70.61; 70.62; 70.64; 70.65; 70.72; and Appendix A to Part 70.

5.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria for the NCS review of WEC's NCS program are outlined in Sections 5.4.3.1, 5.4.3.2, 5.4.3.3, and 5.4.3.4 of NUREG-1520 (NRC, 2002). This includes the commitment to use NRC NCS Regulatory Guide 3.71 (NRC, 1998), which modified the use of the American National Standards Institute/American Nuclear Society (ANSI/ANS) Series-8 NCS standards.

5.3 STAFF REVIEW AND ANALYSIS

5.3.1 ORGANIZATION AND ADMINISTRATION

WEC commits to ANSI/ANS 8.19 1996, "Administrative Practices for Nuclear Criticality Safety," as it applies to organization and administration. The responsibility and authority for nuclear criticality safety has been delegated by WEC management to the Manager, Nuclear Criticality Safety. The NCS manager reports to the Manager, EH&S. The EH&S Manager reports to the Plant Manager. The Plant Manager has overall accountability for ensuring that all nuclear fuel

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manufacturing activities at WEC are conducted safely and in compliance with applicable regulations and license conditions. The NCS organization is administratively independent of the manufacturing, engineering, and quality organizations.

The NCS manager has responsibility for the administration of the NCS program, including the following activities: (1) the performance of process and equipment criticality safety evaluations before a new or modified fissile material operation is first operated; (2) the determination of parametric controls and spacing requirements; (3) the conduct of audit and inspection services to ensure operations are being conducted in accordance with approved nuclear criticality safety procedures and practices; (4) the posting of limits and controls; (5) the technical content of NCS training; and (6) the conduct of audits of the nuclear criticality safety program. The NCS manager is also responsible for the documentation and maintenance of process, equipment, and program reviews; of validated nuclear criticality safety evaluations; and of operations equipment and procedure reviews, verifications, and approvals.

NCS engineers perform the above activities as directed by the NCS manager. Both the NCS manager and the NCS engineers have the authority to suspend activities if their professional judgment deems the activities unsafe, or contrary to license or regulatory requirements.

A qualified NCS technical reviewer performs an independent verification of all criticality safety evaluations and calculations that support limits specified in a safety analysis. The technical reviewer verifies that a proposed calculation geometry model and configuration adequately represents the system being analyzed. The technical reviewer also verifies that proposed material characterizations (e.g., density, concentration, etc.) adequately represent the system.

The minimum requirements for a position as an NCS manager is a baccalaureate degree, or equivalent, with a science or engineering emphasis and two years of experience in assignments involving NCS regulatory activities in the nuclear business. An NCS manager has appropriate knowledge of nuclear criticality safety and its administration. The minimum requirements for the position of a NCS engineer is a baccalaureate degree, or equivalent, with a science or engineering emphasis and two years of experience in positions involving NCS activities in the nuclear business. An NCS engineer has knowledge in the quality execution of assigned function programs (typically demonstrated by formal performance reviews by a NCS manager), and in administration of assigned functional programs (e.g., performing NCS evaluations).

The staff has reviewed the WEC NCS organizational structure and finds that it is acceptable because the NCS organization is independent from the production staff. NCS evaluations are performed by qualified reviewers, with independent review, to ensure quality assurance, and that the NCS organization is consistent with the requirements in ANSI/ANS-8.19-1996, “Administrative Practices for Nuclear Criticality Safety.” Additionally, the staff finds that the licensee has addressed the acceptance criteria in NUREG-1520, Section 5.4.3.2.

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5.3.2 MANAGEMENT OF NCS PROGRAM

The primary purpose of the WEC NCS program is to designate the controls and barriers that are relied on to prevent criticality in operations with SNM. The WEC NCS program also serves to: (1) prevent an inadvertent nuclear criticality; (2) protect against the occurrence of an identified accident sequence in the ISA Summary; (3) ensure compliance with the NCS performance requirements of 10 CFR 70.61; (4) establish and maintain NCS safety parameters, procedures, IROFS, and safety and operating limits for IROFS; and (5) conduct NCS evaluations to ensure that under normal and credible abnormal conditions, all nuclear processes will remain subcritical and maintain an approved margin of subcriticality for safety.

The licensee's approach to criticality safety is based on the double contingency principle, which states that process designs should incorporate sufficient margins of safety to require at least two, unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible. The preferred approach to demonstrate double contingency is to control two independent parameters. In those instances where multiple controls are used to prevent changes in a single parameter (e.g., mass, moderation, or configuration) and double contingency protection exists, by way of multiple process upsets before a criticality accident is possible, sufficient redundancy and diversity of controls are used to ensure that at least two process upsets remain independent.

The licensee's NCS function establishes limits and controls for all activities involving SNM. Administrative limits and controls are conveyed via postings in the operating area or via operating procedures or both. Engineered limits and controls are provided in operating and maintenance procedures as necessary. Before a modification or addition to the facility, process or equipment used for handling, processing, or storing SNM is made, the change is evaluated and approved following an approved procedure. All changes are reviewed by NCS unless it is determined through change management procedures that NCS review is not required to evaluate the change.

The staff has reviewed the licensee's management of the NCS program and finds that it is acceptable because the licensee commits to develop, implement, and maintain an NCS program to meet the regulatory requirements of 10 CFR Part 70, and NCS safety parameters and procedures are established. Additionally, the staff finds that the licensee has addressed the acceptance criteria in NUREG-1520, Section 5.4.3.1.

5.3.3 MANAGEMENT MEASURES

WEC maintains several programs, systems, and functions to ensure that all IROFS will be available and reliable, will remain available and reliable, and will be under surveillance for malfunction detection and appropriate corrective action. These management measures include training, procedures, and audits and assessments.

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All new employees are given annual general nuclear criticality safety training, which includes training to recognize the criticality accident alarm system (CAAS) signal and the importance of immediately evacuating in the event that there is a criticality accident. The licensee also provides annual specialized training for personnel that handle fissile material. The effectiveness of training is evaluated by written and/or oral tests, the number of violations found during nuclear safety inspections, and the supervisor assessment of the employee.

The licensee staff are trained to perform all operations in strict compliance with procedures, RWPs, or postings, and not to perform any operation involving SNM, that is not addressed in a written and approved procedure, RWP, or posting. Procedures that implement IROFS are reviewed and approved by the appropriate safety discipline.

Program and process assessments are conducted to compare established NCS standards to WEC performance. The assessments take the form of program audits and compliance inspections. WEC commits to meet the guidelines of ANSI/ANS-8-19 (1996), as it relates to audits and assessments.

Audits and assessments are conducted to compare established NCS standards to WEC performance. WEC commits to meet the guidelines of ANSI/ANS-8-19(1996), as it relates to audits and assessments.

Program assessments take the form of program audits. Specific portions of the NCS program, evaluated during a particular assessment, are based on previous internal audit findings, external audit findings, NRC inspection activities, current operating conditions, and time since last assessment. Program audit schedules are developed annually, with the complete NCS program assessed on a triennial frequency. Results of the assessments are documented and maintained for the NRC staff review and inspection.

Process assessments take the form of compliance audits that evaluate implementation of NCS requirements (e.g., conformance to the applicable criticality safety evaluation (CSE) container spacing, following procedures and postings, etc.) for WEC operations. The frequency of these audits are based on previous internal audit findings, NRC inspection results, incidents (those reported and those requiring notification), configuration management activities, and the time since last assessment. Formal compliance audit schedules are developed annually, with one third of the fissile material processing areas that are described in the ISA, audited annually, so that the complete set of operations, making up the WEC ISA, are assessed on a triennial frequency. Results of the assessments are documented and maintained for the NRC staff review and inspection.

Facility walkthrough assessments are conducted for each of the fissile material processing areas described in the ISA. These assessments are performed by the NCS function, with a focus on field compliance with established NCS controls. These assessments are based on the

[redacted]

criticality safety risk defined in the ISA and performed periodically so that the complete set of operations, making up the CFFF ISA, are assessed on a quarterly (higher risk) or semiannual (lower risk) frequency. Results of the assessments are documented and maintained for the NRC staff review and inspection.

The staff has reviewed the licensee commitments to NCS management measures and finds that they are acceptable because the licensee commits to provide training to personnel, commits to conduct activities involving SNM with written and approved procedures, to conduct NCS walkdowns using a graded approach based on the ISA, to conduct NCS audits such that all processes and all aspects of the program are audited within three years, and to the double contingency principle as it relates to procedures. The staff finds that the licensee has addressed the acceptance criteria in NUREG-1520, Section 5.4.3.3.

5.3.4 METHODOLOGIES AND TECHNICAL PRACTICES

5.3.4.1 Computer Codes

(a) Criticality Code Validation

The staff reviewed the licensee's commitments to code validation and verification as described in Section 6.1.5 of the application. Sections 6.1.5.1-6.1.5.3 of the application describe the licensee's commitments regarding criticality code validation, while Section 6.1.5.4 describes the licensee's commitments regarding code verification. The staff found the licensee's commitments to code validation and verification acceptable, as discussed below. The staff also reviewed one of the licensee's validation reports in detail (as discussed below) and determined that it met the criteria listed in Section 5.4.3.4.1(8) of NUREG-1520. Section 6.1.5.3 of the application states that all future validations will be performed so as to comply with the methodology in the reviewed validation report, which is specifically referenced in the application.

Section 5.1.5.3 of the application states that validation is performed in accordance with ANSI/ANS-8.1-1998, and that all validations done after June 27, 2007, will be performed in accordance with ANSI/ANS-8.24-2007. The staff determined that the licensee's description of the code validation methodology in the application, and its commitments to ANSI/ANS-8.1-1998 and ANSI/ANS-8.24-2007, satisfied the acceptance criteria in Section 5.4.3.4.1(7) of NUREG-1520, with the exception of describing the validated area of applicability (AOA). While the licensee did not meet this acceptance criterion, it did commit (by letter LTR-RAC-07-56 dated July 18, 2007) to provide newly issued or revised validation reports no later than the following calendar quarter. This will meet the expectation of Section 5.4.3.4.1(7) of NUREG-1520, which states that a change notification letter should be submitted when validations are revised. Because computer codes must be validated before calculations are performed, and evaluations must be completed before changes can be implemented in the field, the quarterly periodicity should be sufficient to enable the NRC to determine whether it warrants further review or inspection. The staff performed a review of ANSI/ANS-8.24-2007 and determined that

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commitment to this standard is acceptable with two exceptions. They are: (1) a positive bias (i.e., over-estimation of k_{eff}) should not be used in determining calculational margin (Section 6.1.2), and (2) rejection of outliers should only be based on the inconsistency of the data with known physical behavior, rather than on statistical methods (Section 6.3.2). The use of a positive bias, in general, takes credit for errors in calculating benchmark cases that may or may not be present in actual facility calculations. The rejection of outliers, without a physical basis may result in not considering all available information on possible contributions to the bias. The licensee's commitment states that it will comply with all the requirements ("shall" statements) of ANSI/ANS-8.24-2007 except as modified by specific license commitments. Commitments prohibiting the use of positive bias and rejection of outliers on statistical grounds alone are included in the application, and therefore this commitment is acceptable to the staff.

In support of its proposed margin of subcriticality for safety, WEC submitted its criticality code validation report (LTR-ESH-05-146, "Validation of the CSAS25 Sequence in Standardized Computer Analysis for Licensing Evaluation (SCALE)-4.4 and the 238-Group ENDF/B-V Cross Section Library for Homogeneous Systems at the Westinghouse Columbia Fuel Fabrication Facility," Rev. 1, by letter dated December 15, 2005. This is one of four validation reports in use at the site, the others being: (1) a SCALE-4.4 validation report for heterogeneous systems; (2) a MCNP validation report for homogeneous systems, and (3) a MCNP validation report for heterogeneous systems. The NRC staff did not review these other three validation reports. However, WEC stated (September 27, 2005, meeting summary) that it would revise its three remaining reports to incorporate changes made in LTR-ESH-05-146 during the course of the review in response to NRC comments.

Validation report LTR-ESH-05-146, Rev. 1 (henceforth referred to as "the validation report") contains a description of the validation methodology, critical benchmarks used in the validation, the results of calculating k_{eff} for those benchmarks, the results of the statistical determination of the upper subcritical limit (USL), and the determination of the AOA.

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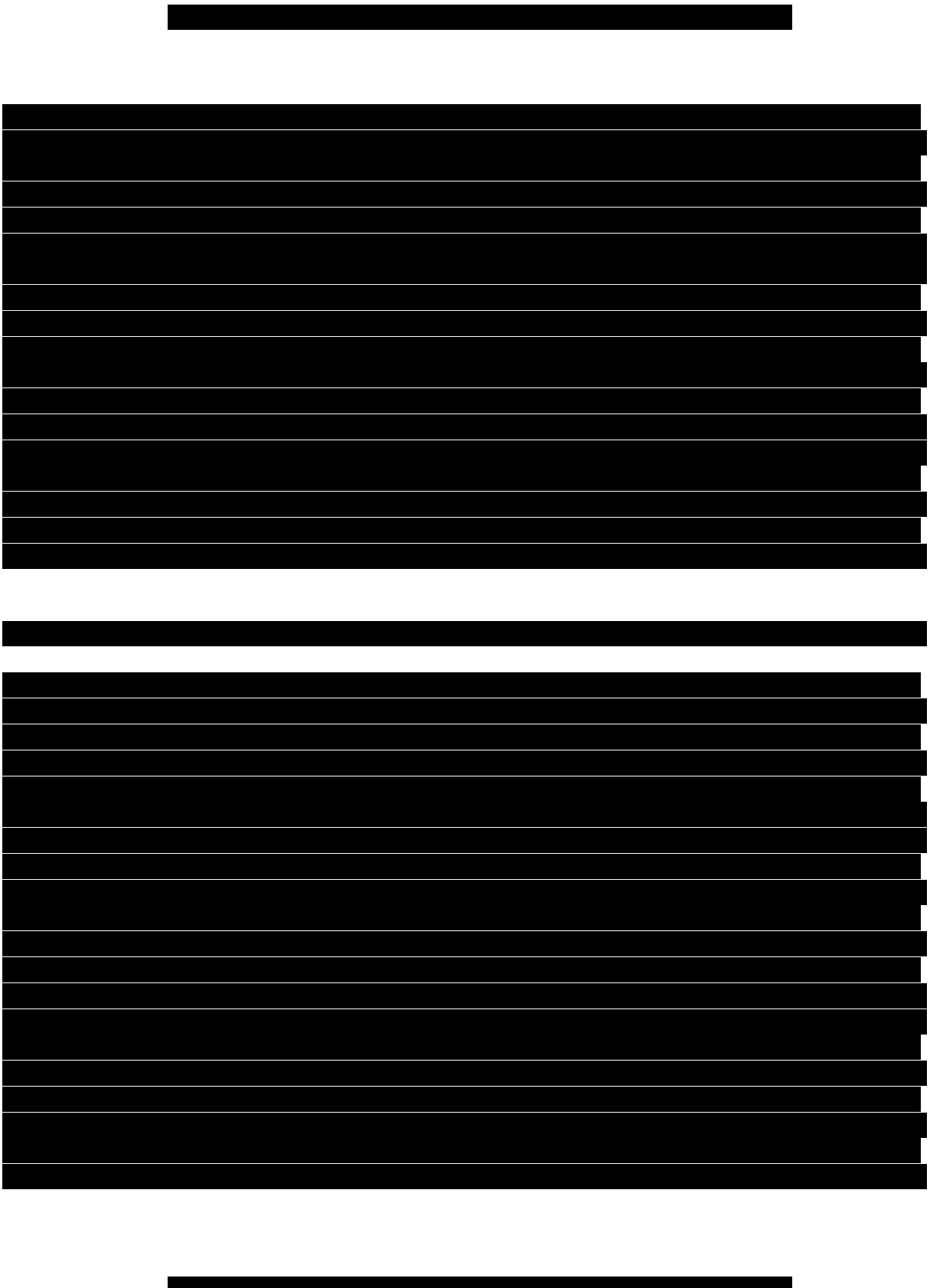

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(b) Margin of Subcriticality

Section 6.1.5.2 of the application discusses the licensee's minimum margin of subcriticality for normal and credible abnormal conditions. The licensee employs two different limits for the 95/95 k_{EFF}, which is defined as:

$$95/95\ k_{EFF} = k_s + 2\sigma_s + (\text{bias} + \text{uncertainty})$$

where k_s is the calculated neutron multiplication factor and σ_s its standard deviation. The limits are as follows:

$95/95\ k_{EFF} \leq 0.95$ (for normal operations and anticipated process upsets)

$95/95\ k_{EFF} \leq 0.98$ (for credible abnormal configurations)

The connection with the validation is that the validation determines the bias and uncertainty; the USL is defined as USL = 0.98 - (bias + uncertainty), so that $k_s + 2\sigma_s \leq$ USL (credible abnormal configurations). The *minimum margin of subcriticality* is defined as 0.05 for normal operations and anticipated process upsets, and 0.02 for credible abnormal configurations.

Normal operations are plant conditions with all double contingency controls in place, such that all controlled parameters are within their safety limits, and uncontrolled parameters evaluated at their worst-case credible values. The terms *anticipated process upsets* and *credible abnormal configurations* are defined in Section 1.1.6 of the application. An *anticipated process upset* is defined as "an event that is expected to occur occasionally during plant lifetime; for NCS is considered as a normal case condition" (the second half of this sentence means simply that these events are subject to the same k_{EFF} limit as normal operations). A *credible abnormal configuration* is defined as "an unlikely process upset that results in the loss of a contingency, and meets criteria specified in Section 6.1.4.2(6)." Section 6.1.4.2 of the application states that classification of an accident as a credible abnormal configuration (which allows use of the 0.98 k_{EFF} limit) must be justified in facility CSEs, and must be based on at least one of the following considerations:

(1) requires multiple independent process upsets or control failures before the condition could occur (multiple failures of the same parameter or multiple parameters failed in the same model);

(2) value of one or more failed/uncontrolled parameters exceeds what is physically credible; or

(3) condition includes at least one parameter that is evaluated at conditions more reactive than at normal operations, but one or more of the other parameters has failed (loss of a contingency).

[redacted]

[redacted]

The staff's evaluation of these k_{EFF} limits and criteria for classifying plant conditions as normal operations, anticipated process upsets, and credible abnormal configurations is described in the following sections. For the upset condition calculations, the appropriate subcritical margin depends on the category of the upset, that is, whether the condition is reasonably expected to occur, or represents something beyond what is physically reasonable. The added conservatism in conditions that exceed what is physically reasonable (i.e., "credible abnormal configurations") makes a smaller margin than what would otherwise be acceptable.

(c) Normal Operations and Anticipated Process Upsets

The staff determined that a minimum margin of subcriticality of 0.05 is acceptable for normal operations. During its two on-site licensing reviews, the staff reviewed several of the licensee's CSEs and calculation ("calc") notes and walked down facility processes. The staff determined that processes at the facility are very similar to those at other low-enriched fuel fabrication facilities, for which a minimum subcritical margin of 0.05 has traditionally been found acceptable. The staff's review of the licensee's validation report LTR-ESH-05-146 (as documented above) concluded that the licensee performed an adequate validation. The staff also concluded that the licensee's commitments to technical practices used in NCS evaluation in the application were adequate. Based on the similarity to processes at other fuel fabrication facilities, the licensee's validation, and use of standard technical practices (including commitments to ANSI standards), the staff concludes that there is reasonable assurance that normal operations will be safely subcritical with a minimum margin of subcriticality of 0.05.

Anticipated process upsets are subject to the same k_{EFF} limits as normal operations. The staff therefore found the minimum margin of subcriticality of 0.05 acceptable for the same reasons as for normal operations.

(d) Credible Abnormal Configurations

The staff determined that a minimum margin of subcriticality of 0.02 is acceptable for credible abnormal configurations, when combined with a margin resulting from conservative calculational practices, as described below. This determination was based on: (1) supplemental validation analyses; (2) the criteria for and definition of credible abnormal configurations; and (3) the use of conservative calculational practices employed for credible abnormal configurations.

Supplemental Validation Analyses

Revision 1 of the validation report included several features that exceeded the standard level of analysis associated with criticality code validation (described in the validation section above). In addition, besides the validation analysis reviewed as described above (LTR-ESH-05-146, Rev. 1), the licensee submitted the following "supplemental" validation analyses. These analyses are termed "supplemental" because they are intended to provide additional assurance,

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beyond the minimum assurance needed for validation, that calculated k_{eff} values below the USL are indeed subcritical. As such, these analyses go beyond the standard level of analysis associated with criticality code validation. These supplemental analyses are:

- LTR-ESH-05-457, "Conservatisms in NCS Calculations Performed in Support of Westinghouse Columbia Fuel Fabrication ISAs" (submitted by letter dated December 15, 2005).

- LTR-ESH-05-420, "Multi-Dimensional Analysis of Validation Area of Applicability" (submitted by letter dated December 15, 2005).

- LTR-ESH-05-440, "Incident Neutron Energy and Fission Fraction Study for the Critical Experiments from the Validation [redacted] at the Westinghouse Columbia Fuel Fabrication Facility," Rev. 1 (submitted by letter dated September 8, 2006).

- LTR-ESH-06-238, "Evaluation of EALF vs H/X for Hypothetical Slabs and Cylinders" (submitted by letter dated September 8, 2006).

- LTR-ESH-06-239, "3-Dimensional Plot of EALF vs H/X Validation Benchmark Data" (submitted by letter dated September 8, 2006).

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The staff determined that these supplemental analyses of the benchmarks provided additional assurance that systems with calculated k_{eff} less than the determined USLs would be subcritical. Based on these supplemental analyses, in conjunction with features of the original validation analysis that exceeded the expectations of regulatory guidance such as NUREG/CR-6698, the staff finds that their use of a minimum margin of subcriticality less than 0.05 to be appropriate. The exact value that is appropriate is discussed below.

Criteria for Credible Abnormal Configurations

The criteria specified in Section 6.1.5.2 of the application mean that not every deviation from normal controlled conditions will be subject to a 95/95 k_{eff} limit of 0.98. Each of the four criteria is discussed in detail below. Classification of a condition as a credible abnormal configuration requires justification in the CSE, based on one of the following three criteria:

(1) requires multiple independent process upsets or control failures before the condition could occur (multiple failures of the same parameter or multiple parameters failed in the same model)

The staff understands this to mean that the modeled condition must involve either: (1) two or more changes in a single parameter, or (2) simultaneous changes in two or more parameters. During the second on-site licensing review, the staff noted that several abnormal configurations involved multiple failures of the same or different parameters. Examples of this included: (1) CN-CRI-06-17, "ADU Conversion Hydrolosis Column, Nitrate Vessel, and Precipitator," in which the licensee [redacted]

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[redacted] and (2) CN-CRI-06-30, “URRS Sifting/Cleaning Hood,” in which the licensee showed that [redacted]

In these examples, the licensee developed one model (or a small number of models) combining multiple upsets, rather than developing a separate model for each credible deviation from normal conditions. Either approach is adequate to demonstrate subcriticality, but the “multiple upset” model will result, in general, in additional conservatism beyond what is required to demonstrate subcriticality. Demonstration of subcriticality following multiple changes in process conditions also goes beyond what is required to demonstrate compliance with double contingency. As discussed in the following section on conservative calculational practices, models combining multiple upsets in this fashion resulted in additional conservatism.

(2) value of one or more failed/uncontrolled parameters exceeds what is physically credible

The staff understands this to mean that the value of a parameter that has failed (or was never controlled) is assumed to be beyond what is physically achievable. The licensee is required to assume “worst credible” values for failed or uncontrolled parameters (e.g., spherical geometry, optimum moderation). During the second on-site licensing review, the staff observed that in several cases, models for credible abnormal configurations assumed the most reactive values for failed or uncontrolled parameters, even when these values were not physically reasonable. Examples of this included: (1) CN-CRI-06-23, Rev. 2, “Criticality Safety Assessment for the Columbia Fuel Fabrication Facility Fuel Assembly Pellet Grinder Lines,” in which the licensee [redacted] (2), CN-CRI-06-23, Rev. 2, in which the licensee also assumed [redacted] and (3) CN-CRI-05-022, “Incinerator Offgas and Ash Handling System,” Rev. 0, in which the licensee modeled [redacted] As discussed in the following section on conservative calculational practices, models assuming parametric values beyond what is physically credible resulted in additional conservatism.

(3) condition includes at least one parameter that is evaluated at conditions more reactive than at normal operations, but one or more of the other parameters has failed (loss of a contingency).

The staff understands this to mean that there is conservatism in a parameter that is maintained throughout the event (i.e., a controlled parameter). The second of the three criteria covers the case in which the conservatism is in a failed or uncontrolled parameter; the third criterion covers the case in which the conservatism is in a parameter that is controlled throughout the upset.

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During the second on-site licensing review, the staff observed that in several cases, models assumed values for controlled (or otherwise limited) parameters that exceeded their limiting values. Examples of this included: CN-CRI-06-16, "ADU Bulk Blending Study," in which the licensee assumed a bounding UO_2 powder density [redacted] and CN-CRI-05-12, Rev. 4, "Calculations to Determine the k_{eff} of the Array of Tanks in the Solvent Extraction [redacted] As discussed in the following section on conservative calculational practices, models assuming values of controlled parameters beyond their safety limits resulted in additional conservatism.

If an evaluated plant condition cannot be shown to meet one of the three criteria (e.g., if the multiple failures required under the first criterion are split into individual upsets), the licensee is required to demonstrate a 95/95 $k_{EFF} \leq 0.95$.

As also committed to in Section 6.1.5.2 of the application, it is not enough for the licensee to show that it has met one of the above three criteria. The documented justification in the CSE must also demonstrate that applying the criteria results in conservatism in k_{eff}. The amount of this conservatism is not quantified, but clearly must be sufficient to contribute to an adequate margin of subcriticality. (For example, if the amount of conservatism is within the uncertainty and variability associated with the system, then it does not contribute to margin of subcriticality). The licensee clarified its understanding of the phrase "demonstrate conservatism" in letter LTR-RAC-07-48, dated June 27, 2007. This letter states that "WEC will demonstrate adequate conservatism which exceeds the uncertainty and variability of the system. Additionally, WEC concurs that an infinitesimal mathematical conservatism would not meet the intent of the license application." [redacted] This letter is part of the licensing basis and will be cited in License Condition S-1.

In addition, the examples reviewed as part of the second on-site licensing review (see following section) indicate that the conservatism will typically be at least several percent in k_{eff}. The required demonstration of conservatism may be based on parametric studies, in which a parameter is varied and the effect on k_{eff} quantified, or on other documented technical bases. The example provided of "other documented technical basis" is historical data that forms the basis for the assumption. The example of this, provided during the second on-site licensing

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review, was the licensee's demonstration that an assumed UO_2 powder density of [redacted] was conservative and based on a long history of measurements and operational data. Based on the on-site review, and the additional clarification provided in LTR-RAC-07-48, the staff finds the licensee's commitment to the demonstration of conservatism acceptable.

The licensee has committed to include the justification required by Section 6.1.4.2(5) and (6) of the application in its CSEs by the completion of its Nuclear Criticality Safety Improvement Project (NCSIP), no later than June 30, 2009. The licensee has proposed the following license condition by letter LRT-RAC-07-29, dated March 28, 2007 (and clarified by its submittal dated May 4, 2007):

S-3 Westinghouse Electric Company shall complete the Nuclear Criticality Safety Improvement Project (NCSIP) (as outlined in LTR-RAC-07-29) by June 30, 2009. Until June 30, 2009, the commitments contained in Section 6.1.4.2(6) of the license application shall apply only to Criticality Safety Evaluations (CSEs) which are generated after the issuance date of this license. Until completion of the NCSIP, WEC will provide quarterly status reports to the NRC providing status of key project deliverables. Upon completion of the NCSIP on June 30, 2009, all CSEs shall meet the criteria of Section 6.1.4.2.

LTR-RAC-07-29 states that existing CSEs will be prioritized for upgrading in terms of risk and the seriousness of observed technical deficiencies. The licensee will provide quarterly status reports on its progress until all CSEs have been upgraded, indicating which and how many CSEs have been updated and a prioritization list of remaining CSEs. These commitments will allow the NRC to monitor the progress of the licensee's commitment to improve the documentation of the basis for subcriticality of its processes. The staff examined the licensee's list of prioritized CSEs during the second on-site licensing review and determined that it seemed appropriately focused on the areas of the highest risk.

The purpose of the NCSIP is to ensure, among other things, that the required technical basis for subcriticality is appropriately documented in facility safety basis documents (the CSEs). However, the possibility exists that, upon review, an existing operation may be found unable to meet the criteria in License Application, Section 6.1.4.2(6), which would represent a significant regulatory and safety concern. Such a situation would not have adequate assurance of subcriticality, and would, therefore, constitute a violation of the performance requirements (i.e., would not be able to demonstrate subcriticality for normal and credible abnormal conditions, including an approved margin of subcriticality for safety), in accordance with 10 CFR 70.61(d).

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The staff considers this reportable as a 24-hour report under 10 CFR Part 70, Appendix A(b)(1), but to make this requirement explicit, and ensure that the information needed to satisfactorily address such an event is submitted, the staff is imposing the following license condition:

S-4. Westinghouse Electric Company shall report any instances identified through its Nuclear Criticality Safety Improvement Project (NCSIP) or other means, in which existing fissile operations cannot be shown to meet a 95/95 $k_{EFF} \leq 0.98$ for credible abnormal configurations meeting the criteria listed in Section 6.1.4.2(6) of the license application, to the NRC within 24 hours of discovery. The occurrence shall be reported as an improperly analyzed condition in accordance with 10 CFR Part 70, Appendix A, paragraph (b)(1), and shall include the specific actions taken to restore adequate assurance of subcriticality.

Upon discovery, the licensee shall either restore compliance with Sections 6.1.4.2 and 6.1.5.2 of the license application (e.g., through re-analysis or changes to processes or controls), shall cease movement of fissile material or other materials that could increase k_{EFF}, or shall take other appropriate compensatory measures.

The above requirements, with regard to performance for the NCSIP and the reporting of any instances in which there is insufficient margin of subcriticality, will provide assurance of continued safe operation until the criteria discussed herein are fully in effect in June 2009.

Conservative Calculational Practices

During the second on-site licensing review, the staff determined that the licensee's models for credible abnormal configurations resulted in a significant amount of calculational conservatism, as described below. The staff focused on those processes for its sampling review that posed the highest risk of criticality [redacted], but also examined some lower-risk processes to ensure that it sampled a diverse cross-section of physical systems. The staff reviewed the licensee's CSEs and calc notes, and walked down the affected processes to determine the amount of conservatism in the facility calculations. For some of these, the licensee performed parametric studies that provided an indication of the amount of conservatism in k_{eff} between realistic and modeled conditions. For some cases, the staff performed independent parametric studies to better quantify the amount of conservatism in k_{eff}, where the licensee had not performed parametric studies. The calculations reviewed by the staff are summarized below:

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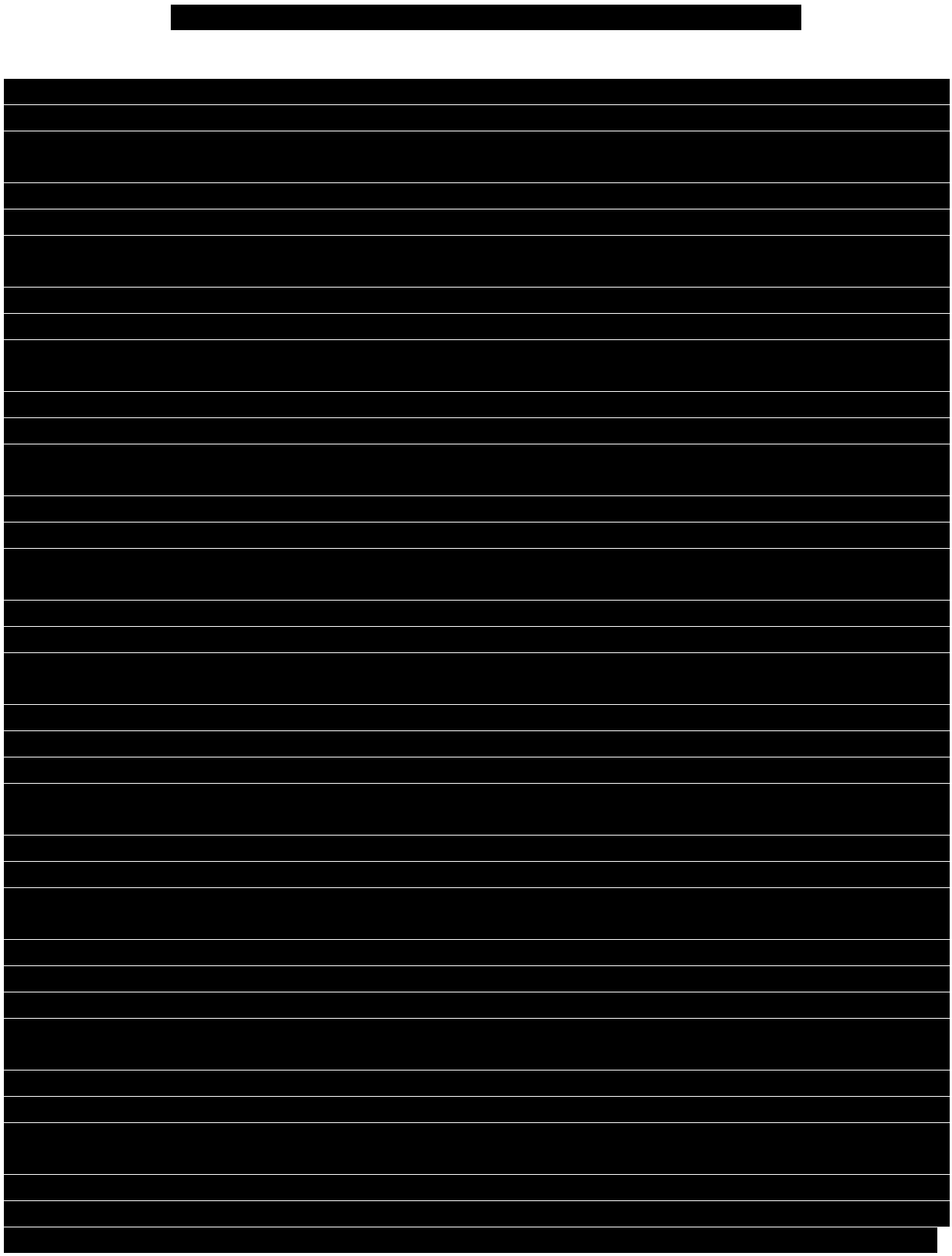

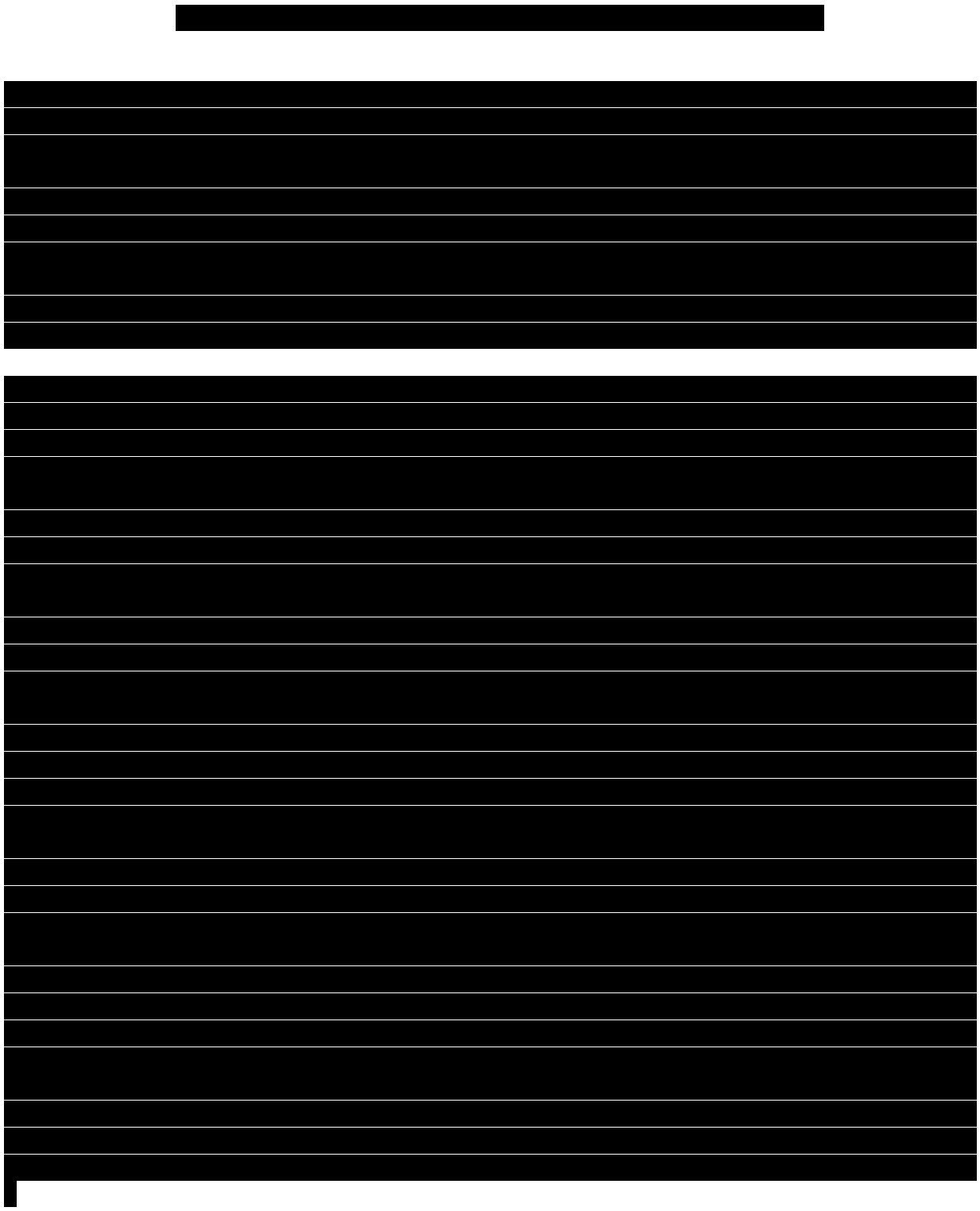

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Based on the above review, the staff has reasonable assurance that the licensee's calculational practices consistently provide a substantial amount of conservatism in the evaluation of credible abnormal conditions. The only exception is for finished fuel assemblies, which are known to be subcritical independent of facility calculations for criticality safety purposes. The exact nature of the conservative assumptions, and the amount of conservatism they provide, varied from process to process. However, the continued use of these technical practices, and the commitment to provide justification (including demonstration of conservatism) in the CSEs, provides confidence that this part of the margin of subcriticality will be maintained over the lifetime of the facility.

Sensitivity Procedure

A fourth consideration proposed by the licensee was the use of its "sensitivity procedure," as described in NCS Manual Chapter NCS-005, Rev. 1, "Use of Sensitivity in NCS Calculations." This procedure is based on a parametric study, which WEC uses to determine the maximum slope in k_{eff} as a function of some controlled parameter. The maximum slope is then used to determine the change in the parameter corresponding to a 0.02 change in k_{eff}. This parameter change is then used to determine the value to which the parameter will be controlled in the operation. The staff evaluated the example provided in NCS-005 and those reviewed calculations which used the sensitivity procedure, and concluded that this procedure did not provide any additional assurance of subcriticality. The reasons for this were that: (1) the procedure is not applied to every calculation that is performed, and (2) when it is applied, it does not always result in an additional margin in the controlled parameters.

5.3.4.2 Technical Practices

The relative effectiveness and reliability of NCS controls are considered during the CSE process. The three means of NCS control in the order of preference are: (1) passive engineered control; (2) active engineered control; and (3) administrative control. The licensee identifies specific control parameters, which define the methods of NCS control as: (1) geometry; (2) volume; (3) mass;(4) moderation; (5) concentration; (6) material composition and process characteristics; (7) enrichment; (8) heterogeneity; (9) neutron absorbers (solid or solution); (10) reflection; and (11) spacing. Each method of NCS control is associated with a means of NCS control. If there is more than one means possible for a given method, the highest order means of NCS control available and feasible is used. For each parameter, the optimum (i.e., most reactive) condition for each parameter is assumed, unless it is demonstrated that less reactive conditions are the worst-case credible conditions, or appropriate controls (IROFS) are established to maintain the parameter within the assumed limits. All assumptions relating to process/equipment/material theory, function, and operation (including credible upset conditions) are justified, documented, and independently reviewed. In addition, the most reactive credible dimensional and material composition tolerances are assumed.

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The licensee applies nuclear safety factors to single isolated units containing fissile material. The safety factors reduce the critical dimension, critical volume, critical mass, and critical concentration to ensure the unit is subcritical. Equipment is designed by physically limiting the dimensions so criticality cannot be achieved under any foreseeable conditions. For material limited by dimension, the dimension will not exceed 90% of the critical dimension for cylinder diameters and 85% of the critical dimension slab thickness. For a unit limited by volumes, the maximum allowed value will not exceed 75% of the critical spherical volume. For accumulations limited by mass, the maximum permissible mass will not exceed 45% of the critical mass if double batching is credible, or 75% of the critical mass, if double batching is not credible.

The staff reviewed the technical practices and find that they are acceptable because the licensee commits to the double contingency principle and defines the acceptability of controlled parameters used to define the criticality safety basis. Additionally, the staff finds that the licensee has addressed the acceptance criteria in NUREG-1520, Section 5.4.3.4.2.

5.3.4.3 Requirements in 10 CFR 70.24

The licensee maintains a CAAS consistent with the requirements of 10 CFR 70.24 and the methodology described in NRC Regulatory Guide 3.71, “Nuclear Criticality Safety Standards for Fuels and Material Facilities,” Revision 1. If the CAAS is out of service, the licensee commits to suspend the movement and processing within one hour of fissile material in the coverage area until the process is brought to a safe shutdown condition. Movement of fissile material necessary to establish or maintain a safe shutdown condition may continue. Movement and processing of fissile material will not resume unless the CAAS is returned to service, or continuously attended portable detection instruments, capable of detection and alarm, are provided to monitor the area normally covered by the installed CAAS. These actions will be directed and enforced by the plant emergency response team. The portable detection and alarm devices shall be of a type that is pre-approved for this use by the NCS function. Once the installed CAAS is returned to service, the monitoring provided by the portable devices may be discontinued. Routine testing, calibration, and/or maintenance of the CAAS for up to four hours is permitted, without suspension of fissile material movement or processing. WEC defines the "within one hour" suspension period as a common interpretation of an immediate action. Exclusion is provided for those systems (such as recirculation of SNM-bearing liquid through activity monitors, or hydrolysis column purge), which require some limited movement of fissile material to establish or ensure a safe shutdown condition.

The staff has reviewed the licensee’s commitment to the CAAS requirements in 10 CFR 70.24 and finds that it is acceptable because the licensee maintains a CAAS that is capable of energizing a clearly audible alarm signal if accidental criticality occurs, and the licensee maintains emergency procedures for each area in which SNM is handled, used, or stored to ensure prompt personnel evacuation upon the sounding of the alarm. Additionally, the staff finds that the licensee has addressed the acceptance criteria in NUREG-1520, Section 5.4.3.4.3.

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5.4 EVALUATION FINDINGS

The staff reviewed the NCS program for WEC and has reasonable assurance that:

(1) The licensee will have in place a staff of managers, supervisors, engineers, process operators, and other support personnel who are qualified to develop, implement, and maintain the NCS program in accordance with the facility organization and administration, and management measures.

(2) The licensee's conduct of operations will be based on NCS methodologies and technical practices, which will ensure that the fissile material will be possessed, stored, and used safely according to the requirements in 10 CFR Part 70.

(3) The licensee will develop, implement, and maintain a criticality accident alarm system in accordance with both the requirements in 10 CFR 70.24 and the facility emergency management program.

(4) The licensee will have in place an NCS program in accordance with the subcriticality of operations and margin of subcriticality for safety requirements in 10 CFR 70.61(d) and baseline design criteria requirements in 10 CFR 70.64(a).

In addition, the staff determined that a small margin in k_{eff} is possible because the licensee made a combination of very conservative assumptions in the abnormal condition models. The overall margin of subcriticality is composed of the margin of 0.02, that is specified in the application, plus the margin provided by these conservative analytical practices.

Based on the supplemental criticality code validation analyses, the restriction of the 0.02 margin of subcriticality to credible abnormal configurations meeting the aforementioned criteria, and the conservative calculational practices employed for credible abnormal configurations, as evidenced in the on-site licensing reviews, the staff concludes that there is reasonable assurance that credible abnormal configurations will be safely subcritical, for calculations generated or revised after license renewal. Commitments to the NCSIP and license condition requiring reporting of instances involving insufficient margin of subcriticality will also provide assurance that existing operations will be demonstrated to have adequate margin on a schedule that is commensurate with risk. The use of a minimum margin of subcriticality of 0.02, combined with the additional margin due to calculational conservatism, is therefore adequate to ensure subcriticality for credible abnormal configurations.

Based on the review, the NRC staff concludes that the WEC NCS program meets the requirements of 10 CFR Part 70 and provides reasonable assurance for the protection of public health and safety, including workers and the environment.

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6.0 CHEMICAL PROCESS SAFETY

The primary purpose of the chemical process safety review is to determine that the licensee has designed a facility that will adequately protect workers, the public, and the environment against chemical hazards of licensed material and hazardous chemicals produced from licensed material. The licensee must also protect against facility conditions or operator actions that can affect the safety of licensed materials and thus present an increased radiological risk.

6.1 REGULATORY REQUIREMENTS

The regulatory basis for this review is found in 10 CFR 70.22 and 70.65. These sections describe the general and additional contents of the application that address chemical process safety. In addition, the chemical process safety review should provide reasonable assurance of compliance with 10 CFR 70.61, 70.62, and 70.64.

6.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria for the NRC's review of chemical process safety are outlined in Section 6.4.3 of NUREG-1520.

6.3 STAFF REVIEW AND ANALYSIS

The NRC's objective is to ensure safe operations involving licensed radioactive material and hazardous chemicals produced from licensed material, as defined in 10 CFR 70.4. The NRC recognizes that hazardous chemicals are also regulated by other Federal and State agencies. At the Federal level, the Occupational Safety and Health Administration (OSHA) has issued 29 CFR 1910.119, "Process Safety Management of Highly Hazardous Chemicals (PSM) Standard," and the Environmental Protection Agency (EPA) has published 40 CFR Part 68, "Risk Management Plan (RMP)."

The NRC staff reviewed the September 29, 2005, License Application for Renewal, as well as its supplements and revision, and the October 15, 2004, ISA Summary, and its supplements.

(a) Chemical Safety Program

10 CFR 70.62(a) requires a licensee to establish a safety program that will adequately protect the worker, public health and safety, and the environment from the chemical hazards of licensed material. WEC's Regulatory component (EH&S) is responsible for the establishment, conduct, and evaluation of licensed activities to assure protection of employees and the public. The

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Regulatory component also evaluates the effectiveness of the chemical safety programs, reviews and approves all procedures, and communicates findings to management for incorporation into facilities, equipment, and procedures. This component conducts and maintains the ISA.

WEC states that the chemical safety program is designed to ensure that all processes and operations comply with applicable federal and state regulations pertaining to chemical safety and that hazards are evaluated and appropriate measures taken. OSHA's PSM standard is the basis for WEC's Chemical Safety Program for all consequence levels (low, intermediate, and high). Employees using hazardous chemicals are specifically trained in procedures for safe handling and disposal.

(b) Chemical Process Safety Information

10 CFR 70.62(b) requires a licensee to maintain process safety information to enable the performance and maintenance of an ISA. Section 4.1.1.5 of the application states that WEC has a methodology for compiling process safety information that will be maintained onsite for use by the team that is performing a system's Process Hazard Analysis (PHA), identifying safety significant controls, performing a safety analysis, and/or quantifying the risk of accident scenarios. Each ISA Summary chapter identifies the key drawings, procedures, and other documents used in the safety analysis.

Section 4.1.3.2 requires that the ISA Summaries be kept current through implementation of the configuration management program. All facility additions or changes require a formal configuration management review. As part of this review, documents, such as drawings and procedures, that need updating, are identified and reviewed prior to approval of the change.

(c) Team Conducting the Hazard Evaluation

10 CFR 70.62(c)(2) requires that an ISA be performed by a team with expertise in engineering and process operations. The ISA is performed by a team consisting of personnel with expertise in the safety disciplines being evaluated. The team members are familiar with the process, engineering, and operations involved. The team is supported by a member knowledgeable in the process hazard analysis technique being used.

(d) Chemical Accident Sequences

10 CFR 70.65 requires a licensee to conduct an ISA to identify facility and external hazards and their potential for initiating accident sequences, their likelihood and consequences, and the IROFS. Section 4 of the application states that WEC has selected the Hazard and Operability method as the primary tool for conducting process hazard analysis on chemical operations. What-if/checklist analysis, Failure Modes and Effects Analysis, Fault tree/Event tree, Layers of Protection Analysis, or other generally recognized PHA methods may also be used, as applicable. When methods other than those identified are used, they will be consistent with NUREG-1513.

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Chemical accident sequences are presented in the ISA Summary, using the accident flow diagram format. Each diagram identifies an initiating event and protective measure failures that collectively represent an accident sequence.

The likelihood of the accident sequences were evaluated in the ISA Summary. WEC provides descriptions of initiating events and their frequency rate indexes. In addition, WEC provides a table describing the failure probabilities and associated indexes for mitigating events, including IROFS.

(e) Chemical Accident Consequences

10 CFR 70.65(b)(7) requires that the proposed quantitative standards used to assess the consequences to an individual, from acute chemical exposure to licensed material or chemicals produced from licensed materials, which are on-site, or expected to be on-site, be described.

In Section 4.1.3.1, WEC commits to assessing the chemical consequences specified in 10 CFR 70.61. In the ISA, the Emergency Response Planning Guidelines (ERPGs) were used to assess the consequences to workers and the public. Exposures to concentrations about the EPRG-2 level corresponds to an intermediate consequence. Exposures at or above the ERPG-3 level correspond to a high consequence event. If either significant changes to the current ERPG values or new ERPG values are established, WEC will update the chemical standards in the annual updates of the ISA.

(f) Chemical Process Safety IROFS

10 CFR 70.61 requires that IROFS be applied to the extent needed to reduce the likelihood of occurrence of each high consequence, credible event, so that the event is highly unlikely or the consequences are less severe. And, that IROFS be applied to the extent needed to reduce the likelihood of occurrence of each intermediate consequence, credible event, so that the event is unlikely or the consequences are less severe.

The ISA Summary chapters describe a number of chemical safety scenarios evaluated by WEC, as well as, corresponding accident sequences. Determination of the consequences was based on the performance requirements of 10 CFR 70.61. Based on the consequence level of the scenario, administrative, active-engineered, or passive-engineered IROFS were identified to mitigate or prevent the accident sequence. Two of the chemical process safety scenarios (a UF_6/HF gas release due to either a cylinder valve failure or to structural failure of a cylinder) were found to have high and intermediate consequences to workers. In each case, IROFS were identified to mitigate or prevent these high or intermediate consequence sequences. The identified IROFS provide protection to prevent a loss of confinement of licensed material during operation of the facility.

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(g) Chemical Process Management Measures

10 CFR 70.62(d) requires that management measures be established to ensure compliance with the performance requirements of 10 CFR 70.61.

Section 3.7 of the application describes the incident investigation program. All reported unusual occurrences are promptly evaluated, corrected, and trended. The application states that WEC has methodologies for determining and categorizing root causes.

Section 7 of the application states that audits are performed on portions of the Chemical Safety Program. WEC performs audits every three years to address the majority of the chemical safety program elements listed in Section 7.1.1.3 of the application.

Corrective actions to address the findings from the audits are tracked through the Corrective Action Process (CAP) in accordance with Section 3.8 of the application.

(h) Coordination of Chemical Process Safety and Emergency Management

For hazardous chemicals, 10 CFR 70.22(i)(3)(xiii) requires that the Emergency Plan certify that the licensee has met its responsibilities under Emergency Planning and Community Right to Know Act of 1986, Title III. WEC's Emergency Plan, Revision 13, states that the facility complies with the EPA Superfund Amendment and Reauthorization Act, Title II regulations, also known as the "Emergency Planning and Community Right to Know Act."

Section 3.7.2.3 of the application describes the types of accidental chemical releases that require notification to regulatory agencies. WEC will notify the NRC of acute chemical exposures to workers or the public to licensed material or hazardous chemicals produced from licensed material. The notification will include the chemical hazards involved, the actual or potential health and safety consequences to workers, the public, and the environment, and the accident sequence leading to the occurrence.

6.4 EVALUATION FINDINGS

Based on the review of the application, the NRC staff concludes that WEC has described and assessed chemical accident consequences and the effects that could result from the handling, storage, or processing of licensed materials. WEC has prepared a hazard analysis that identifies and evaluates those chemical process hazards and potential accidents, and established safety controls providing reasonable assurance of safe facility operation. To ensure that the performance requirements in 10 CFR Part 70 are met, WEC has stated that controls are available and able to perform their safety-related functions when needed.

The staff concludes that WEC's plan for managing chemical process safety meets the requirements of Part 70 and provides reasonable assurance that the public health and safety and environment will be protected.

7.0 FIRE SAFETY

The purpose of this review is to determine, with reasonable assurance, that WEC has (1) designed a facility that provides adequate protection against fires and explosions that could affect the safety of licensed materials and thus present an increased radiological risk; (2) considered the radiological consequences of fires; and (3) instituted suitable safety controls to protect workers, the public, and the environment.

7.1 REGULATORY REQUIREMENTS

The regulatory basis for the fire safety review includes the general and additional contents of the application, as required by 10 CFR 30.33, 10 CFR 40.32, 10 CFR 70.22, and 10 CFR 70.65. In addition, the fire safety must provide reasonable assurance of compliance with 10 CFR 70.61, 70.62, and 70.64.

7.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria that the NRC uses for reviews of fire safety are outlined in Sections 7.4.3.1 through 7.4.3.5 of NUREG-1520 (NRC, 2002).

7.3 STAFF REVIEW AND ANALYSIS

The fire protection review was performed relative to the guidance provided in NUREG-1520. The information to support this review was obtained from the "WEC License SNM-1107 Renewal Application," June 27, 2007, to the NRC; and an onsite review at the WEC CFFF.

7.3.1 Building Construction and Facility Design

The facility and its original fire protection systems were designed and constructed to industrial standards that were in effect at the time of construction. The licensee commits to meeting the prevailing codes whenever facilities are expanded or modified. Facilities are generally noncombustible masonry or metal construction. The facility enables rapid personnel egress in accordance with the guidance provided in NFPA-101, "Life Safety Code." The electrical installation and wiring is in accordance with NFPA 70, National Electric Code."

7.3.2 Process Fire Safety

Hydrogen is used in the licensed process to provide a reducing atmosphere in the sintering furnaces and calciners. Although there is a risk associated with its use, safety systems are designed and installed to effectively prevent an accident scenario. Liquid hydrogen is stored in

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a contractor-maintained tank, remotely located from the production facilities. Excess flow of hydrogen is stopped by automatic shutoff valves. Natural gas flame curtains are installed on the furnaces and calciners to ensure combustion of excess hydrogen that escapes when material is moved in or out of the furnace. Natural gas piping is equipped with automatic shutoff valves, that will activate in the event of an excess flow condition from a system failure. Sintering furnaces comply with NFPA-86C, "Standard for Ovens and Furnaces," that was in effect at the time the furnaces were upgraded. The large volume of air outside the sintering furnace and the capacity of the ventilation system ensure that any credible release of hydrogen will be diluted to well below 25% of the lower explosive limit for hydrogen. Flammable gas detectors are installed where required.

Flammable and combustible liquids are stored as required by NFPA-30, "Flammable and Combustible Liquid Code," and oxygen, acetylene, and propane gases are stored in the manner required by NFPA-55, "Standard for the Storage, Use, and Handling of Compressed Gases." Fire hazards associated with processing uranium oxides and combustible metals have been evaluated and conform to prevention and suppression requirements. The solvent extraction area contains combustible liquids such as tributyl phosphate and kerosene. It is protected by a wet pipe sprinkler system. In addition, the makeup supply of kerosene is separated from the extraction area by a firewall.

Plant boilers are constructed and operated in accordance with industry standards. They are separated from the buildings where the licensed process is located. Stationary combustion engines are appropriately designed, constructed, and operated.

7.3.3 Fire Protection and Emergency Response

The facility maintains a Fire Emergency Response Team, made up of employees trained in fire fighting techniques, first aid procedures, and emergency response. The team is organized, operated, trained, and equipped for incipient fire fighting capability. The team handles minor fires and provides a first-response effort, designed to supplement the local fire department, for a major fire at the plant. The team, working with the emergency response center, coordinates off-site fire department activities to ensure moderator control and criticality safety. A sufficient number of fully qualified Fire Emergency Response Team members are available on each shift. The facility maintains mutual aid agreement with the local fire department, which is located less than 10 minutes (driving time) from the facility. Other mutual aid agreements are in place with the Palmetto Richland Hospital and Richland County Sheriff's Department. Offsite agencies participate in the biennial exercise.

Fire alarm pull stations and audible fire alarms are installed throughout the facility. Automatic fire detectors are installed in areas with high combustible loading and/or infrequent occupancy, unless such areas are protected by automatic fire suppression systems. Portable fire extinguishers are installed throughout the facility in accordance with NFPA 10. Multipurpose fire extinguishers are provided generally for Class A/B/C fires. Specialized extinguishers are located in areas requiring protection from particular hazards, including water-exclusion areas.

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The fire protection system includes two (2) above-ground storage tanks of 200,000 and 250,000 gallon capacity for fire water. Each tank is equipped with a pump rated at 1000 gpm at 100 psig to provide water at the flows required by the suppression systems. Hydrants and hoses around the site are supplied by 6-inch diameter branch lines. The facility is furnished with standpipes and hose connections except in moderator-exclusion zones. Portable extinguishers of the appropriate type and size are installed at proper locations. The suppression equipment was verified to be in satisfactory condition and unimpaired.

The fire pumps, pre-action sprinklers, deluge system, and hydrants, are operationally tested in accordance with testing frequencies specified by NFPA 25, "Inspection, Testing, and Maintenance of Water-based Fire Protection Systems." Hoses are hydrostatically tested and re-racked annually. Automatic sprinkler systems are designed and installed in accordance with industry standards.

7.3.4 Fire Safety Management

The licensee commits to an adequate fire safety program, including satisfactory management measures including but not limited to: (1) a maintenance program to install, test, and maintain IROFS to ensure that they are available and reliable; (2) fire safety awareness training for employees and contractors; (3) an approved hot work permit program and housekeeping practices as an integral part of the Human Performance Program; (4) a Fire Safety Function, reporting to the EH&S (Regulatory) Component of the organization.

The licensee's industrial risk insurance carriers provide expertise and recommendations during their periodic assessments of the fire protection program. The most recent assessment was conducted during August 2005, by American Nuclear Insurers. The periodic risk assessments audit the systems and program to current NFPA standards, and the consultant identifies any deficiencies in the current installation and maintenance that present a danger to safety, providing recommendations for resolving these deficiencies. Annual tests of fire protection systems are carried out by the insurance carrier and /or fire equipment service contractor.

The services performed by American Nuclear Insurers include witnessing the capacity flow tests for the fire pump and plotting a pump discharge curve, witnessing tests of the deluge systems, witnessing sprinkler system drain tests and checking sprinkler control valves. On a monthly basis, surveillances of sectional valves, portable fire extinguishers, and other relatively routine fire protection activities are carried out by the "Safety Operator." In addition, periodic program audits and self-assessments are performed by the licensee.

7.3.5 Fire Hazards Analysis

The site Fire Hazard Analyses were performed for all plant areas and are part of the ISA process. They are maintained current by the Management of Change (Configuration Management) program. It was noted that a fire barrier separates the incinerator from the adjacent solvent extraction area.

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Pre-fire plans have been developed using current information regarding building construction, operations, points of attack, and personnel. The plans discuss available fire protection features and utilities for each process area. Information is available on combustible loadings and fire fighting strategy. Emergency team members are trained in the use of the pre-fire plans, which are available at the emergency team building.

7.4 EVALUATION FINDINGS

The staff concluded that the licensee's capabilities meet the criteria in Chapter 7 of NUREG-1520 (NRC, 2002). The staff determined that the licensee's proposed equipment, facilities, and procedures provide reasonable assurance that adequate fire protection will be provided and maintained for those IROFS to meet the safety performance requirements of 10 CFR Part 70.

7.5 REFERENCES

(NRC, 2002) U.S. Nuclear Regulatory Commission (NRC). NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," 2002.

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8.0 EMERGENCY MANAGEMENT

WEC's Emergency Plan is a living document, updated annually. Safety Condition S-2 gives the date of the current Emergency Plan. The staff finds that this plan is adequate, and that the requirements of 10 CFR 70.23(a)(11) are met. Safety Condition S-2 is carried forward, unchanged, in the renewed license.

9.0 ENVIRONMENTAL PROTECTION

The purpose of the U.S. Nuclear Regulatory Commission's (NRC's) review of WEC's Environmental Protection Program is to determine whether WEC's proposed environmental protection measures are adequate to protect the environment, and the health and safety of the public, as required by 10 CFR Parts 20 and 70.

WEC's environmental report was part of its license renewal request, and was the basis for the EA and FONSI that the NRC staff previously prepared and issued in support of the proposed action.

9.1 REGULATORY REQUIREMENTS

To be considered acceptable, WEC must satisfy the following regulatory requirements regarding environmental protection:

1. Part 20 specifies the effluent control and treatment measures necessary to meet the dose limits and dose constraints for members of the public specified in Subparts B, D, and F; the survey requirements of Subpart F; the waste disposal requirements of Subpart K; the records requirements of Subpart L; and the reporting requirements of Subpart M.

2. 10 CFR 70.22(a)(7) states that the application shall contain a description of the equipment and facilities that will be used by WEC to protect health and minimize danger to life or property (such as handling devices, working areas, shields, measuring and monitoring instruments, devices for the disposal of radioactive effluents and wastes, storage facilities, ...).

3. 10 CFR 70.22(a)(8) states that the application shall contain procedures to protect health and minimize danger to life or property (such as procedures ... for personnel monitoring and waste disposal, ...)

3. 10 CFR 70.23(a) specifies in part that an application for the possession and use of SNM will be granted provided that, among other things, WEC's equipment and facilities are adequate to protect health and minimize danger to life or property, and that WEC's proposed procedures to protect health and minimize danger to life or property are adequate.

4. 10 CFR 70.59 outlines the radiological effluent monitoring reporting requirements for a Part 70 licensee.

9.2 REGULATORY ACCEPTANCE CRITERIA

The acceptance criteria for the NRC's review of WEC's environmental protection program are outlined in Section 9.4.3.2 of NUREG-1520 (NRC, 2002).

9.3 STAFF REVIEW AND ANALYSIS

The NRC staff reviewed Chapter 10.0, "Environmental Protection," of the application. Chapter 10 describes the CFFF Environmental Protection Program that assures that exposure of the public and the environment to hazardous materials, used in facility operations is kept ALARA. The Environmental Protection Program includes effluent air controls, liquid waste treatment, solid waste disposal, environmental monitoring, semi-annual reporting of effluent data, off-site dose control, performance and documentation of analyses, and audits and compliance inspections.

The Environmental Protection Program includes commitments to perform representative stack sampling to determine the adequacy of air effluent controls and demonstrate compliance with applicable regulations. It includes liquid waste treatment facilities to implement ALARA and assure that 10 CFR 20 limits are met prior to discharge to the Congaree River; the effluent is continuously sampled and a composite of this sample is analyzed for gross alpha and beta activity and for isotopic uranium content. Solid waste disposal preparation facilities, with sufficient capacity and capability to enable processing, packaging, and transfer of solid wastes to licensed treatment or disposal to licensed treatment or disposal facilities, are provided and maintained in proper operating condition. No radioactive wastes are disposed of on site. Environmental monitoring of air, surface water, ground water, Congaree River water, sediment, soil, vegetation, and fish is performed in accordance with an established schedule. Environmental protection analysis is included in WEC's ISA process. WEC performs audits and compliance inspections of the Environmental Protection Program.

9.4 EVALUATION FINDINGS

WEC has developed a program to implement adequate environmental protection measures during operation, which include effluent controls to maintain public doses ALARA as part of the radiation protection program and environmental and effluent monitoring. The NRC staff concludes that WEC's program, as described in its application, is adequate to protect the environment and the health and safety of the public, and complies with regulatory requirements, imposed by the Commission, in Parts 20 and 70. The bases for these conclusions are the commitments contained in Chapter 10 of the application and discussed in Section 9.3 above.

The NRC staff consulted with other agencies, including U.S. Fish and Wildlife Service, the South Carolina Department of Health and Environmental Control, the South Carolina Department of Archives and History, and the Catawba Indian Nation prior to issuing an EA, for

this licensing action (dated April 2007). The EA and FONSI were published in the Federal Register (72 FR 28715, May 22, 2007). The NRC staff concluded that the proposed renewal of license SNM-1107, involving the continued operation of the CFFF site will not result in a significant impact to the environment. The NRC staff also concluded that the proposed action will not adversely affect federal- or state-listed threatened or endangered species. The staff also finds no significant impacts to regional historic and cultural resources. The facility already exists, and no substantial changes to the facility or operation are associated with the license renewal. Gaseous emissions and liquid effluents are within regulatory limits for nonradiological and radiological components. Public and occupational radiological dose exposures are below 10 CFR Part 20 regulatory limits.

10.0 DECOMMISSIONING

The purpose of this review of WEC's Decommissioning Funding Plan (DFP) is to determine that funds will be available to decommission the facility safely and in accordance with 10 CFR 70.25.

10.1 REGULATORY REQUIREMENTS

The following NRC regulations require planning, financial assurance, and record-keeping for decommissioning, as well as procedures and activities to minimize waste and contamination:

10 CFR 20.1401-1406	"Radiological Criteria for License Termination" (Subpart E)
10 CFR 70.22(a)(9)	"Decommissioning Funding Plan"
10 CFR 70.25	"Financial Assurance and Recordkeeping for Decommissioning"
10 CFR 70.38	"Expiration and Termination of Licenses and Decommissioning of Sites and Separate Buildings or Outdoor Areas"

10.2 REGULATORY ACCEPTANCE CRITERIA

NUREG-1520 (NRC, 2002); NUREG-1757, "Consolidated NMSS Decommissioning Guidance," (NRC, 2003); and NUREG-1727 "NMSS Decommissioning Standard Review Plan" define relevant regulatory guidance and appropriate acceptance criteria for decommissioning and DFPs contained in applications.

10.3 STAFF REVIEW AND ANALYSIS

WEC updated the cost estimate in March 2006. The NRC reviewed the cost estimate and decommissioning financial assurance instruments and determined that adequate financial resources will be available to decommission the CFFF. 10 CFR 70.25(e) requires licensees to update the cost estimates every three years and to submit the updates for NRC review. WEC has committed to review and update the cost estimate, as needed, on a triennial basis and submit the updated cost estimate to the NRC.

10.4 EVALUATION FINDINGS

The NRC staff evaluated WEC's DFP in accordance with NUREG-1757. On the basis of this evaluation, the NRC staff determined that WEC's financial assurance for decommissioning continues to provide sufficient funding to ensure decommissioning and decontamination of the facility, even if the licensee is unable to meet its financial obligations, and, therefore, provides reasonable assurance of protection for workers, the public, and the environment.

10.5 REFERENCES

(NRC, 2002) U.S. Nuclear Regulatory Commission (NRC). NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," 2002.

(NRC, 2002) U.S. Nuclear Regulatory Commission (NRC). NUREG-1727, "NMSS Decommissioning Standard Review," 2002.

(NRC, 2003) U.S. Nuclear Regulatory Commission (NRC). NUREG-1757, "Consolidated NMSS Decommissioning Guidance," 2003.

11.0 MANAGEMENT MEASURES

Management measures are functions that WEC performs, generally on a continuing basis, which are applied to Safety Significant Controls (SSCs), which include IROFS, to ensure compliance with established performance requirements that the IROFS are available and reliable. Management measures shall be implemented to assure compliance with performance requirements, and the degree to which they will be applied will be a function of the item's importance in terms of meeting performance requirements, as evaluated in the ISA. This chapter addresses each of the management measures included in the 10 CFR Part 70 definition of management measures, including: (1) configuration management (CM); (2) maintenance; (3) training and qualifications; (4) procedures; (5) audits and assessments; (6) incident investigations; (7) records management; and (8) other quality assurance (QA) elements.

The purpose of this review is to verify whether WEC's application for renewal provided conclusive information in Chapter 3 "Conduct of Operations," to ensure that the management measures applied to SSCs and/or IROFS, as documented in the ISA Summary, provide adequate assurance that the IROFS will be available and reliable, and consistent with the performance requirements of 10 CFR 70.61. This review also determines whether the measures are applied to the IROFS in a graded manner commensurate with the IROFS' importance to safety.

11.1 REGULATORY REQUIREMENTS

The requirements for fuel cycle facility management measures are specified in 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material."

1. 10 CFR 70.4 states that management measures include: (1) CM; (2) maintenance; (3) training and qualifications; (4) procedures; (5) audits and assessments; (6) incident investigations; (7) records management; and (8) other QA elements.

2. 10 CFR 70.62(a)(3) states that records must be kept for all IROFS failures; describes required data to be reported; and sets time requirements for updating the records.

3. 10 CFR 70.62(d) requires a licensee to establish management measures, for application to engineered and administrative controls and control systems that are identified as IROFS, pursuant to 10 CFR 70.61(e), to ensure they are available and reliable.

4. 10 CFR 70.72 requires a licensee to establish a CM program to evaluate, implement, and track changes to the facility; structures, systems and components; processes; and activities of personnel.

11.2 REGULATORY ACCEPTANCE CRITERIA

The guidance applicable to the NRC's review of the licensee's management measures program is contained in Chapter 11 of NUREG-1520 (NRC, 2002). This chapter is applicable in its entirety. The acceptance criteria applicable to this review are contained in Section 11.4.3 of NUREG-1520 (NRC, 2002).

11.3 STAFF REVIEW AND ANALYSIS

Chapter 3, "Conduct of Operations," of the WEC application contains licensee commitments concerning management measures that are implemented on a continuing basis to reasonably assure that the CFFF activities for protection of the environment, health and safety of employees, and the neighboring public are conducted to a high standard of quality. These management measures are applied to SSCs to provide reasonable assurance that IROFS are designed, implemented and maintained as necessary, to ensure they are available and reliable to perform their intended functions when needed.

WEC's commitments concerning management measures includes the following elements: (1) CM; (2) maintenance; (3) QA; (4) procedures, training, and qualification; (5) human factors; (6) compliance inspections, program audits, and self-assessments; and (7) incident investigations, corrective action process, and record keeping and reporting.

11.3.1 CONFIGURATION MANAGEMENT PROGRAM

The licensee's CM function is described in Chapter 3.1 of the application.

CM is a formal review process that assures that facility or equipment design changes and/or computer software modifications do not have an adverse impact on environmental protection, health, safety, and/or safeguards at the CFFF. The licensee states that the CM program is implemented through provisions captured in a structured safety analysis of new structures, systems, and components, or modifications to existing structures, systems, and components. Elements of the CM program are controlled by the quality program described in Section 3.3 of the application. The CM program is implemented in accordance with approved procedures for change management, and will be assessed periodically to determine the program's effectiveness. When deficiencies in programmatic processes or procedures are identified, corrective actions will be taken to promptly correct the discrepant condition.

The licensee states that the CM program structure, described in Section 3.1.1, is implemented in accordance with approved procedures for change management. The CM Program procedures will be descriptive and will define the review and approval process used to ensure that new or modified structures, systems and components comply with applicable regulatory requirements. The licensee's CM program structure and implementing procedures are structured and arranged as follows:

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The licensee's Engineering Component procedures will be used to specify the configuration control process used to ensure that all changes are properly identified, reviewed, approved, implemented, tested and documented. Any alterations or additions, temporary or permanent, to the facility's physical configuration, or facility documentation or design requirements, will be controlled. Additionally, the technical basis for modification, including those aspects of the facility design basis relied on for safety will include the rationale of how the new or modified structures, systems, and components are expected to operate during normal conditions and process upset conditions. Other Engineering Component technical basis requirements include the determination of the use and application of codes, standards, and technical specifications. The combination of design requirements and design basis information, associated with the design process, consisting of design inputs, design constraints, design analysis and calculations and design outputs will be appropriately identified. The types of documents and specific documents included in the engineering component include provisions for storing documents, controlling and tracking documents and changes thereto, and retrieving these documents in a timely manner.

Regulatory Component procedures capture and document the regulatory review of configuration change authorizations. These procedures provide the "how-to" and the functional interface between the facility design basis and the integrated processes described in the ISA and other safety analyses, and hazard classification documents. Topical areas for proposed modifications of, or additions to include but are not limited to, existing hazardous material handling or storage systems, hazardous equipment, uranium processing systems and ancillary facilities and operations that are used in conjunction with establishing environmental protection, radiation safety, criticality safety, safeguards, chemical safety, and fire safety of facility operations.

Product Assurance Component procedures and processes provide reasonable assurance that technically appropriate methods and processes are used and documented to ensure computer software output that have the potential to affect safety or safeguards are developed, validated, and managed, in accordance with procedures for computer software quality assurance.

In Section 3.1.2 of the WEC application, the licensee describes the process used for configuration management program implementation, by stating that the CM program is designed and implemented as an ancillary management measure in support of the facility's ISA. Since configuration management is an integrated management program that establishes consistency among design requirements, physical configuration, and facility documentation, staff reviewed a sequence of activities and functions described by the licensee that were documented through the configuration change control process. Program elements reviewed by staff to determine the consistency of the program requirements include: (1) program management, (2) design requirements (3) document control, (3) change control, (4) regulatory reviews and approvals, and (5) assessments. The licensee states that the configuration change control process and supporting documentation are linked to the applicable facility baseline ISA. The facility baseline ISA will be used to provide a framework for the facility technical baseline, which will be used to

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accurately control and reflect details of change, including required approvals. Technical adequacy of changes to engineering documents will be controlled in accordance with the requirements described in Section 3.1 of the application.

11.3.2 MAINTENANCE

In Chapter 3, Section 3.2, “Maintenance,” of the application, the licensee states that the maintenance program is implemented in accordance with approved procedures to keep safety-related systems and components in a condition of readiness such that they are likely to perform their desired functions when called upon to do so. The maintenance program is controlled by the quality program described in Section 3.3 of the application and its purpose is to ensure that SSCs or IROFS, determined by the ISA, are installed, tested, and maintained in accordance with approved procedures.

Periodic equipment performance and expectations regarding the conduct of maintenance activities on various equipment are defined and identified by the operations functions. Operator Maintenance (OM) procedures and Preventive Maintenance (PM) procedures provide assurance that the need for preventive and predictive maintenance activities such as tests, inspections and diagnostics will be performed by the maintenance function when required. A typical ISA Safety Significant Control Table is described in Table 3.1 of the application. The elements and functions described in Table 3.1, combined with the associated maintenance procedures, will be used to establish scheduled periodic maintenance, determine the level of inspection required, assess and determine calibration, repair, and replacement requirements, determine when post- repair/replacement testing is required, and when periodic functional testing/periodic in-service testing or monitoring of IROFS and SSCs are required to ensure safe reliable operation of the facility. A computerized maintenance planning and control system will be used to implement the CFFF maintenance program. Computerized modules execute planning and control of all maintenance actions. The electronic maintenance system include the following modules: (1) equipment module; (2) maintenance module; (3) inventory module; (4) purchasing module; and (5) calibration module.

11.3.3 QUALITY ASSURANCE

The licensee states that quality assurance will be implemented through the Regulatory Component Quality Assurance Program. In Section 3.3 of the application, the licensee states, that some level of QA will be applied commensurate, with the type and magnitude of specific operations conducted at the facility. A graded process by which the level of analysis, documentation, and actions necessary to comply with a requirement will be considered. Graded considerations will include the items relative importance to safety, safeguards, security and the degree of risk posed by the operations through application of the graded approach.

Implementation of the Regulatory Component QA program will be described in the WEC CFFF Regulatory Component Quality Program/Policy Manual. The licensee has committed to the application of the 18 basic elements and QA principles described in the American Society of

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Mechanical Engineers (ASME) Quality Assurance Requirements for Nuclear Facilities (ASME NQA-1). Additional QA management commitments are further described in the WEC Quality Program/Policy Manual, which will be used in the mandatory application of company policies, imposed through the WEC Quality Management System, 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants" and 10 CFR Part 71, "Packaging and Transportation of Radioactive Material".

The WEC quality program manual will be applied to all activities affecting quality. The WEC QA Program will be used to verify the quality of items and services supplied to the Regulatory Component Quality Assurance Program. The licensee states that the graded approach to quality assurance is an integral part of systematic integrated safety analysis of facility hazards. Therefore, a measure of importance will include the identification of SSCs or items designated as IROFS, within the facility, that are intended to prevent and/or mitigate hazard consequences. Safety system grading will be as follows:

Quality Level A safety systems are high consequence systems that are designated as "crucial" to safety and will receive the full application of QA program requirements. The full application of QA program requirements will be imposed to determine priorities, provide the proper level of analysis, and to appropriate the proper resource allocation. QA grading determinations will emphasize safety of the item or service and determine the adequacy of the item prior to placement into service. Risks associated with the items end use will also be considered to fully ensure that failure of an SSC or designated IROFS availability and/or reliability is highly unlikely. The application of the applicable 18 elements of the Regulatory Component quality program will be applied.

Quality Level B and Safety Significant C are intermediate consequence systems that are designated as "important" to safety and receive the appropriate attention regarding installation, operation, care and maintenance. These grading designations will receive selective application of QA program requirements. QA grading will be applied, commensurate with the items safety significance, to ensure failure of an SSC or designated IROFS availability and/or reliability is highly unlikely.

Quality Level C are defense in depth systems that have safety implications, however, these systems are neither crucial nor important to safety (in the context of radiological exposure to the worker, the offsite public and the environment). Therefore, selective application of QA program elements and safety precautions is not required. Defense in depth systems will be installed, tested, operated, and maintained in accordance with prudent industry practice.

The licensee states that QA programmatic implementation of QA requirements are an integral part of routine operations and QA decisions will be based on safety system performance histories. The QA program's Regulatory Component Quality Program/Policy Manual functionally describes the QA organization, which also specifies QA authority and line management responsibility for all program elements within the facility. Programmatic elements will be carried out in a comprehensive and the balanced manner. The program will provide for

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planning and accomplishment of activities under suitably controlled conditions. Monitoring of activities include the appropriate functional separations, program checks and assessments, operational readiness review, procedure control, issue identification, incident investigation and corrective action.

11.3.4 PROCEDURES, TRAINING, AND QUALIFICATION

Facility procedures, training, and qualification will be integrated into a combined process to ensure that safety and safeguards activities are conducted by trained and qualified individuals. Functional elements of the integrated process will be developed by subject matter experts, and will be reviewed and approved by cognizant individuals. Procedures, training and qualification records of personnel will be subject to review and approval. The licensee states that only approved procedures, that have been authorized by Component Management, at a level that is responsible and accountable for the operations covered, will be used. Procedures, training, and qualification are management measures controlled by the quality program described in Section 3.3 of the application.

11.3.5 HUMAN FACTORS

Human factors concepts will be employed at the CFFF, in recognition of how the total job environment shapes the overall expectations, thoughts, and decisions made by employees. The basis of the human factors model used at the CFFF was derived from the Integrated Behavioral Safety and Human Performance Program. Human factors is a management measure controlled by the quality program described in Section 3.3 of the application.

The Behavioral Safety and Human Performance Program is designed to influence the overall behavior of employees before accidents or incidents have an opportunity to occur. The Institute of Nuclear Power was used as the process model for developing human factors and behavior analysis. The facility embarked upon a task to benchmark human performance behavior. Human performance factors of operation and process oriented task and procedure evolutions were analyzed throughout the organization to promote and support safe and reliable operations.

The standards and principles used by management include the following: (1) humans are fallible; (2) error is predictable; (3) organizations influence behavior; (4) behaviors are reinforced; and (5) events are avoidable. Management error reduction methodologies include the following: (1) questioning attitude; (2) self checking; (3) peer reviews; (4) pre-job briefing; (5) time out; (6) procedure use and adherence; and (7) personnel safety assessments. The licensee states that the Behavioral Safety and Human Performance Program will be implemented through practice, reinforcement, and training in error reduction techniques. Trained observers will be used to document and conduct systematic observations, focusing on high-risk or error-likely processes.

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11.3.6 COMPLIANCE INSPECTIONS, PROGRAM AUDITS, AND SELF-ASSESSMENTS

Compliance inspections, program audits, and self-assessments will be conducted to ensure that CFFF operations categorized as being important to radiation safety, environmental protection, health, safety, and safeguards are properly documented. Assessments, inspections, and program audits will be effective and will be conducted in accordance with specified requirements. Performance standards will be consistent with management expectations. Compliance inspections, audits, and self-assessments will be periodically performed for the programs described within Chapter 3.0 of the application. Topical areas of assessment will include topics such as Nuclear Criticality Safety, Radiation Safety, Chemical Safety, Fire Safety, Emergency Management, and Environmental Protection. Compliance inspections, program audits, and self-assessments will be classified as integrated activities . The overall results obtained from these integrated activities is to obtain information regarding the overall program, which will be used to self-identify, self report, and self-correct deficient or discrepant issues such as process upsets and procedures that are less than adequate. Compliance inspections, program audits, and self-assessments are management measures controlled by the quality program described in Section 3.3 of the application.

11.3.7 INCIDENT INVESTIGATIONS

The Incident investigation process will be used to identify, report, and investigate abnormal events. The process incorporates the reporting requirements of 10 CFR 70.50 and 70.74 at the CFFF and include the following: (1) a formal system for systematic reporting and investigation of abnormal occurrences (i.e., process upsets and less than adequate procedures); (2) corrective actions and actions to prevent recurrence of similar occurrences; and (3) follow-up actions to ensure effectiveness of corrective and preventive actions. CFFF has established structured methods that will be used to determine and categorize apparent root cause(s) of failure(s). Incident investigation is a management measure controlled by the quality program described in Section 3.3 of the application.

Corrective actions to abnormal events, failures, malfunctions, deficiencies, defective items, out-of-control processes, and nonconformance's will be identified and documented. When conditions that are adverse to safety are identified, the extent of the impact to other processes, items, or activities will be evaluated so that the appropriate action is taken. A structured, disciplined approach will be used to detect, correct, and prevent a recurrence of conditions adverse to safety. The licensee's CAP will be used to determine the existence of trends. This computerized system will track commitments, issue resolution, and trace corrections through completion. Appropriate levels of management will be involved in the corrective action process. Responsibilities are specified in corrective action procedures. The corrective action process is a management measure controlled by the quality program described in Section 3.3 of the application.

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11.3.8 RECORDS MANAGEMENT

The CFFF records management system generates records that are applicable to design, procurement, pre-operational testing and inspection, maintenance, operation, manufacturing, receiving and storage, IROFS and/or SSC failures. The licensee, has in place, provisions to receive, preserve, control, and store records in accordance with the guidelines, procedures, policies, and practices set forth. Records specifically required by applicable regulations will be maintained in accordance with mandated requirements. Preservation and safekeeping of records are management measures and records, controlled to ensure that records are managed and are retrievable through their life cycle as prescribed by the quality program described in Section 3.3 of the application.

11.4 EVALUATION FINDINGS

The staff's evaluation has verified that the application provides sufficient information to satisfy the regulatory requirements of 10 CFR Part 70, and, on the basis of this information, the staff concludes that the evaluation is complete and acceptable.

11.4.1 CONFIGURATION MANAGEMENT

The staff has reviewed the CM function for the CFFF. WEC has suitably and acceptably described its integrated configuration management program, including the methods used to establish consistency among design requirements, physical configuration, and facility documentation. The CM program consists of CM functions associated with the following program elements: (1) program management; (2) design requirements; (3) document control; change control; (4) maintenance; (6) training; and (7) assessments of procedures, processes, facilities, activities, and equipment for SSCs or designated IROFS. Management-level policies and procedures, including an analysis and independent safety review of any proposed activity involving IROFS, has been adequately described. Programmatic and technical procedures identify and include evaluations, probabilistic risk assessment, grading determination, human factors engineering, operating and emergency procedures and planning. When credit for these capabilities are considered, they provide reasonable assurance that consistency among design requirements, physical configuration, and facility documentation is maintained as part of a new activity or change in an existing activity involving licensed material. The management measures include the following elements of CM:

1. CM Management: The organizational structure, procedures, and responsibilities necessary to implement CM are in place.

2. Design Requirements: The design requirements and design bases are documented and supported by analyses, and the documentation is maintained current.

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3. Document Control: Documents, including drawings, are appropriately stored and accessible. Drawings and related documents captured by the system are those necessary and sufficient to adequately describe IROFS.

4. Change Control: Responsibilities and procedures adequately describe how WEC will achieve and maintain strict consistency among the design requirements, the physical configuration, and the facility documentation. Methods are in place for suitable analysis, review, approval, and implementation of identified changes to IROFS. This includes appropriate CM controls to ensure configuration verification, functional tests, and accurate documentation for equipment or procedures that have been modified.

5. Assessments: WEC has committed to performing assessments that include both initial and periodic assessments to verify and ensure the adequacy of the CM function.

6. Design Reconstitution: WEC has adequately described, in the ISA Summaries, that complete, accurate, and retrievable design information, needed to support facility design changes and their evaluation to enhance existing design control and configuration management practices during design reconstitution is complete. Current design bases will be readily available and verified for all IROFS, such that the configuration will be consistent with the as-built facility documentation.

11.4.2 MAINTENANCE

WEC has committed to establishing performance expectations by maintaining the reliability and availability of IROFS through maintenance management of the IROFS. The maintenance function is supported by engineering design envelopes, which provide the pre-approved set of limits or constraints in which maintenance activities may be performed. To ensure consistency, acceptable maintenance activities will be: (1) based on approved procedures; (2) employ work control methods that properly consider personnel safety, environmental safety, awareness of facility operating groups, operational safety, QA, and the rules applied to CM; (3) utilize of the ISA Summary to identify IROFS that require maintenance and the proper use of the deterministic approach to determine when, and at what level maintenance is required; (4) justify the PM intervals and equipment reliability goals; (5) provide training that emphasizes the importance of identified IROFS, regulatory authority, codes, standards, and personal safety; and (6) generate documentation and supporting records attesting to surveillance, tests, inspections, equipment failures, repairs, and replacements of IROFS.

For the reasons discussed above and in Section 11.3.2, the staff concludes that the licensee's maintenance functions meet the requirements of 10 CFR Part 70 and provide reasonable assurance that the health and safety of the workers and public will be assured.

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11.4.3 PROCEDURES, TRAINING AND QUALIFICATION

Procedures, training, and qualifications are integrated into a combined process to assure that safety and safeguards activities will be conducted by trained and qualified individuals. The application has described a suitably detailed process for the development, approval, and implementation of procedures, training and qualification. IROFS have been addressed, as well as items important to the health of facility workers and the public, and protection of the environment. The staff concludes that the process used for the development, approval, and implementation of procedures, training and qualification meet the requirements of 10 CFR Part 70.

11.4.4 AUDITS AND ASSESSMENTS

Based on its review of the application, the NRC staff has concluded that WEC has adequately described its audit and assessment process. The staff has reviewed WEC's plan for conducting audits and assessments and finds the process acceptable. The staff concludes that WEC's plan for implementation audits and assessments meets the requirements of 10 CFR Part 70 and provides reasonable assurance of protection of the health and safety of the public and workers, and the environment.

11.4.5 INCIDENT INVESTIGATIONS

WEC has established an organization responsible for: (1) performing incident investigations of abnormal events that may occur during operation of the facility; (2) determining the root cause(s) and generic implications of the event; (3) recommending corrective actions for ensuring a safe facility and safe and reliable facility operations; and (4) reporting of incident investigations when required by regulations. WEC has committed to monitoring and documenting corrective actions from initiation through closure. WEC has committed to the maintenance of documentation so that "lessons learned," that may be applied to future operations of the facility, are captured. Accordingly, the staff concludes that WEC's description of the incident investigation process is acceptable and complies with applicable NRC regulations.

11.4.6 RECORDS MANAGEMENT

The staff has reviewed the WEC application records management system and concluded that the system: (1) will be effective in the collection, verification, protection, and storage of information applicable to the facility and its design, operations, maintenance, and testing; (2) the records management system will have the capacity to retrieve information in readable form for the designated lifetime of the records; (3) will provide records storage areas with the capability to protect and preserve health and safety records that are stored there during the mandated periods, including protection of the stored records against loss, theft, tampering, damage or

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deterioration during and after emergencies; and (4) will provide reasonable assurance that any deficiencies in the records management system or its implementation will be detected and corrected in a timely manner.

11.4.7 OTHER QA ELEMENTS

The licensee has addressed other QA elements that will be applied to SSCs or items designated as IROFS, and other management measures in Chapter 3.0 of the application. Based on the review of the application, the NRC staff has concluded that the licensee has adequately described the application of other QA elements and their relationship to IROFS, management measures, and other safety-related items. The staff also concluded that the licensee's approach in this area adequately addresses the implementation of the QA program and the conduct of operations at the facility. The staff has also determined that the licensee provides reasonable assurance that personnel performing quality-related activities will perform work in accordance with approved procedures and will demonstrate suitable proficiency in their assigned tasks. Additionally, the staff concluded, through its evaluation of the licensee's QA process, procedures, and methods that:

1. The licensee has established, documented, and developed an organizational structure responsible for developing, implementing, and assessing the management measures for providing assurance of safe facility operations, in accordance with the acceptance criteria in Section 11.4 of NUREG-1520 (NRC, 2002).

2. The licensee has established and documented a program to develop and implement QA elements and administrative measures for staffing, performance, assessment findings, and implementing corrective actions.

3. The licensee has developed a process for preparation and control of written plant procedures, including a process for evaluating changes to procedures, SSCs or designated IROFS, and functional tests. The process for review, approval, and documentation of procedures has been established and will be implemented and maintained.

4. The licensee will develop and implement a program of surveillance, tests, and inspections that will provide reasonable assurance of satisfactory in-service performance of SSCs or designated IROFS. Specified standards, acceptance criteria, and testing steps have been provided and described.

5. Periodic independent audits and assessments will be conducted to determine the effectiveness of the management measures. Management measures will provide for documentation of audit findings, incident investigation, and implementation of corrective actions.

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6. Training requirements have been established and documented for assuring that employees are provided with the necessary skills and skill sets to perform their jobs safely. Management measures have been provided for evaluation of the effectiveness of training against predetermined objectives and criteria.

7. The organizations and personnel responsible for performing QA functions will have the required independence and authority to effectively carry out their QA element functions without undue influence from those directly responsible for process operations.

8. QA elements adequately cover the IROFS, as identified in the application and management measures are established to prevent hazards from escalating into higher-risk events or catastrophic accidents.

Accordingly, the staff concludes that the licensee's application of other QA elements meets the requirements of 10 CFR Part 70.62(d), and other applicable regulations, and provides reasonable assurance of protection of worker and public health and safety and protection of the environment.

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12.0 MATERIAL CONTROL AND ACCOUNTING

The NRC staff's review of, and findings regarding, WEC's material control and accountability (MC&A) program, is based in part on information that has been withheld from public disclosure under 10 CFR 2.390(d).

The staff concluded that WEC provided an acceptable Fundamental Nuclear Materials Control Plan (FNMCP) for the CFFF that will meet the applicable Part 74 requirements. The FNMCP describes acceptable methods for achieving the performance objectives in 10 CFR 74.31(a) and the system capabilities of 10 CFR 74.31(c). As a result, the staff concluded that WEC meets the requirements in the area of MC&A to operate the CFFF, under Part 74.

WEC requested that existing License Condition S-9 be deleted and that License Condition SG-1.9 of the existing license be revised and renumbered to the following:

SG-1.4 **Notwithstanding the requirement of Section 2.1.1, Block 6.b, of NUREG/BR-0006, which is incorporated via 10 CFR 74.15, to complete receiver's measurements of scrap receipts (following recovery processing) within 60 days of receipt, in cases in which the 60-day limit for confirmatory measurements cannot be met for UF_6 heels when the Block 6.b action code N (of DOE/NRC Form 741) is used to book such receipts, the licensee shall complete receiver's measurements relative to recovering and measuring UF_6 heels no later than the next physical inventory.**

The staff agrees that this commitment is adequate to meet the requirements of 10 CFR 74.15 and is acceptable.

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13.0 PHYSICAL PROTECTION AND PHYSICAL SECURITY

13.1 REGULATORY REQUIREMENTS

Each licensee who possesses or uses 10 kg or more of SNM of low strategic significance must submit a physical security plan describing how the licensee will comply with all the requirements of 10 CFR 73.67(c) - (g).

13.2 REGULATORY ACCEPTANCE CRITERIA

The licensee used Regulatory Guide 5.59 as guidance to write the physical security plan (PSP). The NRC reviewers used 10 CFR 73.67(f) " Fixed site requirements for SNM of low strategic significance" and NUREG-1615 "Physical Protection Requirements for Categories I, II and III Material at Fuel Cycle Facilities" to review the PSP. NUREG-1615 describes the requirements in 10 CFR 73.67.

13.3 STAFF REVIEW AND ANALYSIS

The NRC staff reviewed the WEC PSP, dated January 7, 2005, which is marked as sensitive information to be withheld under 10 CFR 2.390(d). Thus, the findings below are based in part on non-public information. As part of the review, the NRC also conducted a site visit. WEC addressed the NRC staff's requests for additional information related to the PSP and submitted an updated PSP, dated March 28, 2007.

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13.4 EVALUATION FINDINGS

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Based on the review of the PSP and its implementation, the NRC staff concluded that the WEC PSP and security measures meet the applicable Part 73 requirements.

14.0 EXEMPTIONS AND SPECIAL AUTHORIZATIONS

14.1 AUTHORIZATIONS

In the application, WEC requested a number of special authorizations and exemptions.

14.1.1 AUTHORIZATION TO MAKE CHANGES TO LICENSE COMMITMENTS

(a) Changes Requiring Prior Approval

WEC shall not make changes to the license application that decrease the effectiveness of commitments, without prior NRC approval. For these changes, WEC will submit to the NRC, for review and approval, an application to amend the license. Such changes will not be implemented until approval is granted.

(b) Changes Not Requiring Prior Approval

Upon documented completion of an ISA for a facility or process, as described in Chapter 4.0 of this license application, WEC may make changes in the facility or process as presented in the application, or conduct tests or activities not presented in the application, without prior NRC approval, subject to the following conditions:

1. There is no degradation in the safety commitments in the application.
2. The change, test, or activity does not impair WEC's ability to meet all applicable Federal regulations.
3. The change, test, or activity does not conflict with any condition specifically stated in the license.

Records of such changes shall be maintained, including technical justification and management approval, in dedicated datapacks, to enable NRC inspection upon request at the facility. A report containing a description of each such change, and appropriate revised pages to the application, shall be submitted to the NRC within three months of implementing the change.

The NRC staff determined that this authorization is in accordance with 10 CFR 70.72 and is acceptable.

14.1.2 AUTHORIZATION FOR LEAK-TESTING SEALED PLUTONIUM SOURCES

WEC requested authorization to perform leak-testing of sealed plutonium sources in accordance with a procedure specified in the application. The NRC staff determined that this authorization is in accordance with NRC regulations, including 10 CFR 20.1501 and 10 CFR 70.56, and good industry practice, and is acceptable.

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14.1.3 AUTHORIZATION FOR POSSESSION AT REACTOR SITES

WEC requested authorization to possess unirradiated fuel assemblies, at nuclear reactor facilities anywhere within the United States, for the purpose of loading them into shipping packages, and delivery to an authorized carrier for transport in accordance with the regulations. Operations incident to such loading shall be subject to the control of a licensed activity representative, approved by the Manager of the Regulatory Component, who shall ensure that the completed transport package complies with all the requirements of the regulations. For such operations, the licensed activity shall be exempted from the conditions of 10 CFR 70.24, "Criticality Accident Alarm Requirements," provided that five (5) conditions specified in the application are satisfied. These conditions are:

(1) As finished fuel assemblies are removed from their approval storage facilities, they shall be constrained in an arrangement that is no more reactive than that which they will assume in the shipping package.
(2) The total number of fuel assemblies in process at any one time shall not exceed the maximum authorized contents of the packaging being loaded.
(3) If two fuel assemblies are in movement at the same time, a 12-inch minimum edge-to-edge separation shall be maintained between them; and, only one fuel assembly at a time shall be loaded into the shipping package.
(4) Loaded packages shall be stored in the approved shipping array, pending delivery to a carrier.
(5) No more than the maximum number of packages authorized for a single shipment shall be loaded and possessed, in conduct of such operations by the licensed activity, at any one location.

The NRC staff reviewed this request and the specified conditions, and determined that authorization for this activity is acceptable and that the requested exemption can be granted.

14.1.4 AUTHORIZATION FOR USE AT OFF-SITE LOCATIONS (WITHDRAWN)

This special authorization was for use of up to 15 grams of U-235 for demonstration or testing purposes at off-site locations in the United States. WEC has withdrawn this authorization request.

[redacted]

[redacted]

14.1.5 AUTHORIZATION FOR TRANSFER OF HYDROFLUORIC ACID

Pursuant to 10 CFR 20.2002, "Method for Obtaining Approval of Proposed Disposal Procedures," aqueous hydrofluoric acid, containing trace quantities of uranium, may be transferred to non-licensed receivers, provided that the three (3) conditions specified in the application are met. These conditions are:

(1) Prior to first unrestricted sale or other transfer of the subject material to each receiver, a detailed plan for such sale or transfer shall be submitted to the NRC staff for review and approval.
(2) Prior to the transfer of the hydrofluoric acid from WEC, each shipment must be representatively sampled and analyzed; and the following maximum permissible concentrations shall not be exceeded: A uranium enrichment of 5 w/o U-235; A uranium concentration of 3 part per million by weight; and, an HF concentration, in the acid solution, of 55 percent by weight.
(3) Particular attention shall be paid to each sale or transfer to assure that the hydrofluoric acid is not to be used for any purpose resulting in human consumption.

The NRC authorized this activity in the November 3, 1995 License Renewal and determined that the activity continues to be in accordance with 10 CFR 20.2002, and is acceptable.

14.1.6 AUTHORIZATION FOR TRANSFERS AS NON-REGULATED MATERIAL

Pursuant to 10 CFR 20.2002, "Method for Obtaining Approval of Proposed Disposal Procedures," industrial waste treatment products from the licensed activity, such as calcium fluoride and other homogenous mixtures, in which the mean concentration of uranium constituents does not exceed 30-picocuries per gram, may be released without continuing NRC licensing controls, to receivers for off-site calcium fluoride drying and briquette manufacturing, or for cement or brick manufacturing, or to disposition at a chemical disposal site or industrial landfill. Calcium fluoride released to off-site manufacturers shall contain a minimum of 60-percent solids. Prudent efforts shall be made to reduce the radioactive contents of all such transferred materials to a level ALARA. A sampling plan shall be implemented to characterize the industrial products in accordance with NUREG/CR-2082, "Monitoring For Compliance With Decommissioning Termination Survey Criteria," as follows:

- The estimation of the population mean for uranium concentration shall be representative of the industrial products being transferred;

[redacted]

- The sample size used to calculate the mean uranium concentration value shall be determined such that the 95 percent confidence limit for the value is less than 25 percent of the value;

- The sampling plan is to provide a minimum confidence level of 95 percent that the true mean uranium concentration value, determined for the industrial to be transferred, is less than the maximum permissible limit of 30 picocuries per gram of dry material.

- Records pertaining to the release of such materials, including identities of receivers, shall be maintained for review by the NRC staff.

The NRC staff authorized this activity in the November 3, 1995 license renewal and has determined that the activity continues to be in accordance with 10 CFR 20.2002 and is acceptable.

14.1.7 AUTHORIZATION TO RELEASE CONTAMINATED RECORDS

The licensed activity may abandon or dispose of small quantities of radioactive materials that are present as minor contamination on certain papers, notebooks, computer print-outs, films, and/or similar items retained for record purposes. No licensed controls shall be required for final disposition of such records, and they may randomly be mingled with, and/or disposed of as other records, provided:

- Prior to transfer from contamination control areas at the licensed facility, a documented survey instrument measurement shall conclude that the following limits are not exceeded: Average uranium-alpha contamination of 220 disintegrations per minute per 100 square centimeters; Maximum uranium-alpha contamination of 2200-disintegrations per minute per 100 square centimeters. Average beta-gamma emitter contamination of 660 disintegrations-per-minute per 100-per-square-centimeters; Maximum beta-gamma emitter contamination of 6600-disintegrations-per-minute per 100-square-centimeters.

- Such records shall be kept in locations that are used primarily for record storage and/or disposal.

The NRC staff authorized this activity in the November 3, 1995, license renewal and has determined that the activity continues to be in accordance with 10 CFR 20.2002 and is acceptable.

[redacted]

14.1.8 AUTHORIZATION TO RELEASE FOR UNRESTRICTED USE

Licensed activity material and equipment may be released from contamination areas on-site to clean areas on-site, or from on-site possession or use to unrestricted possession or use off-site, provided such releases are subject to all applicable conditions of the NRC staff's April 1993 document entitled, “Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material.”

The NRC staff authorized this activity in the November 3, 1995 license renewal and has determined that the activity continues to be in accordance with 10 CFR 70.3 and is acceptable.

14.1.9 AUTHORIZATION TO USE ICRP 68

DAC and ALI values, based on the dose coefficients published in ICRP Publication No. 68, may be used in lieu of the DAC and ALI values in Appendix B of 10 CFR Part 20, in accordance with internal procedures.

The NRC staff authorized this activity in License Amendment 30 to the previous license, dated April 26, 2002 (ML021270336), and has determined that the activity continues to be in accordance with 10 CFR 20.2301 and is acceptable.

14.2 EXEMPTIONS

14.2.1 EXEMPTION FROM PRIOR COMMITMENTS

All commitments made to the NRC staff prior to the approval date of this application, shall no longer be binding on WEC, following approval of this application, unless re-imposed as License Conditions.

14.2.2 EXEMPTION FROM INDIVIDUAL CONTAINER POSTING

Notwithstanding the requirement of paragraph (a) of 10 CFR 20.1904, “Labeling Containers,” the licensed activity shall be exempted from the requirement that "...each container of licensed material bears a durable clearly visible label," provided, in lieu thereof, a sign bearing the legend, "EVERY CONTAINER OR VESSEL IN THIS AREA MAY CONTAIN RADIOACTIVE MATERIAL," is posted at each entrance to areas of buildings in which radioactive materials are used or stored, to areas in which such materials are not used or stored. Regarding storage of radioactive material outside the Fuel Manufacturing Building, the number of posted buildings and size of posted areas shall be minimized to the extent practicable, consistent with manufacturing and storage requirements.

[redacted]

[redacted]

The NRC staff authorized this activity in the November 3,1995, license renewal and has determined that the activity continues to be in accordance with 10 CFR 20.2301 and is acceptable.

14.2.3 EXEMPTION FROM RESPIRATOR USE REPORTING

Notwithstanding the requirement of paragraph (d) of 10 CFR 20.1703, “Use of Individual Respiratory Protection Equipment,” since the use of respiratory protection has been ongoing at the CFFF, continued use shall be exempted from the requirement to "notify, in writing, the Regional Administrator of the appropriate Nuclear Regulatory Commission Regional Office listed in Appendix D at least 30-days before the date that respiratory protective equipment is first used."

The NRC staff authorized this activity in the November 3,1995, License Renewal and has determined that the activity continues to be in accordance with 10 CFR 20.2301 and is acceptable.

14.2.4 EXEMPTION FROM SHALLOW-DOSE EQUIVALENT TISSUE DEPTH

Notwithstanding the requirement of 10 CFR 20.1003, “Definitions: Shallow-Dose Equivalent," the licensed activity shall be exempted from the requirement that the Shallow-Dose Equivalent is taken as the dose equivalent at a tissue depth of 0.007-centimeter (7 mg/cm), when this dose equivalent is measured for the finger. In lieu thereof, for finger doses, the Shallow-Dose Equivalent shall be taken as the dose equivalent at a tissue depth of 0.038-centimeter (38 mg/cm^2). This applies to both the assessment of finger doses and for determining compliance with the finger dose limit.

The NRC staff authorized this activity in November 3, 1995 License Renewal and has determined that the activity continues to be in accordance with 10 CFR 20.2301 and is acceptable.

14.2.5 EXEMPTION FROM CRITICALITY MONITORING SYSTEM REQUIREMENTS

Notwithstanding the requirement of 10 CFR 70.24, the licensed activity shall be exempted from the "monitoring system" requirements in the areas, and under the conditions specified below:

Office and conference room areas, chemistry laboratories, metallurgical laboratories, development laboratories, health physics counting rooms, and machine shop -- provided that:

- Each such area shall be remote from other operations with SNM.
- Each such area shall be administratively limited to 1000 grams of U-235, and; for chemistry laboratories, an additional 5 grams of U-233.

[redacted]

[redacted]

Low concentration storage areas in which containers have uranium in quantities representing no more than 350-grams of U-235 per package and no more than 5 grams of U-235 in any 10 liters of package, or, no more than 50-grams of U-235 per container and no more than an average of 5 grams of U-235 per 10 liters of package, provided that:

> Each such area qualifies for appropriate nuclear isolation with respect to other areas where SNM is more concentrated.

The limits established above represent values that are below the maximum subcritical limits, as established in numerous technical references, including LA-12809, ARH-600, LA-10860, ANSI/ANS-8.1-1998, and the limits presented in the "Handbook for the Conduct of Nuclear Criticality Safety Activities at the Columbia Fuel Fabrication Facility." These limits apply to all aspects of the operation, including expected upset conditions.

Storage areas in which the only SNM present is contained in authorized packages as defined in 49 CFR 173, provided that:

- The maximum number of containers permitted in each such area shall be unlimited for low specific activity packages.
- The maximum number of packages bearing FISSILE labels stored in any one storage area must be limited so that the total sum of the criticality safety indices, in any individual group of such packages does not exceed 100. Groups of such packages must be stored so as to maintain a spacing of at least 6m (20 feet) from all other groups of such packages.

The NRC staff authorized this activity in the November 30, 1995, license renewal and has determined that the activity continues to be in accordance with 10 CFR 70.17 and is acceptable.

14.2.6 EXEMPTION FROM PACKAGED RADIOACTIVE MATERIAL MONITORING REQUIREMENTS

Notwithstanding the requirement of 10 CFR 20.205(b) to monitor the external surfaces of packaged radioactive material receipts for radioactive contamination, the licensed activity is exempted from such requirements relative to flatbed trailer shipments of fuel assemblies received from the General Electric Company for interim storage purposes only, provided the constraints, conditions and controls committed to in a letter, dated November 30, 1993, (identification # NRC-93-036), are satisfied, and further provided that the total number of such fuel assemblies stored at the site at any given time, does not exceed 250.

The NRC staff authorized this activity in License Amendment 12 to the previous license, dated April 29, 1998, and has determined that the activity continues to be in accordance with 10 CFR 20.2301 and is acceptable.

[redacted]

[redacted]

14.2.7 EXEMPTION FOR ELECTRONIC SUBMISSIONS

Notwithstanding the requirements of 10 CFR 70.5, communications or reports concerning the regulations in 10 CFR Part 70 and any application filed under these regulations may be submitted electronically.

The NRC staff authorized this activity in License Amendment 30 to the previous license, dated April 26, 2002 (ML021270336), and has determined that the activity continues to be in accordance with 10 CFR 20.2301 and is acceptable.

14.2.8 EXEMPTION FROM THE TRANSPORTATION REQUIREMENTS FOR CERTAIN FISSILE MATERIAL

The licensed activity is exempt from fissile material classification and from the fissile material package standards of 10 CFR 71.55 and 10CFR 71.59 for the transport of certain bulk materials contaminated with U-235. Concentration limits, stated as the ratio of U-235 to non-fissile material, are established and provide control parameters adequate to ensure nuclear criticality safety for shipments. This exemption has already been approved for WEC Licensee SNM-33 on April 15, 2002.

The NRC staff authorized this activity in License Amendment 35 to the previous license, dated January 2, 2003 (ML030080034), and has determined that the activity continues to be in accordance with 10 CFR 71.12 and is acceptable.

[redacted]

15.0 SAFETY EVALUATION REPORT PREPARERS

The individuals listed below are the principal contributors to the preparation of this Safety Evaluation Report. The NRC staff directed the effort and contributed to the technical evaluations.

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