

Environmental Impact Statement for the License Renewal of the Columbia Fuel Fabrication Facility in Richland County, South Carolina

Final Report

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Final Report

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ABSTRACT

The U.S. Nuclear Regulatory Commission (NRC) prepared this environmental impact statement (EIS) as part of its environmental review of the Westinghouse Electric Company, LLC (WEC) license renewal application to renew its special nuclear material (SNM) license SNM-1107 to continue operating the Columbia Fuel Fabrication Facility (CFFF) for an additional 40 years. The CFFF is located in Hopkins, South Carolina, and has been operating since 1969. This EIS provides the NRC staff's evaluation of the potential environmental impacts of the proposed action, the no-action alternative, and a 20-year license renewal alternative. The proposed action is the renewal of the special nuclear material license SNM-1107 to allow the WEC to continue licensed operations and activities at the CFFF site for an additional 40 years.

On June 5, 2020, the NRC staff decided to prepare an EIS because new information related to the WEC's remedial investigations being conducted under a Consent Agreement with South Carolina Department of Health and Environmental Control revealed uncertainty related to the source and extent of contamination onsite and the potential future migration pathways offsite and precluded the NRC staff from making a finding of no significant impact through the environmental assessment process.

The WEC's ongoing remedial investigations under the Consent Agreement with South Carolina Department of Health and Environmental Control are being conducted in coordination with the State, not the NRC. However, the NRC staff considered these remedial investigations and associated actions in its description of the affected environment and environmental impact determinations in this EIS.

Based on its environmental review, the NRC staff recommends that the WEC's license SNM-1107 for the operation of the CFFF be renewed for an additional 40 years. The NRC staff based its recommendation on the following:

- the license renewal application, which includes the environmental report and supplemental documents and the WEC's responses to the NRC staff's Requests for Additional Information
- consultation with Federal, State, and Tribal agencies and input from other stakeholders, including comments on the draft EIS
- independent NRC staff review of environmental issues
- the assessments of impact determinations provided in this EIS.

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EXECUTIVE SUMMARY

In December 2014, the U.S. Nuclear Regulatory Commission (NRC) received a license renewal application (LRA) from Westinghouse Electric Company, LLC (WEC) for its Columbia Fuel Fabrication Facility (CFFF), located in Hopkins, South Carolina. The WEC requested that its NRC special nuclear materials license be renewed for an additional 40 years to continue fabricating low-enriched uranium fuel assemblies for commercial nuclear power reactors. The WEC did not propose changes to their current licensed processes or construction of new buildings or structures. The WEC revised the LRA and associated environmental report in March 2019 mainly to incorporate responses to NRC's requests for additional information (RAI) dated January 18, 2019. The LRA was updated again in 2021.

In June 2018, the NRC published a final environmental assessment (EA) and a finding of no significant impact concerning the license renewal request. The EA documented the potential environmental impacts of the proposed continued operation of the CFFF for another 40 years. Shortly thereafter, in July 2018, there was a leak from equipment at the CFFF that resulted in uranyl nitrate containing hydrofluoric acid entering the subsurface under the facility building. Additionally, the WEC initiated an investigation, under the purview of the South Carolina Department of Health and Environmental Control (SCDHEC), into a leak in 2011 from a buried pipe that also allowed process wastewater containing uranium to enter the subsurface under the main facility building. Because of that new information and the public concerns about the releases, the NRC decided to reopen its environmental review. As a result, the NRC withdrew the June 2018 EA and finding of no significant impact and announced, in a *Federal Register* notice (84 FR 57777), the publication of an updated draft EA for public review and comment. After the draft EA public comment period, the NRC staff determined that a finding of no significant impact could not be reached after considering new information provided by the WEC related to the remedial investigations being conducted under a Consent Agreement (CA) with the SCDHEC. The information revealed uncertainty regarding the source and extent of contamination onsite and the potential future migration pathways offsite. Therefore, on June 5, 2020, the NRC staff informed the WEC that it would prepare an environmental impact statement (EIS). On July 31, 2020, the NRC published a Notice of Intent in the *Federal Register* (85 FR 46193) to prepare an EIS and began the EIS scoping comment period. The NRC staff issued the Scoping Process Summary Report on February 25, 2021. In support of the preparation of the EIS, the NRC staff issued RAIs, which were submitted to the WEC on November 3, 2020. On December 18, 2020, the WEC provided their responses to the NRC staff. Additional clarification requests related to the WEC's previous responses to the RAIs on the EIS were submitted by the NRC to WEC on March 18, 2021. The WEC's responses to the NRC staff's clarification requests were received on March 24, 2021.

On August 6, 2021, the NRC published a draft EIS and began the EIS public comment period. The NRC held a webinar on August 26, 2021, as a public meeting (86 FR 43276-TN7178), and provided an overview of the relicensing application, the draft EIS analysis and conclusions, and invited attendees at the webinar to provide comments. Many participants expressed an interest in having more time to review the draft EIS and provide comments. The NRC extended the initial 45-day public comment period by an additional 60 days to conclude on November 19, 2021 (86 FR 53694-7187). All comments on the draft EIS were reviewed by the NRC staff and are provided in Appendix D along with responses from the NRC staff.

On February 18, 2022, the NRC staff issued additional RAIs in support of the final EIS and the Safety Evaluation Report. The WEC's responses were provided on February 21, 2022, March

15, 2022, and March 21, 2022. In conducting its independent review, the NRC staff also considered information provided by Federal, State, and Tribal governments, and public comments received during the EIS scoping process and draft EIS public comment period.

This final EIS considers and weighs the environmental impacts from the WEC's proposed renewal of the CFFF licensed operations for an additional 40 years, the no-action alternative, and the 20-year license renewal alternative on land use, geology and soils, surface and groundwater resources, ecological resources, climatology, meteorology, and air quality, noise, historic and cultural resources, visual and scenic resources, socioeconomics, public and occupational health, transportation, waste generation and management, accidents, environmental justice, and assesses costs and benefits. This final EIS also considers all comments received during the draft EIS public comment review period and describes avoidance of potential adverse impacts and mitigation measures for the reduction of potential adverse impacts, including the three new proposed conditions that the WEC agreed to add to the license, if renewed, new commitments from the WEC that would be incorporated into the LRA, and additional measures that the NRC staff identified as having the potential to further reduce environmental impacts, but that the licensee did not commit to in its application.

The NRC's *Environmental Review Guidance for Licensing Actions Associated with Office of Nuclear Materials Safety and Safeguards (NMSS) Programs* (NUREG-1748) categorizes the significance of potential environmental impacts as follows:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: The environmental effects are sufficient to alter noticeably but not destabilize important attributes of the resource.

LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

With respect to the WEC's proposed 40-year license renewal, the NRC staff evaluated the following resource areas and determined that the proposed action would have a SMALL impact on land use, terrestrial and aquatic ecology, air quality, noise, historic and cultural resources, visual and scenic resources, socioeconomics, public and occupational health, transportation, waste generation and management from operations, accidents, and environmental justice. The NRC staff determined that impacts from waste generation and management would be SMALL to MODERATE during decommissioning.

While impacts on soils, surface water, and groundwater can be noticeable, the NRC staff determined that impacts on soils and surface water resources from the proposed action would be SMALL. Some soils near the plant buildings have been contaminated, but soils away from the operational areas have been only minimally affected to date. Under the CA, the WEC would assess remediation efforts, which are expected to disturb surface soils only near the plant buildings. Further, any soil contamination would be remediated during decommissioning for which funding is assured under NRC's decommissioning funding regulations.

Surface water withdrawals and consumptive use of water for CFFF operations would have negligible effects on other uses/users of the Congaree River during the proposed license renewal period. Future discharges to the Congaree River would continue in accordance with the NRC license and National Pollutant Discharge Elimination System permit and, thus, would have minor effects on water quality. Contamination of onsite water bodies from the proposed continued operation of the CFFF is possible during the proposed license renewal term,

however, there is a low potential for contaminants to move offsite because of the implementation of activities and programs to minimize the effects of releases on other users of the local surface water resources (e.g., spill prevention controls, the environmental sampling and monitoring program, and Federal and State permitting requirements).

The existing groundwater sampling data indicate that the contaminant plumes resulting from past activities at the CFFF site currently remain onsite and occur only in the surficial aquifer. While actions taken by the WEC in response to past contaminant releases have reduced the likelihood of future inadvertent releases with continued operation of the CFFF, future inadvertent releases of contaminants to the subsurface are reasonably foreseeable. Additionally, the current groundwater contamination is not likely to travel beyond the CFFF site boundary during the period of the proposed action. However, there are significant uncertainties that affect the evaluation of fate and transport of contaminants in groundwater. Based on these findings, the NRC staff concluded that impacts on groundwater from the proposed action would be SMALL to MODERATE.

The WEC has made changes to its NRC environmental sampling and monitoring program including new monitoring wells; additional surface water, groundwater, sediment, and soil sample locations; and use of a conceptual site model as a decision-making tool. The WEC also developed procedures to help make decisions about the sampling program and remediation based on analysis of environmental data. As more information and data are gathered through the WEC's implementation of the CA, these procedures will allow the WEC to further refine its environmental monitoring and sampling program and remediation activities. Continuation of the current groundwater monitoring and implementation of procedures are expected to provide improved detection of and response to any future releases that may occur. The WEC also agreed to three new proposed license conditions related to the WEC's environmental monitoring and sampling program. The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either the SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2 and 2.4.2 of this EIS.

Further, per NRC regulations, the WEC must maintain records and funding to ensure the CFFF can be decommissioned to meet NRC's regulatory limits.

The NRC staff also evaluated potential cumulative impacts from the proposed action considering other past, present, and reasonably foreseeable future actions in the vicinity of the CFFF site. The NRC staff determined that the proposed license renewal would contribute SMALL incremental impacts on all resource areas, except for groundwater resources. However, because the past operation of the CFFF has had a noticeable effect on the water quality of the onsite groundwater that continues to be observed in the most recent data, and on the water quality of the onsite surface water bodies (including past exceedance of water quality standards and the current exceedance of uranium residential screening levels in Mill Creek sediments), the NRC staff concluded that the cumulative impacts to groundwater and surface

water from past and current CFFF operations are MODERATE. Although the proposed continued operation of the CFFF for an additional 40 years could noticeably alter onsite groundwater quality, the continued operation would not destabilize or significantly affect the groundwater resource because there is a low potential for contaminants to move offsite.

Under the no-action alternative, the NRC would deny the WEC's request to renew CFFF's SNM-1107 license for an additional 40 years. The WEC, however, would continue to operate the CFFF under its current license until it expires on September 30, 2027. Upon license expiration, the WEC would be required to start the decommissioning process, including any site remediation, unless the WEC requests and obtains a renewed license. The NRC staff found that the environmental impacts from the no-action alternative would be SMALL on most environmental resource areas except for groundwater resources, socioeconomics and waste management. Potential impacts on groundwater resources under the no-action alternative would be similar to the potential impacts from the proposed action (as summarized above), however, the impacts would only be expected to be experienced through license expiration. Potential impacts on socioeconomics would be MODERATE because the CFFF would cease operations and begin decommissioning activities. Decommissioning would likely cause the WEC to employ a smaller workforce than the current CFFF operations workforce. Decommissioning activities would also be temporary and eventually the employment and other economic activity associated with the CFFF site would end, resulting in a noticeable adverse impact on the local economy. Decommissioning would also cause an increase in waste generation, and potential impacts would be SMALL to MODERATE.

The NRC staff also considered as an alternative to approving the WEC's license renewal request with a shorter license renewal term, i.e., a renewal term of 20 years. The NRC staff found that the potential environmental impacts from this alternative would be similar to the potential impacts from the proposed action except that the impacts would occur over a shorter timeframe.

The cost-benefit analysis in the final EIS compares the costs and benefits of the proposed action to the alternatives identified above considering various scenarios and financial discounting rates. The proposed action would generate costs and benefits, both from an environmental and economic perspective. After assessing and weighing the costs and benefits, the NRC staff concludes that benefits of the proposed action outweigh the economic and environmental costs. Further, the staff concludes that the no-action alternative would result in environmental and economic costs to society that would exceed the costs for the proposed action. While the 20-year license renewal alternative also would result in a positive economic benefit-cost ratio similar to the proposed action, the duration of beneficial impacts and positive economic returns to CFFF operations would be shorter lived.

After weighing the impacts of the proposed action and comparing them to those of the no-action alternative and 20-year license renewal alternative, the NRC staff, in accordance with Section 51.91(d) of Title 10 of the *Code of Federal Regulations* sets forth its NEPA recommendation regarding the proposed action. The NRC staff recommends that the NRC renews the WEC's license SNM-1107 authorizing continued operations for the CFFF for an additional 40 years. This recommendation is based on (1) the LRA, which includes the environmental report and supplemental documents and the WEC's responses to the NRC staff's RAIs; (2) consultation with Federal, State, and Tribal agencies and input from other stakeholders, including comments on the draft EIS; (3) independent NRC staff review; and (4) the assessments of impacts determination in this final EIS.

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
μCi	microcurie(s)
μg	microgram(s)
AADT	annual average daily traffic
ac	acre(s)
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ADAMS	Agencywide Documents Access and Management System
ADR	alternate dispute resolution
ADU	ammonium diuranate
AEA	Atomic Energy Act
AIT	Augmented Inspection Team
ALARA	as low as reasonably achievable
AOC	area of concern
APE	area of potential effect
AS/SVE	air sparging/soil vapor extraction
BACT	best available control technology
BAQ	(SCDHEC) Bureau of Air Quality
BMCU	Black Mingo Confining Unit
BTU	British thermal units(s)
CA	Consent Agreement
CAA	controlled access area; also Clean Air Act
CaF ₂	calcium fluoride
CAL	Confirmatory Action Letter
CAP	Corrective Action Program
CEB	Community Engagement Board
CEDE	Committed effective dose equivalent
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFFF	Columbia Fuel Fabrication Facility
CFR	Code of Federal Regulations
cfs	cubic feet per second
cis-1,2-DCE	cis-1,2-dichloroethylene
cm	centimeter(s)
CO	confirmatory order
CO ₂ eq	carbon dioxide equivalent
COPC	constituent of potential concern
CSM	Conceptual Site Model
CSX	CSX Transportation, Incorporated

CWW	contaminated wastewater
CVOC	chlorinated volatile organic compound
DFP	Decommissioning Funding Plan
DMR	Discharge Monitoring Report
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
EA	environmental assessment
EF	Enhanced Fujita
EIS	environmental impact statement
EJ	environmental justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ER	environmental report
ERPG	emergency response planning guideline
ESA	Endangered Species Act
F	Fujita
FONSI	finding of no significant impact
FRN	<i>Federal Register</i> Notice
FS	feasibility study
ft	foot (feet)
ft ³	cubic foot (feet)
FWS	U.S. Fish and Wildlife Service
GHG	greenhouse gas
GPR	ground-penetrating radar
GHG	greenhouse gas
gpd	gallon(s) per day
ha	hectare(s)
HCL	hydrochloride
HDPE	high-density polyethylene
HEPA	high-efficiency particulate air
HF	hydrofluoric acid
HFSS	hydrofluoric acid spiking station
hr	hour(s)
Hwy	highway
IAEA	International Atomic Energy Agency
IROFS	item relied on for safety
ISA	Integrated Safety Analysis
ISO	International Organization for Standardization
IWSW	inactive water supply well
JFD	joint frequency distribution
IROFSs	items relied on for safety

ISA	integrated safety analysis
ISG	interim staff guidance
kg	kilogram(s)
km	kilometer(s)
L	liter(s)
LAR	license amendment request
lb	pound(s)
L/d	liter(s) per day
LIDAR	Light Detection and Ranging
LLRW	low-level radioactive waste
LRA	license renewal application
LRCAC	Lower Richland Citizen Advisory Council
µg	microgram(s)
LLRW	low-level radioactive waste
m	meter(s)
m ³	cubic meter(s)
mbp	million years before present
MBTA	Migratory Bird Treaty Act
MCF	million cubic feet
mCi	millicurie(s)
MCL	maximum contaminant level
MDC	minimum detectable concentration
MEI	maximally exposed individual
mg	milligram(s)
Mgd	million gallons per day
mi	mile(s)
ml	milliliter(s)
MMBTU	metric million British thermal units
mpd	million years before present
mrem	millirem
MSL	mean sea level
mSv	millisievert(s)
MT	metric ton(s)
MTU	metric tons of uranium
NAAQS	National Ambient Air Quality Standards
NCRP	National Council of Radiation Protection and Measurements
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NMFS	National Marine Fisheries Service

NMSS	National Council of Radiation Protection and Measurements
NO ₂	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Parks Service
NPV	net present value
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
O ₃	ozone
OMB	Office of Management and Budget
ORV	outstandingly remarkable value
OSHA	Occupational Safety and Health Administration
OU	operable unit
PA	Programmatic Agreement
PCE	perchloroethylene
PHE	public health emergency
pCi	picocurie(s)
pCi/g	picocuries per gram
PM _{2.5}	particulate matter with an aerodynamic diameter of 2.5 microns or less
PM ₁₀	particulate matter with an aerodynamic diameter of 10 microns or less
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTE	potential-to-emit
PVC	polyvinyl chloride
RAI	request for additional information
RCRA	Resource Conservation and Recovery Act
rem	roentgen equivalent man
RIWP	Remedial Investigation Work Plan
RSL	residential screening level
RUSL	residential use screening level
SC	South Carolina
SCDAH	South Carolina Department of Archaeology and Historic Preservation
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCDOT	South Carolina Department of Transportation
SCDPS	South Carolina Department of Public Safety
SCE&G	South Carolina Electric and Gas
SCIAA	South Carolina Institute of Archaeology and Anthropology
SER	Safety Evaluation Report

SHPO	State Historic Preservation Office
SNM	Special Nuclear Material
SR	State Route
SO ₂	sulfur dioxide
SOLX	solvent extraction
sVOC	semi-volatile organic compound
T	ton(s)
TBP	tributyl phosphate
Tc-99	technetium-99
TCE	trichloroethene
TEDE	total effective dose equivalent
THPO	Tribal Historic Preservation Officer
TPBAR	Tritium-Producing Burnable Absorber Rod
TSS	total suspended solids
U	uranium
U-234	uranium-234
U-235	uranium-235
U-238	uranium-238
UDP	Unanticipated Discovery Plan
UF ₆	uranium hexafluoride
UN	uranyl nitrate
U.S.	United States
UO ₂	uranium dioxide
UO ₂ F ₂	uranyl fluoride
URRS	uranium recycle and recovery services
USCB	U.S. Census Bureau
USEI	U.S. Ecology Idaho, Inc.
USGS	U.S. Geological Survey
VC	vinyl chloride
VCC	Voluntary Cleanup Contract
VOC	volatile organic compound
WCM	wet combustibile materials
WEC	Westinghouse Electric Company, LLC
WGS	Westinghouse Government Services LLC
WSW	water supply well
WWTP	wastewater treatment plant
yr	year(s)
χ/Q	atmospheric dispersion factor(s)

1.0 INTRODUCTION

The Westinghouse Electric Company, LLC's (WEC) Columbia Fuel Fabrication Facility (CFFF), located in Hopkins, South Carolina, has been operating since 1969 and fabricates low-enriched uranium fuel assemblies for commercial nuclear power reactors. In December 2014, the WEC submitted an application, including an environmental report (ER), to the U.S. Nuclear Regulatory Commission (NRC) to renew its special nuclear material (SNM) license SNM-1107 (WEC 2014-TN6421) to continue to operate the CFFF for an additional 40 years. The NRC staff accepted the WEC's license renewal application (LRA) for detailed technical review on December 30, 2014 (NRC 2014-TN7073). A notice of opportunity to request a hearing and petition for leave to intervene for the LRA was published in the *Federal Register* (FR) on February 27, 2015 (80 FR 10727-TN7074). If granted as proposed, the renewed license would allow WEC to continue authorized operations and activities at the CFFF site for a period of 40 years from the date the NRC approves the license renewal request. The WEC's license (SNM-1107) was last renewed by the NRC in 2007 for 20 years and will expire in September 2027 (NRC 2007-TN6528).

As part of the review of the WEC's LRA, the NRC is preparing an environmental impact statement (EIS) in accordance with the National Environmental Policy Act of 1969 (NEPA, 42 U.S.C. § 4321 *et seq.*; TN661) and NRC's NEPA-implementing regulations at Title 10 of the *Code of Federal Regulations* (10 CFR) Part 51 (TN250), "Environmental Projection Regulations for Domestic Licensing and Related Regulatory Functions." The NRC staff published a draft EIS for public review and comment in August 2021 in accordance with 10 CFR 51.73 (TN250). The NRC staff is issuing this final EIS after addressing comments from the public and external stakeholders on the draft EIS. The comments received and the NRC staff's responses to those comments are included in Appendix D of this final EIS.

The NRC staff is also conducting a detailed safety analysis of the WEC's LRA to assess compliance with applicable NRC regulations, including 10 CFR Part 70 (TN4883), "Domestic Licensing of Special Nuclear Material," and 10 CFR Part 20 (TN283), "Standards for protection against radiation." The NRC staff's safety analysis will be documented in a separate Safety Evaluation Report (SER). The NRC's decision about whether to renew the WEC license as proposed will be based on the results of the NRC staff's review as documented in the SER and the EIS.

1.1 Proposed Action

The proposed action, as requested by the WEC, is the continued operation of the CFFF for an additional 40 years in Hopkins, South Carolina. Current operations at CFFF include receiving natural and low-enriched uranium hexafluoride (UF₆) in cylinders, converting it to uranium dioxide (UO₂) powder through the ammonium diuranate (ADU) conversion process, and processing the UO₂ powder into fuel assemblies (pellet pressing, sintering, fuel rod loading and sealing, assembly fabrication). The CFFF has a production capacity of 1,500 MTU/yr with a maximum capacity of 1,600 MTU/yr. In its LRA (WEC 2021-TN7106), the WEC did not request changes to its NRC license related to operations nor construction of new buildings or structures within the controlled access area (CAA) or restricted area (WEC 2019-TN6510).

1.2 Purpose of and Need for the Proposed Action

The CFFF is one of three facilities in the United States currently licensed by the NRC to manufacture fuel assemblies for commercial nuclear power plants. The WEC’s license renewal request, if granted as proposed, would allow the CFFF to continue to be a source of nuclear fuel for commercial nuclear power plants for 40 years from the date the NRC approves the renewal.

Fuel fabrication facilities convert low-enriched uranium into fuel for commercial nuclear power reactors that generate electricity.

1.3 NEPA Environmental Review Process

NEPA established national environmental policy and goals to protect, maintain, and enhance the environment and established a process for Federal agencies to implement these specific goals for actions under their jurisdiction. The purpose of this EIS is to assess the potential environmental impacts of the WEC’s proposed license renewal and alternatives to the proposed action. The NRC staff has prepared this final EIS following NRC regulations 10 CFR Part 51 (TN250) and pursuant to guidance in NUREG–1748, *Environmental Review Guidance for Licensing Actions Associated with Office of Nuclear Materials Safety and Safeguards (NMSS) Programs* (NRC 2003-TN1983). The NRC staff’s environmental review process for the license renewal of the CFFF is depicted in Figure 1-1.

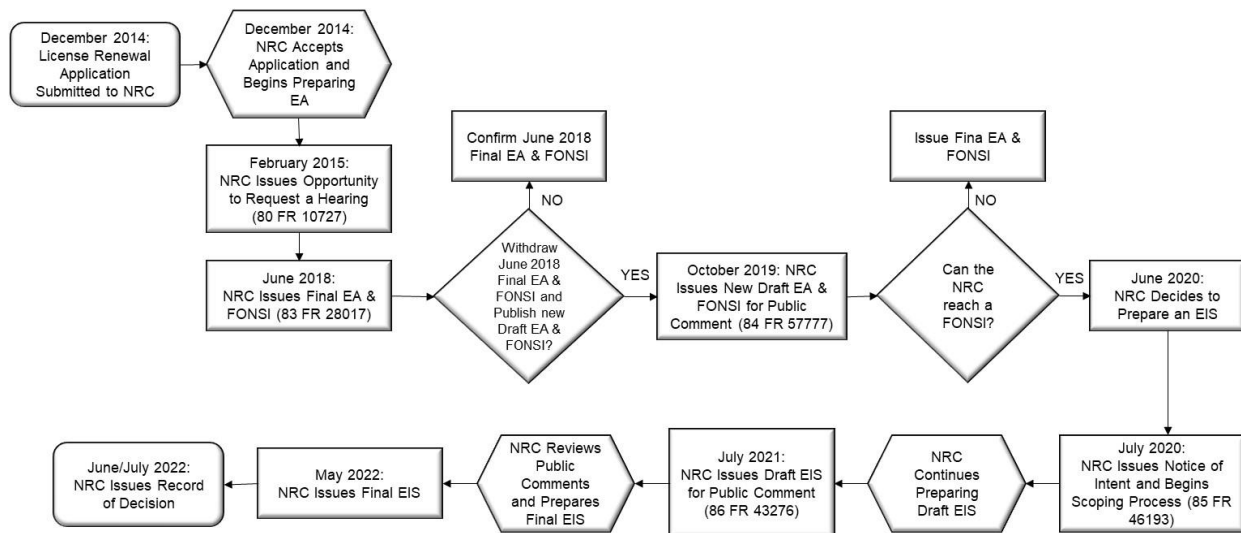


Figure 1-1 The NRC’s NEPA Environmental Review Process for the Proposed License Renewal of the CFFF

1.3.1 Decision to Prepare an EIS

On June 15, 2018, the NRC published a final environmental assessment (EA) (NRC 2018-TN6416) and a finding of no significant impact (FONSI) in the *Federal Register* (83 FR 28014-TN6415). In July 2018, the WEC identified a leak that released uranium and hydrofluoric acid (HF) into the subsurface environment. Additionally, under the purview of the South Carolina Department of Health and Environmental Control (SCDHEC), the WEC initiated an investigation

into a leak from a buried pipe that occurred in 2011, which allowed uranium to enter the subsurface under the main building. Based on this new information and public concern about the releases, the NRC staff decided to reopen its environmental review. On October 28, 2019, the NRC concurrently withdrew its June 2018 EA and FONSI and published a new draft EA (NRC 2019-TN6472) for public review and comment (84 FR 57777-TN6422).

On February 26, 2019, the SCDHEC executed a Consent Agreement (CA) with the WEC (SCDHEC/WEC 2019-TN6554) to conduct remedial investigations and address historical contamination at the CFFF site. Subsequently, on June 5, 2020, the NRC staff decided to prepare an EIS (NRC 2020-TN6519) because new sampling and monitoring data from the remedial investigations conducted by the WEC (2020-TN6751) under a CA with the SCDHEC revealed uncertainty related to the source and extent of contamination onsite and the potential future migration pathways offsite (SCDHEC/WEC 2019-TN6554) and precluded the NRC staff from making a FONSI through the EA.

1.3.2 Notice of Intent to Prepare an EIS and Scoping Process

In accordance with 10 CFR 51.26 (TN250), the NRC published a Notice of Intent (NOI) in the *Federal Register* to prepare an EIS and conduct a scoping process on July 31, 2020 (85 FR 46193-TN6417). Through this *Federal Register* Notice (FRN), e-mails sent to the WEC e-mail distribution lists, and posts on social media (e.g., Facebook and Twitter), the NRC staff invited potentially affected Federal, State, local, and Tribal governments; organizations; and the public to provide comments on the scope of the EIS. The NRC staff conducted the EIS scoping process between July 31 and August 31, 2020 (85 FR 46193-TN6417). The NRC received more than 60 written comments from the public, local, State, and Federal agencies, and Indian Tribes. In February 2021, the NRC published a Scoping Process Summary Report (NRC 2021-TN6934) documenting its determinations regarding the EIS's scope. The Scoping Process Summary Report (incorporated by reference) describes the scoping process and addresses the comments received during the scoping comment period, as well as written and oral comments gathered during the previous environmental review public comment period for the October 2019 draft EA (NRC 2019-TN6472), which preceded the development of this EIS. The NRC staff also held a public meeting to discuss the status of its review of the WEC CFFF LRA on February 4, 2021 (WEC 2021-TN6913, NRC 2021-TN6914, NRC 2021-TN6915, NRC 2021-TN7001).

1.3.3 Scope of the EIS

This EIS evaluates the environmental impacts of the proposed action—continuing the currently licensed operations through the requested 40-year license renewal period. The EIS considers the operations and activities occurring at the CFFF site, the affected environment, and the interaction between the two. This EIS incorporates by reference information from EAs prepared for the previous license renewals and the draft EA published for public comment in October 2019, where noted.

In preparing this EIS, the NRC staff considered various documents and sources of information, including documents from the WEC regarding the LRA and ER: the WEC's March 2019 updated LRA and ER (WEC 2019-TN6423, WEC 2019-TN6510); the August 2019 subsequent update to LRA (which included additional environmental monitoring data) (WEC 2019-TN6423); the December 2020 update to the ER (WEC 2020-TN6869); and the September 2021 update to the LRA (WEC 2021-TN7106). The NRC staff also considered documents published as part of the CA between the WEC and the SCDHEC, and previous NRC reports and publications relevant to the licensing of the CFFF.

Additionally, the NRC staff provided requests for additional information (RAIs) to the WEC on November 3, 2020 (NRC 2020-TN6788) to which the WEC responded on December 18, 2020 (WEC 2020-TN7076). The NRC submitted requests for additional clarification concerning the WEC's previous responses to the RAIs on March 18, 2021 (NRC 2021-TN7047). The WEC's responses to NRC staff's March 2021 requests for additional clarifications were received on March 24, 2021 (WEC 2021-TN7043, WEC 2021-TN7048). On February 18, 2022, the NRC staff issued additional RAIs (NRC 2022-TN7193) in support of the final EIS and the SER. The WEC's responses were provided on February 21, 2022, March 15, 2022, and March 21, 2022 (WEC 2022-TN7182, WEC 2022-TN7214, and WEC 2022-TN7215, respectively). In conducting its independent review, the NRC staff also considered information provided by Federal, State, and Tribal governments, and public comments received during the EIS scoping process and draft EIS public comment period.

1.3.3.1 Issues Studied in Detail

In accordance with NEPA, the NRC staff conducted an independent and detailed evaluation of the potential environmental impacts from the proposed continued operation of the CFFF for an additional 40 years, the no-action alternative, and the 20-year license renewal alternative. This EIS provides a detailed analysis of the following environmental resource areas:

- land use,
- geology, seismology, and soils,
- water resources – surface and groundwater,
- ecological resources – terrestrial and aquatic,
- protected species and habitat,
- climatology, meteorology, and air quality,
- noise,
- historic and cultural resources,
- visual and scenic resources,
- socioeconomics,
- public and occupational health,
- transportation,
- waste generation and management,
- accidents,
- environmental justice,
- costs and benefits, and
- cumulative impacts.

1.3.3.2 Issues Eliminated from Detailed Study

This EIS evaluates the environmental impacts of continued operation of the CFFF. Some issues and concerns raised during the October 2019 draft EA public comment period and the

EIS scoping process (NRC 2021-TN6934) were determined to be beyond the scope of the EIS. These topics include (but are not limited to) the following:

- use of other nuclear fuel types,
- concerns about the safety and security of nuclear fuel, nuclear energy and future demand for nuclear energy in general, and nuclear weapons,
- consideration of the business structure of the WEC and contractors used to operate CFFF,
- issues related to financial assets and ownership of the WEC and its subsidiary,
- concerns regarding regulation and oversight of dual-use facilities, including the relationships to U.S. Department of Energy's National Nuclear Security Administration,
- concerns regarding compensation to potentially affected landowners,
- concerns regarding emergency plans and evacuation routes,
- concerns regarding security and terrorist attack prevention, and
- general disagreement with nuclear power and the need for nuclear fuel.

1.3.4 Draft EIS Public Comment Process

Consistent with the NRC's regulations at 10 CFR 51.73, the NRC staff published the draft EIS for public review and comment (86 FR 43276-TN7178) on August 6, 2021. The 45-day public comment period began on August 6, 2021, upon the U.S. Environmental Protection Agency's (EPA's) publication of its notice of availability in the *Federal Register* (86 FR 43236-TN7187). In response to requests from the public and other external stakeholders to extend the draft EIS public comment period, on September 28, 2021, the NRC staff announced a 60-day extension and re-opening of the public comment period through November 19, 2021 (86 FR 53694-7186).

The public and external stakeholders could provide written and oral comments through e-mail (WEC_CFFF_EIS@nrc.gov), by leaving a voicemail using a standard toll-free number, U.S. mail, and through the Federal rulemaking website at <https://www.regulations.gov>. A public webinar was conducted on August 26, 2021, to gather oral comments (NRC 2021-TN7179).

The draft EIS was accessible via the NRC's Agencywide Documents Access and Management System (ADAMS) using accession number ML21209A213, and the NRC's public web site at <https://www.nrc.gov/info-finder/fc/westinghouse-fuel-fab-fac-sc-lc.html>. The NRC staff also made hard copies of the draft EIS available to the public at the following locations: (1) Richland Public Library – Main: 1431 Assembly St., Columbia, SC 29201, (2) Richland Public Library – Lower Richland: 9019 Garners Ferry Road, Hopkins, SC 29061, and (3) Richland Public Library – Eastover: 608 Main Street, Eastover, SC 29044, and mailed hard copies of the draft EIS to individuals upon request.

The NRC staff provided notification and advertised the publication of the draft EIS, public comment period, and August 26, 2021 public comment webinar in the *Federal Register* (86 FR 43276-TN7178); via NRC e-mail distribution and NRC listserv (<https://www.nrc.gov/public-involve/listserver/fuel-cycle-fac-correspondence.html>); and in local newspapers and radio stations. The NRC staff notified other Federal and State agencies, U.S. Congressional representatives, and South Carolina Legislature representatives. The NRC staff also sent postcards via U.S. mail to residences in the immediate vicinity of the CFFF providing notification

of the availability of the draft EIS, the public comment period, and public comment webinar. The NRC also issued a press release and advertised via social media. A flyer (or informational sheet) containing information about the conclusions in the draft EIS, the public comment period, and the public webinar was distributed via NRC distribution e-mail, through the NRC listserv, and uploaded to the NRC public web site.

Notification of the August 26, 2021 public comment webinar was also provided in the NRC's public meeting notice system and a copy of the informational slides the NRC staff used during the webinar was distributed ahead of the public webinar via NRC distribution e-mail, and was subsequently uploaded to the NRC's ADAMS and public web site (<https://www.nrc.gov/info-finder/fc/westinghouse-fuel-fab-fac-sc-lc.html>). The transcript of the public webinar was also made available via NRC's ADAMS and the public web site, and distributed to interested parties on the NRC's email distribution list. Additionally, the NRC staff published two videos related to the draft EIS on its YouTube channel. The first video provided an overview of the draft EIS (<https://youtu.be/96L91-HDXTE>) and the second video provided a summary of the potential environmental impacts on surface water and groundwater resources from the proposed action (<https://youtu.be/hBnHzYNCGTE>). The web links to these recorded presentations were uploaded to the NRC public web site and distributed via NRC's email distribution list.

In total, 71 people provided oral and written comments. Appendix D of this EIS provides responses from the NRC staff to these comments by subject matter. Where applicable, the responses note where changes were made to the EIS as a result of those comments.

1.3.5 Concerns of the Local Community

There are several minority or low-income communities within a 20-mile (mi) radius of the CFFF. During the comment period on the draft EIS, the NRC staff heard concerns about and opposition to the proposed action. The bulleted list below is not exhaustive but includes the most common issues identified by the local community members, community organizations, Tribes, and local, and state government representatives throughout the development of this EIS. The NRC staff received comments from the groups above regarding:

- opposition to the proposed action for a license renewal term length of 40 years,
- advocating for the 20-year term for license renewal, an alternative to the proposed action,
- advocating for a shorter licensing term than either 20 years or 40 years, such as 5 years or 10 years,
- concerns over WEC's past operating performance and safety impacts to workers,
- concerns over past surface water and groundwater contamination,
- concerns over future inadvertent leaks or spills causing contamination,
- concerns about aging of the facility,
- concerns about climate change impacts on the facility,
- concerns about impacts on cultural resources,

Appendix D summarizes and responds to these comments and all other comments received on the draft EIS. The individuals, communities and organizations who provided comments are listed in EIS Tables D-1 through D-3. These issues are also discussed in the safety review being conducted separately, the discussion of alternatives in Chapter 2, and the discussions of surface and groundwater impacts and cultural resources impacts in Chapter 3.

1.4 Applicable Regulatory Requirements, Permits and Authorizations

In addition to obtaining an NRC license renewal for continued operation of the CFFF, the WEC is required to obtain all other necessary permits and approvals from other Federal and State agencies. Table 1-1 lists the status of the required permits and approvals.

Table 1-1 Environmental Approvals for the CFFF Continued Operation

Regulatory Agency	License/ Permit	Description	Status^(a)
U.S. Nuclear Regulatory Commission	SNM-1107	SNM-1107 LRA (WEC 2019-TN6571, WEC 2021-TN6920)	License renewal application submitted. Under review.
South Carolina Department of Health and Environmental Control	SC00001848	National Pollutant Discharge Elimination System (NPDES) Permit	Under review. Permit renewal request submitted. Draft 5-year renewal permit underwent 30-day public comment period ending October 12, 2019 (WEC 2019-TN6777).
South Carolina Department of Health and Environmental Compliance	1900-0050-R1	Air Quality Permit	Permit renewal request submitted. Under review. Draft renewal permit underwent 30-day public comment period ending October 12, 2019 (WEC 2019-TN6777, SCDHEC 2019-TN7177).
South Carolina Department of Health and Environmental Compliance	094	Radioactive Materials License	Current.
South Carolina Department of Health and Environmental Compliance	40-0846	X-Ray Facility Registration	Current. No expiration date.
South Carolina Department of Health and Environmental Compliance	0046-39-20-X	Radioactive Waste Transport	Renewal permit request submitted.
South Carolina Department of Health and Environmental Compliance	SCR000000	Stormwater Permit	Current.
South Carolina Department of Health and Environmental Compliance	40561001	Environmental Laboratory Qualification	Current.
South Carolina Department of Health and Environmental Compliance	SC40-0332G	Infectious Waste Generator Permit	Current.

(a) Under Review indicates that the WEC has submitted its application for the permit. Current indicates the permit/license are active and valid.

1.5 Consultation and Coordination with Other Agencies

Federal agencies are required to comply with the Section 106 process of the National Historic Preservation Act of 1966 (NHPA; 54 U.S.C. § 300101 *et seq.*; TN4157), as amended, and Section 7 of the Endangered Species Act of 1973 (ESA; 16 U.S.C. § 1531 *et seq.*; TN1010), as amended. The consultations conducted for the proposed action are summarized in EIS Sections 1.5.1 and 1.5.2. A list of the consultation correspondence and a more detailed consultation history is provided in Appendix A of this EIS.

1.5.1 Consultation

1.5.1.1 NHPA Section 106 Consultation

Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties and allow the Advisory Council on Historic Preservation (ACHP) an opportunity to review and comment on the undertaking. The ACHP is an independent Federal agency that promotes the preservation, enhancement, and productive use of our nation's historic resources. The NHPA-implementing regulations are found in 36 CFR Part 800 (TN513), "Protection of Historic Properties." In accordance with 36 CFR 800.8, the NRC staff is coordinating its NHPA Section 106 review with its NEPA environmental review. Throughout the NRC's environmental review of the WEC's LRA, the NRC staff has been consulting with the South Carolina State Historic Preservation Office (SHPO) and Federally recognized Indian Tribes. In May 2015, the NRC staff initially reached out to the South Carolina SHPO requesting concurrence with the NRC staff's determination that no historic properties listed in or eligible for listing in the National Register of Historic Places (NRHP) would be affected by the proposed action (SCAHC 2015-TN5608) because the WEC did not request changes to its currently licensed operations or construction of new buildings or structures. The South Carolina SHPO concurred, and further explained that the CFFF site has a high probability of the existence of significant archaeological properties and any future proposed expansion or ground disturbance in undisturbed areas should be submitted to their office for review and comment (SCAHC 2015-TN5608). The South Carolina SHPO also noted that if archaeological materials are encountered during construction, procedures described in 36 CFR 800.13(b) (TN513) would apply, and the Federal agency or the WEC should contact the SHPO office immediately. The NRC staff sent a similar letter to the Catawba Indian Nation also requesting concurrence (NRC 2015-TN5595). The NRC staff did not receive a response from the Catawba Indian Nation.

The NRC staff continued its consultation with the South Carolina SHPO (NRC 2019-TN6541) and Catawba Indian Nation (NRC 2019-TN6542) during the publication of the October 2019 draft EA for public review and comment (NRC 2019-TN6472). The NRC staff explained that the WEC would be conducting further investigation into onsite water and soil contamination under a CA executed with the SCDHEC (SCDHEC/WEC 2019-TN6554), which would require the installation of groundwater monitoring wells and sediment sampling in disturbed and previously undisturbed areas of the CFFF site (NRC 2019-TN6472). Installation of the new groundwater wells and sediment sampling would be short-term and involve minimal land disturbance. The WEC's contractor would follow established procedures to address inadvertent discoveries of cultural resources and avoid subsurface objects during installation of the wells. The contractor would also use ground-penetrating radar prior to conducting ground-disturbing activities as part of well installation.

In November 2019, the Catawba Indian Nation provided comments to the NRC staff indicating no “immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas,” and requesting that the Tribe “be notified if Native American artifacts and/or human remains are located during the ground disturbance phase of the project” (Catawba Indian Nation 2019-TN6418).

On July 31, 2020, the NRC staff notified the Catawba Indian Nation (NRC 2020-TN6531), and the South Carolina SHPO (NRC 2020-TN6529) of the NRC staff’s intent to prepare an EIS for the WEC’s LRA, and invited comments during the EIS scoping process (NRC 2020-TN6539). No response was received from the South Carolina SHPO. On August 31, 2020, the Catawba Indian Nation indicated its desire to be consulted about the proposed action (Catawba Indian Nation 2020-TN6534).

On June 29, 2021, the NRC staff held a call with the South Carolina SHPO to provide a status update and share additional information provided by the WEC in response to the NRC staff’s RAIs (NRC 2020-TN6788 and NRC 2021-TN7047). The NRC staff provided the sitewide cultural resources procedures the WEC has in place (RA-432 [WEC 2021-TN7060], SYP-233 [WEC 2021-TN7064], RA-136 [WEC 2021-TN7062], and TRN-170 [AECOM Undated-TN7063]). As discussed in Section 3.9 of this EIS, the NRC staff does not anticipate that the proposed action would affect historic properties. On August 6, 2021, the NRC staff transmitted the draft EIS and the determination of effects to the South Carolina SHPO in accordance with the Section 106 regulations at 36 CFR 800.4(d)(1) (NRC 2021-TN7120). The South Carolina SHPO responded on September 21, 2021 (SCDAH 2021-TN7191) and provided recommendations regarding the description of the area of potential effects (APE); evaluation of indirect effects from the proposed action; resolution of adverse effects, if any; and recommended the findings and recommendations from the WEC’s cultural resource survey be included in the final EIS. During the preparation of this final EIS, the NRC staff discussed these comments with the South Carolina SHPO.

On August 6, 2021, the NRC staff also transmitted the draft EIS to the Catawba Indian Nation. In the associated letter, the NRC staff described the evaluation of impacts on historic and cultural resources and the determinations of effects (NRC 2021-TN7122). On September 20, 2021, the Catawba Indian Nation provided comments to the NRC staff on the draft EIS and requested that the comment period be extended until after the cultural resource survey of the CFFF site was completed. The Catawba Indian Nation’s comments focused on the Green Hill Mound (located near the CFFF site but outside the license area boundary), the APE, and impacts from monitoring wells on the Denley Cemetery (located inside the CFFF site). Additional information about impacts on historic and cultural resources can be found in Section 3.9 of this final EIS.

On December 7, 2021, in response to comments provided by the U.S. Department of Interior (DOI) and the South Carolina SHPO on the draft EIS, the NRC staff provided the draft EIS to the Muscogee Nation (NRC 2021-TN7125), the Cherokee Nation (NRC 2021-TN7124), and the Eastern Band of Cherokee Indians (NRC 2021-TN7123), who have ancestral ties to Richland County, South Carolina. The NRC staff did not receive responses from these Tribes. Consultation correspondence is listed in Appendix A.

Because the WEC conducted a cultural resource survey at the CFFF site, the NRC staff anticipates providing its effects determination, including any updates since the publication of the draft EIS, to the South Carolina SHPO, the Catawba Indian Nation, the Muscogee Nation, the

Cherokee Nation, the Eastern Band of Cherokee Indians prior to publication of the NEPA Record of Decision. A detailed discussion of the NHPA Section 106 consultation is provided in Appendix A.

Additionally, during the preparation of this EIS, the NRC staff reached out to the Pine Hill Indian Tribe and interested members of the public to discuss the scope of the proposed action and the NRC's regulatory role. The NRC staff notified and transmitted the draft EIS to the Pine Hill Indian Tribe and provided notification of the draft EIS public comment webinar. The Pine Hill Indian Tribe provided comments on the draft EIS on September 20, 2021. The NRC staff has addressed their comments in Appendix D of this final EIS. The NRC staff will submit the final EIS to all consulting parties (South Carolina SHPO, the Catawba Indian Nation, the Muscogee Nation, the Cherokee Nation, and the Eastern Band of Cherokee Indians). The NRC staff sent a letter, dated May 26, 2022, to the South Carolina SHPO summarizing the consultation activity and concluding NHPA Section 106 consultation (NRC 2022-TN7460).

1.5.1.2 ESA Section 7 Consultation

The ESA was enacted to prevent the further decline of endangered and threatened species and to restore those species and their critical habitats. ESA Section 7 (16 U.S.C. § 1531 *et seq.*; TN1010) requires that agencies consult with the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) to ensure that actions they authorize, permit, or otherwise carry out, will not jeopardize the continued existence of any listed species or adversely modify designated critical habitats. The NRC staff has consulted with the FWS and the NMFS as required under Section 7 of the ESA. For a detailed discussion of the NRC staff's consultations under ESA and impacts on federally listed species see Appendix A and Section 3.6 of this EIS, respectively.

1.5.1.2.1 FWS Consultation

Consultation with the FWS began in May 2015 during the development of the 2018 EA and FONSI when the NRC staff requested concurrence that the proposed 40-year license renewal is not likely to adversely affect terrestrial species or habitats under FWS jurisdiction (NRC 2015-TN5594). The FWS concurred and requested to be kept informed if new impacts were identified (NRC 2015-TN5594). In June 2019, the NRC staff informed FWS about the onsite contamination investigations and installation of groundwater monitoring wells and sampling, currently being conducted by the WEC under the CA with the SCDHEC (SCDHEC/WEC 2019-TN6554). Installation of the new groundwater wells and sampling at the CFFF site is approved by the SCDHEC and is conducted under the WEC's current NRC license (NRC 2019-TN6473). The NRC staff and FWS determined that installation of new monitoring wells would cause minimal land disturbances, and FWS concurred that the NRC's assessment that a 40-year license renewal would be unlikely to cause adverse effects to protected species or habitats (NRC 2019-TN6473; FWS 2019-TN6429). After review of the October 2019 draft EA, the FWS reconfirmed that the proposed CFFF 40-year license renewal was not likely to adversely affect federally listed species or habitats (FWS 2019-TN6426).

On July 31, 2020, the NRC staff notified the FWS of the NRC's intent to prepare an EIS for the WEC's LRA and invited them to participate in the scoping process (NRC 2020-TN6556).

During the development of this EIS, the NRC staff determined that no new information would call into question the staff's previous finding that the proposed action is not likely to adversely affect federally listed species under the FWS's jurisdiction. The impacts on federally listed

species evaluated and documented in this EIS have not changed from those discussed in the 2019 draft EA, which considered the impacts from installation of new monitoring wells at the CFFF site and that the FWS reviewed. As previously discussed, the FWS determined then that the proposed CFFF 40-year license renewal is not likely to adversely affect federally listed species (FWS 2019-TN6426). Therefore, reinitiation of consultation with FWS is not required (NRC 2020-TN6520). The NRC staff notified the FWS of the draft EIS issuance and will provide notification to the FWS on the issuance of this final EIS.

1.5.1.2.2 NMFS Consultation

The NRC staff requested informal consultation in 2017 with NMFS during the development of the 2018 EA and FONSI (NRC 2017-TN5603). The main focus of this consultation was the potential for impacts associated with the release of chemical pollutants from effluent releases into the Congaree River. Shortnose sturgeon were the original focus of the consultation because they are the only ESA federally listed species under the purview of NMFS that are known to occur in the action area (i.e., the Congaree River); however, NMFS determined that Atlantic sturgeon should also be considered because they could recolonize the area in the future if fish passages are added to downriver dams that impede their migration (NRC 2018-TN5588). On April 12, 2018, following its review of the NRC staff's biological evaluation (NRC 2017-TN5603) and additional information exchanges with NRC staff to better understand the potential impacts of radioactive and nonradioactive constituents (NRC 2017-TN5603; NMFS 2017-TN5577; NRC 2017-TN5605; NMFS 2017-TN5589; NRC 2017-TN5611), NMFS concurred with the NRC's determination that the proposed 40-year license renewal is not likely to adversely affect the shortnose sturgeon or Atlantic sturgeon under NMFS jurisdiction (NRC 2018-TN5588). Additionally, NMFS re-concurred with its *may affect, but is not likely to adversely affect* determination during the preparation of the October 2019 draft EA (NRC 2019-TN6419).

On July 31, 2020, the NRC notified the NMFS of the NRC staff's intent to prepare an EIS for the WEC's LRA and invited them to participate in the scoping process (NRC 2020-TN6520).

During the development of this EIS, the NRC staff determined that no new information would call into question the staff's previous findings for shortnose and Atlantic sturgeon because (1) installation of new groundwater monitoring wells would not adversely affect the two sturgeon species (NRC 2019-TN6419) and (2) the analysis in this EIS further evaluated onsite contamination in Sunset Lake and Mill Creek, which are within health standards and not expected to adversely impact listed sturgeons downstream in the Congaree River (see Sections 3.5 and 3.6). Therefore, reinitiation of consultation with NMFS is not required (NRC 2020-TN6520). The NRC staff notified NMFS of the publication of the draft EIS and will provide notification to NMFS upon issuance of this final EIS.

1.5.2 Coordination with Other Agencies

1.5.2.1 Congaree National Park

The Congaree National Park provided information about the geology and hydrology of the region during the NRC staff's preparation of the October 2019 draft EA. During a visit to the CFFF site, staff from the SCDHEC and the NRC met with Park staff to discuss the various reviews being undertaken and the local hydrogeology in the region. Park staff provided geology plates of the Congaree River Basin, which provided information about the heterogeneity of the subsurface. The NRC staff notified the U.S. National Park Service of the publication of the draft

EIS. The DOI provided comments to the NRC on September 17, 2021 (DOE 2021-TN7216), about the draft EIS, and the NRC staff has addressed these comments in Appendix D of this final EIS. The NRC staff will provide notification to the U.S. National Park Service upon issuance of this final EIS.

1.5.2.2 SCDHEC

As part of information-gathering activities during the environmental review process, the NRC staff has met with the SCDHEC staff to discuss and understand the remedial investigations and activities the WEC is conducting under the CA and other permit reviews. The SCDHEC provided comments to the NRC during the draft EA public comment period explaining the new data that the WEC was gathering as a result of the CA with the SCDHEC and recommending that the new data be considered in the environmental review process. As discussed in Section 1.3.2 of this EIS, the NRC staff addressed comments received during the 2019 draft EA comment period in the February 2020 Scoping Summary Report (NRC 2021-TN6934). Additionally, the NRC staff continued to reach out to the SCDHEC and review the SCDHEC's website to keep abreast of the progress of the implementation of the CA.

On July 31, 2020, the NRC staff notified the SCDHEC of the NRC staff's intent to prepare an EIS for the WEC's LRA and invited them to participate in the scoping process (NRC 2020-TN6520). On August 6, 2021, the NRC staff transmitted the draft EIS to the SCDHEC. On November 19, 2021, SCDHEC provided comments on the draft EIS focused on the WEC's remedial investigations under a CA with the SCDHEC and the WEC's operating air permit renewal application and technical review process (SCDHEC 2021-TN7192). During the preparation of the final EIS, the NRC staff discussed these comments with the SCDHEC. Additionally, the NRC staff has addressed these comments in Appendix D of this final EIS. The NRC staff will provide notification to the SCDHEC upon issuance of this final EIS.

1.5.2.2.1 Consent Agreement with the WEC

On February 26, 2019, the SCDHEC executed a CA with the WEC (SCDHEC/WEC 2019-TN6554) to conduct remedial investigations to address historical contamination at the CFFF site, and implement a communication protocol for any future contamination. Under the CA, the WEC will conduct remedial investigations that would provide information and data to determine the source and extent of contamination at the site. After the remedial investigations are completed, remediation alternatives would be determined by the WEC in coordination with SCDHEC and then implemented. The NRC is not a party to the CA (SCDHEC/WEC 2019-TN6554).

The CA follows the EPA's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 U.S.C. § 9601 *et seq.*; TN6592) process (SCDHEC/WEC 2019-TN6554). The CA replaces a Voluntary Cleanup Contract that the WEC and SCDHEC had entered into in August 2016 in response to the volatile organic compound (VOC) contamination in groundwater at the site. Under the CA, the WEC submitted a Remedial Investigation Work Plan (RIWP) (WEC 2019-TN6553) to the SCDHEC that outlines the WEC's evaluation of the CFFF site's groundwater, surface water, and soil, and the source and extent of contamination. SCDHEC approved the RIWP (also referred to as Phase I RIWP) on June 19, 2019. The RIWP focuses the investigation and remediation efforts on eight operable units (OUs) and Western Groundwater Area of Concern (AOC) (WEC 2019-TN6546). Figure 2-4 in Section 2.1.2 of this final EIS shows the AOC and OUs: Northern Storage Area, Mechanical Area, the Chemical

Area, West Lagoons Area, Primary Wastewater Treatment Area, Sanitary Lagoon Area, Southern Storage Area, and Western Storage Area.

As a requirement of the CA, the WEC has developed a site Conceptual Site Model (CSM) (WEC 2020-TN6526). The CSM describes the physical, chemical, and biological processes that govern the transport, fate, risk, and level of impact of contamination to ecological and/or human receptors. The CSM provides insights about data gaps and uncertainty to inform environmental assessments of the CFFF site.

The WEC's implementation of the approved RIWP is being conducted using a phased approach. Upon full implementation of the RIWP (Phase I and Phase II), the WEC would submit a Remedial Investigation Report to the SCDHEC for approval. This final report would document the results of the remedial investigations. The Remedial Investigation Report would also include the results of a human health and ecological risks evaluation that the WEC would conduct upon completion of the remedial investigations. The results of this risk evaluation would be included in a Baseline Risk Assessment as an appendix to the Remedial Investigation Report. After the SCDHEC's approval of the Remedial Investigation Report, the WEC would submit a Feasibility Study evaluating remedial alternatives for the CFFF site. The SCDHEC would then issue a Record of Decision identifying the remediation for the CFFF site. The WEC would implement the Remedial Action upon the SCDHEC approval of the WEC's Remedial Design of the chosen remedy for any given OU. The results of the implementation of the Remedial Design for any given OU would be documented in a Remedial Action Completion report. Finally, after completion of all the CA requirements, the WEC would provide a final report to the SCDHEC documenting the remediation of the CFFF site (SCDHEC/WEC 2019-TN6554).

Additionally, the WEC has submitted to the SCDHEC several addenda to the approved RIWP:

- Addendum 1 – Southern Storage Area Sampling Work Plan (WEC 2019-TN6552),
- Addendum 2 – East Lagoon Characterization RIWP (WEC 2019-TN6555),
- additional floodplain assessments (WEC 2019-TN7010),
- Sediment Transect Sampling Plan (WEC 2019-TN7009),
- Southern Storage Area Operable Unit Intermodal Container Work Plan (WEC 2019-TN6884),
- Updated Communication Protocol (WEC 2019-TN7008),
- Technetium Source Investigation Work Plan (WEC 2020-TN7011),
- HFSS#1 Soil Sampling Work Plan (WEC 2020-TN6537), and
- Addendum 3 – Sanitary Lagoon Operable Unit Sludge Characterization Work Plan (WEC 2021-TN6921).

In June 2019, the WEC began to execute the activities described in the approved RIWP (also referred to as Phase I). Additionally, each month, the WEC provides a status update to the SCDHEC, which can be found on the SCDHEC's website at <https://scdhec.gov/environment/ongoing-projects-updates/westinghouse/westinghouse-bureau-land-waste-management>.

In July 2020, the WEC submitted its *Interim Remedial Investigation Data Summary Report* to SCDHEC, which discussed the results of the WEC's implementation of Phase I of the RIWP (June 2019 through January 2020) (WEC 2020-TN6526). The report discussed the extent of previously identified groundwater impacts; areas of the plant operations that had not been previously evaluated; potential surface water and sediment impacts; potential sources of technetium-99 (Tc-99) contamination; depths of surface water bodies; and evaluation of private water supply wells. The WEC also used the data and analysis gathered through the implementation of Phase I of the RIWP to develop the CSM.

The WEC also executed the SCDHEC-approved Tc-99 source investigation work plan (WEC 2020-TN7011) to evaluate the source of the Tc-99 contamination at the CFFF site. Based on the sampling data and analysis discussed in the *Technetium-99 Source Investigation Report* (WEC 2020-TN6538), the WEC concluded that there are no active sources of Tc-99 from current operations of the CFFF, and that potential sources would be from past surface releases. The WEC will continue to evaluate the horizontal and vertical extent of Tc-99 during the implementation of the Phase II RIWP (WEC 2020-TN6538).

The evaluation of the data gathered through implementation of the Phase I RIWP identified areas that required additional assessment to further define the source, location, and extent of the contamination, further develop the CSM, and complete the Tc-99 investigation work plan (SCDHEC 2020-TN7003). The WEC submitted the Phase II RIWP to the SCDHEC for approval in September 2020 (WEC 2020-TN6707), which the SCDHEC approved in October 2020 (SCDHEC 2020-TN7012) with a few exceptions. The WEC submitted an addendum to the RIWP to address these exceptions (WEC 2020-TN6917), which the SCDHEC approved in November 2020 (SCDHEC 2020-TN7005). Implementation of the Phase II RIWP began in November 2020 and was completed in August 2021. Phase II RIWP planned activities included continued monitoring and assessment of the impact on groundwater and soil from sources of constituents of potential concern (e.g., chlorinated volatile organic compounds, nitrate, fluoride, Tc-99, and uranium) and assessment of sediment, groundwater, and sludge in the Sanitary Lagoon, Gator Pond, middle ditches, and other areas of concern (WEC 2020-TN6707, WEC 2020-TN6917). The following addenda were subsequently approved by SCDHEC:

- additional well monitoring permits (WEC 2021-TN7007),
- Addendum 3 – Sanitary Lagoon Operable Unit Sludge Characterization Work Plan (WEC 2021-TN6921), and
- Sediment Sampling Plan to Bound the Extent of Uranium Around SED-44 (WEC 2021-TN7006).

The WEC completed the remedial investigation fieldwork to fully characterize the site and was authorized by the SCDHEC to prepare the final remedial investigation report, which will include a human health risk evaluation and an ecological risk evaluation (Baseline Risk Assessment) (WEC 2021-TN7170). The fieldwork data were submitted to the SCDHEC in the CA monthly progress reports, available on the SCDHEC website, <https://scdhec.gov/environment/environmental-sites-projects-permits-interest/westinghouse/westinghouse-bureau-land-waste-management>. The WEC's remedial fieldwork under the RIWP characterized the source, nature, and extent of contamination at CFFF by examining groundwater, surface water, soil, and sediment. The WEC installed 57 new groundwater monitoring wells and a sentinel groundwater monitoring well network around the chemical area manufacturing building, as part of its remediation. The WEC also removed

contaminated intermodal storage containers from the Southern Storage Area and shipped them offsite for disposal as low-level waste. Additionally, the WEC removed the East Lagoon from service and remediated it in accordance with the closure plan approved by the SCDHEC. The WEC also completed the characterization of the Sanitary Lagoon sludge to support the planned closure process (WEC 2021-TN7170).

1.5.2.3 U.S. Environmental Protection Agency Region IV

The EPA reviews all draft EIS documents prepared by Federal agencies in accordance with Section 309 of the Clean Air Act. The NRC staff transmitted the draft EIS to EPA Region IV upon publication on July 30, 2021, and again on August 6, 2021, when the draft EIS public comment period began. The EPA Region IV provided comments to the NRC on November 19, 2021 (EPA 2021-TN7128), which focused on the evaluation of impacts from the proposed action on groundwater and surface water bodies, tribal treaty rights, climate change, and environmental justice. The NRC staff has been participating in discussions with the EPA Region IV during the preparation of this final EIS. Additionally, the NRC staff has addressed the EPA's comments in Appendix D of this final EIS, and will provide notification to the EPA of the issuance of this final EIS.

2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter of the environmental impact statement (EIS) describes the licensed Columbia Fuel Fabrication Facility (CFFF) site and operations that would continue during the proposed 40-year license renewal period if the U.S. Nuclear Regulatory Commission (NRC) grants the license renewal request, and also describes the alternatives to the proposed action that the NRC staff considered (1) the no-action alternative and (2) the 20-year license renewal alternative.

2.1 Proposed Action

The proposed action, as requested by Westinghouse Electric Company, LLC (WEC), is the renewal of a 10 CFR Part 70 license to possess and use special nuclear material (SNM) for 40 years at its Columbia Fuel Fabrication Facility located in Hopkins, South Carolina. The facility is licensed to possess and process enriched uranium up to a maximum of 5 weight-percent uranium-235 for the manufacture of nuclear fuel assemblies for use in commercial nuclear power reactors. The WEC did not request changes to its NRC materials license or propose construction of new buildings or structures within the controlled access area or restricted area (WEC 2019-TN6510).

2.1.1 Site Location and Layout

The CFFF site occupies 469 hectares (ha) (1,151 acres [ac]) in Hopkins, South Carolina, in Richland County. The site is approximately 13 kilometers (km) (8 miles [mi]) southeast of the city limits of Columbia, South Carolina. Figure 2-1 provides the general location of the CFFF site. Approximately 28 ha (68 ac) of the property area are used for facility operations and support activities.

Figure 2-2 shows the CFFF's controlled area boundary, which is bounded by South Carolina highway S 48 (Bluff Road) to the north and private property owners in all other directions. Access to the site is controlled by fencing, security barriers, and natural barriers (e.g., land contours). The manufacturing facilities are located about 490 meters (m) (1,600 feet [ft]) from the nearest point on the site boundary. The main manufacturing building for the CFFF is located approximately 760 m (2,500 ft) from the roadway. Physical access is through the main plant road that connects CFFF to Bluff Road, which is controlled by a continuously staffed security guard station located on the main access road. The controlled area boundary is equivalent to the site's property boundary and encompasses the restricted area, which is defined in the license as the area within the fenced area, including the main manufacturing building on the site.

The CFFF site lies within the flood basin of the Congaree River, which flows approximately 6.4 km (4 mi) southwest of the main plant (WEC 2019-TN6510). Stormwater from the CFFF drains into Sunset Lake and Mill Creek, which subsequently drains into the Congaree River. Figure 2-3 shows that the remaining property (approximately 441 ha [1,083 ac]) is mostly undeveloped (WEC 2019-TN6571).

As shown in Figure 2-3, the restricted area is a physically defined area bounded by the administration and main manufacturing buildings on one side and security fence on the remaining three sides. Physical access to the restricted area is limited to authorized individuals and visitors who are escorted.

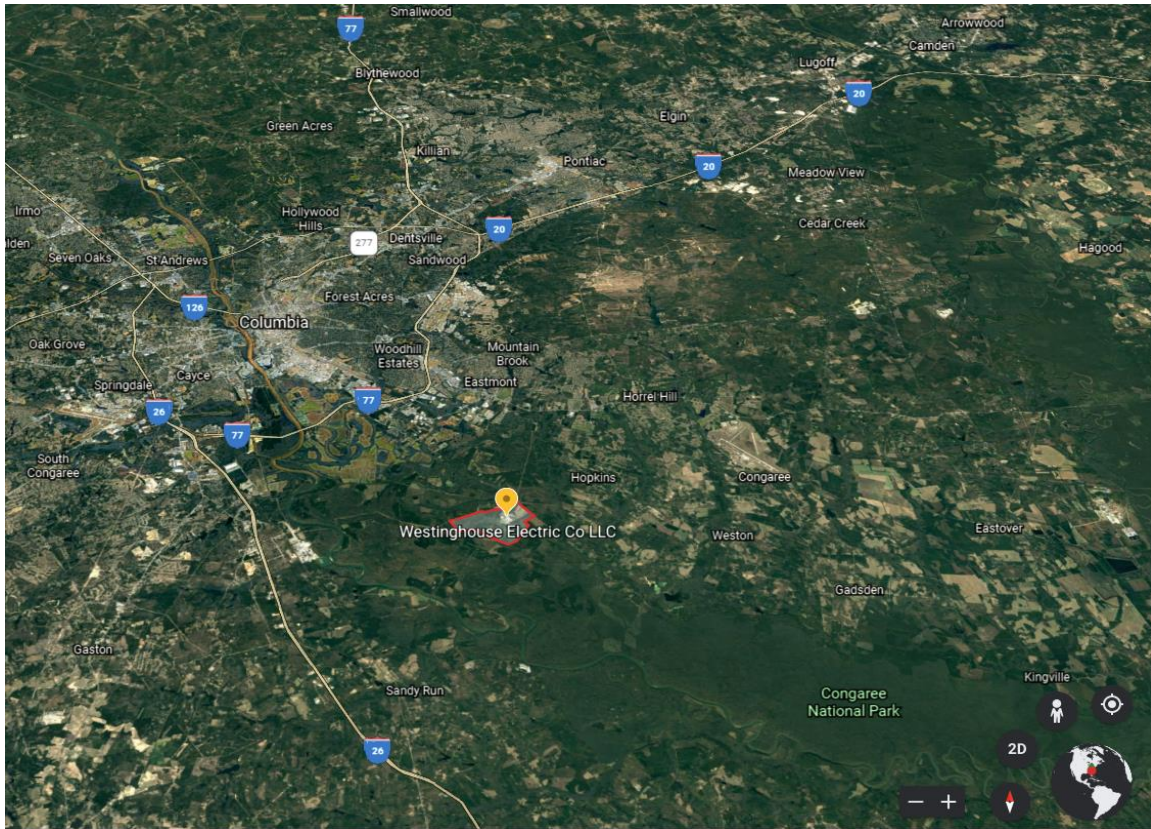


Figure 2-1 General Site Location (Source: Modified from Google Earth)

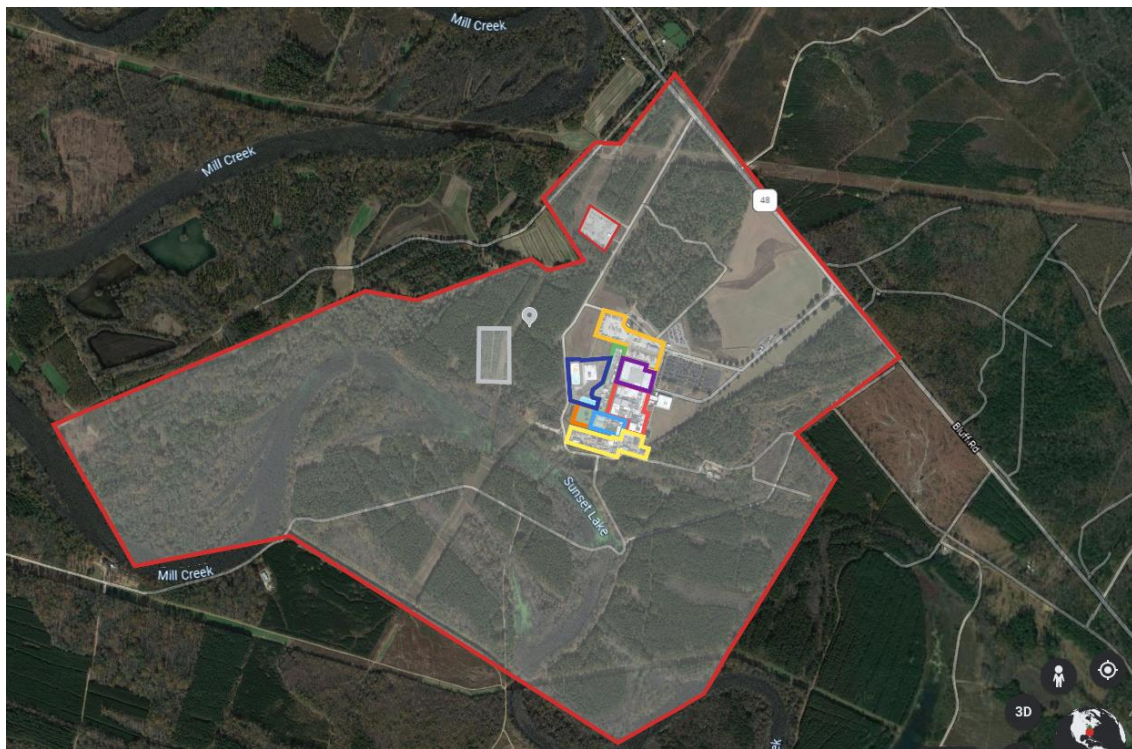


Figure 2-2 CFFF's Controlled Area Boundary (Source: Modified from Google Earth)



Figure 2-3 CFFF Site Layout (Source: Modified from Google Earth)

2.1.2 Facility Operations during the License Renewal Term

The CFFF manufactures nuclear fuel assemblies containing natural and low-enriched uranium oxide fuel for use in light-water commercial nuclear power reactors. The CFFF also produces other fuel-related products, such as control rods and mechanical components. The primary facilities consist of a main fuel fabrication plant, laboratory, wastewater treatment plant (WWTP) and lagoons, raw material storage buildings, parking lots, and office space. As illustrated in Figure 2-4, the WEC, in support of the remedial investigations under a Consent Agreement (CA) with South Carolina Department of Health and Environmental Control (SCDHEC), divided the CFFF into eight operational units (OUs) based on the different types of site activities and operations: Northern Storage Area, Mechanical Area, Chemical Area, West Lagoons Area, Wastewater Treatment Area, Sanitary Lagoon Area, Southern Storage Area and Western Storage Area. Figure 2-4 also shows a Western Groundwater Area of Concern just west of the main facilities area that the WEC is also monitoring. This area is discussed further in Section 2.2.2.3 of this EIS.

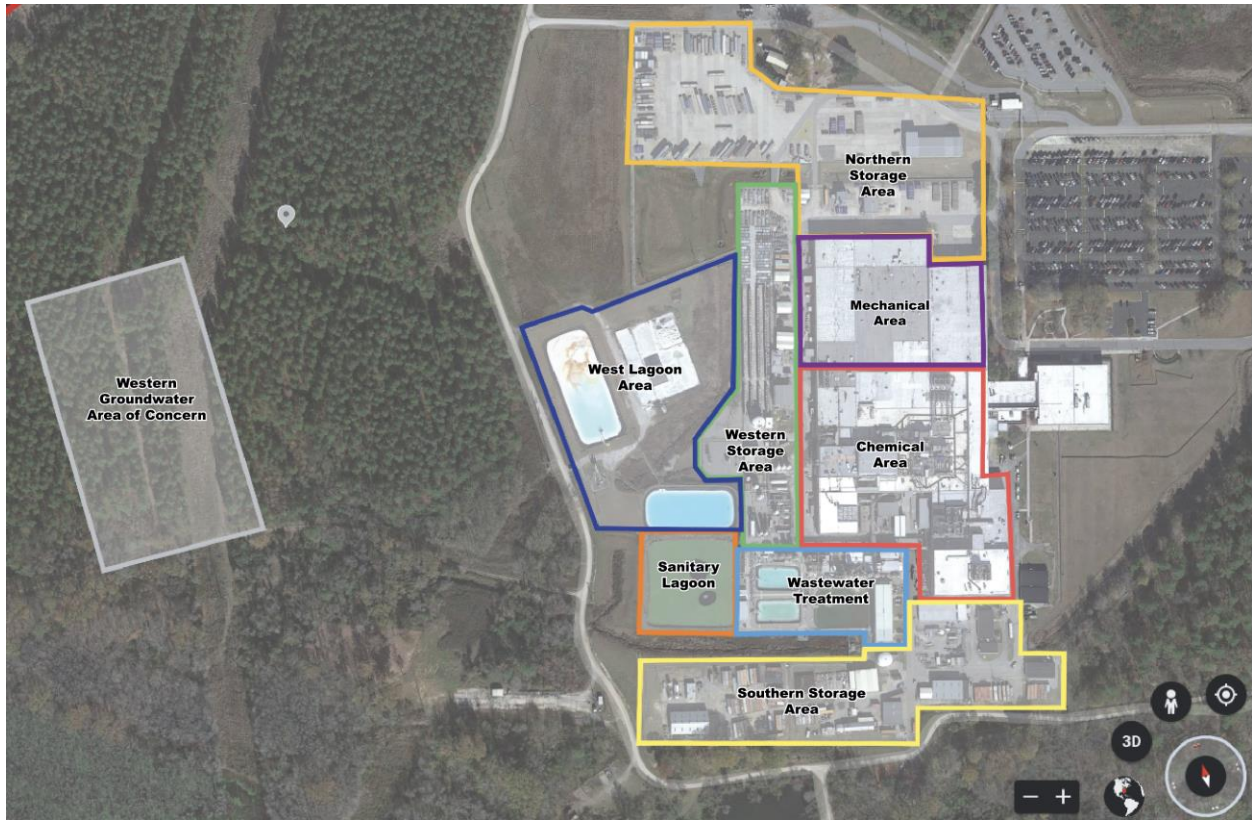


Figure 2-4 CFFF Operational Units (Source: Modified from Google Earth)

Manufacturing of the fuel assemblies is conducted in the main manufacturing building, which is divided into the Chemical Area and Mechanical Area. The Chemical Area includes uranium operations involving uranium hexafluoride (UF_6) conversion, powder blending, pellet manufacturing, fuel rod loading, and scrap processing. The Mechanical Area includes operations involving encapsulated uranium and sealed uranium materials for rod certification and storage, and final fuel rod assembly. The CFFF receives cylinders of natural and low-enriched UF_6 via truck shipment. The production of nuclear fuel assemblies at the CFFF (see Figure 2-5) starts with the chemical conversion of UF_6 into uranium dioxide (UO_2). This is accomplished via the ammonium diuranate (ADU) process, which uses water and ammonium hydroxide.¹ The UO_2 is processed and pressed into fuel pellets heated to form a ceramic material, and then further processed through a grinding operation. These fuel pellets are loaded and sealed into metal fuel rods. The rods are assembled into bundles that form the nuclear fuel assemblies.

¹ In 2011, the CFFF replaced the use of anhydrous ammonia with aqueous ammonium hydroxide (WEC 2019-TN6510).

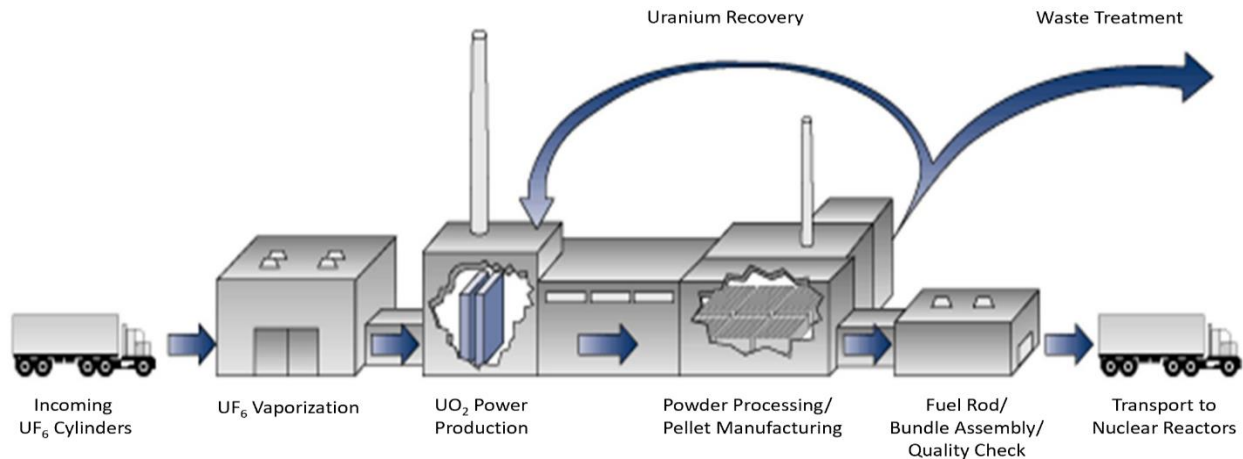


Figure 2-5 Typical Light-Water Reactor Fuel Fabrication Facility (Source: NRC 2020-TN6835)

Other facilities and processes that support the ADU chemical conversion process and pellet fabrication include oxidation of recycled fuel pellets, chemical receipt, storage and handling, cylinder recertification, cylinder washing, respirator cleaning, scrap recovery, laboratory analysis, incineration, solvent extraction (SOLX), waste treatment, welding, metal fabrication, quality control testing, and shipping container refurbishing. During scrap recovery, the material is converted to triuranium octoxide (U_3O_8) powder and uranyl nitrate (UN). The UN is subsequently processed through the ADU process (WEC 2019-TN6510). All manufacturing operations are governed by NRC-approved radiation and environmental protection, nuclear criticality safety, industry safety and health, SNM safeguards, and quality assurance controls. The completed fuel assemblies are shipped in NRC-approved containers to the WEC's customers for use at commercial nuclear power plants. The shipments of nuclear materials from the CFFF are governed by the NRC, the U.S. Department of Transportation (DOT), and State of South Carolina regulations.

Low-level radioactive combustible scrap is incinerated to permit the recovery of uranium and to minimize the volume of waste disposal at a licensed low-level radioactive waste (LLRW) disposal facility. Typical incinerator feed materials include uranium-contaminated paper, shoe covers, gloves, mops, plastic bags, tape, and fiberboard containers (WEC 2012-TN7017). The incineration process consists of primary and secondary combustion chambers; off-gas scrubbing and filtration systems, and an ash transfer milling and leaching system. As clarified by the WEC, ash generated by the incineration process is dissolved and the uranium is recovered in the form of UN, which is the CFFF recycle feedstock. The gases given off during the burning of solid wastes include carbon monoxide, sulfur dioxide (SO_2), coarse particles (PM_{10}), fine particles ($PM_{2.5}$), volatile organic compounds (VOCs), nitrogen oxides (NO_x), and mineral acid hydrochlorides (HCLs) and hydrogen fluoride (HF) due to the burning of rubber, plastics, and other chemicals. The incinerator off-gas is treated by scrubbing and filtration. The scrubber solution is treated and cooled such that excess solution is automatically or manually transferred to the liquid waste treatment and the condensed liquid is returned to the scrubber system for reuse. Prefilters and high-efficiency particulate air (HEPA) filters are used to support various air filtration processes throughout the plant. When filters have reached their useful life, they are transported to a cutting room where they are disassembled. The frames are removed from the filter media and shredded prior to drumming, assaying, and shipping offsite as LLRW. Operators attempt to remove additional particulate matter, including small amounts of uranium, from the filter media in the cutting room and subsequently recycle the uranium in the process.

The SOLX process separates uranium from contaminants, recovers it as clean UN solution, and delivers it to storage tanks for conversion back to usable product UO₂. In 2019, the WEC modified its management practices for the SOLX mixture containing perchloroethylene (PCE) (WEC 2020-TN6844). The WEC no longer adds SOLX mixture containing PCE to wet combustible material (WCM) and revised its process to segregate WCM containing any PCE residual into a dedicated Satellite Accumulation Area. The WEC has also ceased inputting WCM containing the SOLX mixture with PCE into the incinerator. Any bulk SOLX mixture that existed as of July 1, 2019 was processed to recover uranium and then sent offsite to a licensed facility as mixed hazardous waste for treatment and disposal. In April 2020, the WEC eliminated its use of PCE in the SOLX process and replaced it with dodecane. In 2022, the WEC anticipates resuming the incineration of SOLX materials containing dodecane and has a revised air permit application pending to reflect this change, including new emissions calculations (WEC 2019-TN6777).

The CFFF site currently has five lagoons that support the uranium recycle and recovery services (URRS) process streams. The West Lagoon Area includes the West I and West II lagoons. The Wastewater Treatment Area includes the South and North Lagoons; and the Sanitary Lagoon Area includes the Sanitary Lagoon. Figure 2-6 describes the URRS process streams at CFFF. In December 2008, the liner of West Lagoon II was replaced, and in 2012, the liners of four lagoons (West I, West II, South, and North Lagoons) were replaced with 80-millimeter (mm; 3.1 inches [in.]) thick high-density polyethylene (HDPE) liner in response to groundwater monitoring data that indicated increasing trends of fluoride and nitrate in the groundwater around the lagoons (WEC 2019-TN6510).

The former East Lagoon had a 36 mil Hypalon liner (NRC 2018-TN6549) that was relined around 1980 when the site's Waterglass system was installed (NRC 2019-TN6472). In 2021, the WEC removed the East Lagoon and remediated the area in accordance with the closure plan approved by the the SCDHEC (WEC 2020-TN6844, WEC 2020-TN7020, WEC 2020-TN7004, WEC 2021-TN7105, and the SCDHEC 2021-TN7175). The Sanitary Lagoon is unlined. The WEC anticipates permanently closing the Sanitary Lagoon and replacing it with a fully contained aboveground treatment system (WEC 2021-TN6921). In support of the closure of the Sanitary Lagoon, the WEC completed the characterization of the Sanitary Lagoon sludge, which will be used to prepare a closure plan for the SCDHEC's approval (WEC 2020-TN6844, WEC 2021-TN6921, WEC 2021-TN7133). The closure of the East Lagoon and the planned closure of the Sanitary Lagoon are discussed in greater detail in Section 2.1.3.3 of this EIS.

A contaminated wastewater (CWW) line was installed to contain contaminated water as part of the 1978 expansion of the west side of the manufacturing building. The CWW line receives wastewater streams from the shower/sink water from the operators' locker rooms, the respirator cleaning facility, and the UF₆ vaporization steam condensate/trench, overflow of the 8A scrubber, and various laboratories sinks and floor drains. The input lines, some of which run underground and external to the building, are routed to a single external line and sump.

The fabrication of neutron-absorbing assemblies, including Tritium-Producing Burnable Absorber Rods (TPBARs), takes place at CFFF, although this activity is not licensed by the NRC. As explained by the WEC, TPBARs are used by the U.S. Department of Energy's Tritium Readiness Program and are designed to produce tritium when placed in a low-enriched uranium fuel assembly and irradiated in a nuclear power reactor (WEC 2021-TN7170). Cumulative impacts associated with manufacturing TPBARs at CFFF are evaluated in Section 3.19 of this EIS.

- Contaminated Wastewater Line Breaches

- Leaks from a buried wastewater pipe (CWW line), discovered in 2008, released an unknown amount of uranium into the subsurface (WEC 2019-TN6510). In 2008, CFFF maintenance personnel inspected an underground external section of the CWW line and identified a breach at a connection point near Dock 3. Samples of the water from the CWW line and soil near the breach were collected and analyzed for radionuclides. The analysis identified radionuclides in the CWW and subsurface soils. In response to the 2008 leak, the WEC replaced the underground piping system using a pipe burst system.
- In 2011, CFFF personnel discovered breaches at two locations in the CWW line buried underneath the manufacturing building floor. Samples of the soil and process wastewater in one breach were collected and analyzed. The analysis identified radionuclides in both the soil and wastewater at the source of the breach. Samples could not be collected at the second breach due to access issues related to the plant infrastructure. In response to the 2011 leak, the affected piping under the building floor was abandoned in place and aboveground polyvinyl chloride (PVC) piping was installed to transport wastewater. The location of the CWW line underneath the building prevented remediation of the soil when the leak was discovered. Under WEC's remediation procedure RA-433, the WEC has committed to continue to monitor the area and, based on the monitoring results, will determine when the area will be remediated (WEC 2019-TN6546). The WEC identifies this area as an area requiring remediation in its Decommissioning Funding Plan (DFP), and the WEC's cost estimate specifically includes removal and disposal of affected soil at the time of site decommissioning (WEC 2021-TN7170).
- In early 2018, CFFF personnel reassessed the data leading to a recharacterization of the 2008 and 2011 leaks (WEC 2019-TN6510). On August 29, 2018, the WEC requested approval from the SCDHEC to install nine temporary monitoring wells (later converted to permanent monitoring wells) at the same locations of the direct-push borings to collect additional samples (WEC 2019-TN6546). CFFF personnel also completed an assessment of the CWW line piping integrity outside of the building and found the system to be intact, and no new concerns were identified (WEC 2019-TN6510).

- South Lagoon Leakage Event

- In March 2012, water level readings of the South Lagoon indicated that a leak had developed in the lagoon's recently replaced liner. The South Lagoon is one of the lagoons used for settling solids from the treated process wastewater prior to discharge to the Congaree River (WEC 2012-TN7045).

- Cylinder Recertification Transfer Line

- In January 2014, there was a leak from a tank transfer line from the Cylinder Recertification Tank (T1405) to the Waterglass Processing Tank (T-1160A) (WEC 2019-TN6510). In immediate response to the leak, the WEC positioned absorbent pads to reduce liquid migration into the soil. The estimated volume of uranium-contaminated process solution spilled was approximately 20–25 gallons. The WEC initiated soil sampling in the affected area prior to soil remediation, with uranium concentration measuring 26.3 parts per million (ppm). Based on these results, the WEC removed approximately 1,033 ft³ of contaminated soil from the affected area and transported it offsite for disposal as LLRW. Additionally, a leak check was performed on the repaired transfer line prior to its return to service (WEC 2019-TN6510).

- Historic Flooding Event

- In October 2015, a historic flooding event occurred in the area. Columbia, South Carolina, received a total of 31.5 centimeters (cm) (12.4 in.) of rain over 4 days, of which 20 cm (8.19 in.) were received within a 12-hour (hr) period. This was a historic event because, for the Columbia area, precipitation of 29.22 cm (11.5 in.) in a 24 hr period corresponds to the 500-year flood and 33.8 cm (13.3 in.) of rain in a 24 hr period corresponds to the 1,000-year flood. In the vicinity of the CFFF site, the Congaree River crested at 37.6 m (123.3 ft) above mean sea level (MSL), and the CFFF site experienced flooding of low-lying areas. The main manufacturing building was not affected by floodwater. Two process lagoons overflowed beyond containment (WEC 2019-TN6510). The Sanitary Lagoon overflowed into the adjacent North and South Lagoons. The West II Lagoon depth was measured to be approximately 38 cm (15 in.) beyond the liner onto the surrounding ground and remained within the berm. In accordance with CFFF procedure, an emergency discharge to the Congaree River was initiated to allow the levels in the lagoons to be decreased at a faster rate. No long-term impacts on groundwater wells within the existing monitoring well network and the water table on the bluff were identified, because the majority of the rainfall left the site via overland flow in CFFF's network of stormwater ditches (WEC 2019-TN6510).

- Scrubber Event

- In 2016, while conducting an annual inspection and cleaning of a scrubber, the WEC found a large mass of material inside the scrubber inlet transition. Initially, the WEC believed that the material was low in uranium content, but further analysis found the uranium mass limit was exceeded. The WEC reported the event to the NRC on July 14, 2016 (EN #52090; NRC 2016-TN5604). On July 31, 2016, the WEC updated the event notification to report material found in the scrubber packing and floor also exceeded the uranium mass limit for the scrubber criticality safety evaluation (NRC 2016-TN5604). The NRC established an Augmented Inspection Team (AIT) to inspect and assess the facts and circumstances surrounding the event. The AIT completed the inspection on September 1, 2016 and provided its report to the WEC on October 26, 2016 (NRC 2016-TN5604). The AIT found that items relied on for safety (IROFS) for the scrubber did not ensure that a criticality accident was highly unlikely and found that the controls and measures to protect against a criticality were not sufficient to assure subcriticality conditions. The AIT also found that the WEC did not establish adequate management measures to ensure the availability and reliability of the IROFSs and that the WEC failed to provide adequate levels of oversight, enforcement, and accountability to the organizations directly involved with configuration management, operations, and maintenance of the wet ventilation systems (NRC 2016-TN5604).
- On August 9, 2016, the WEC provided commitments to the NRC to identify the causes of the event and take corrective actions (WEC 2016-TN5623). The NRC issued a Confirmatory Action Letter (CAL) on August 11, 2016, (NRC 2016-TN5591) confirming the WEC's commitments to ensure the root causes of the event were adequately evaluated and appropriate corrective actions were implemented before resumption of operations. In September 2016, the NRC staff inspected against the CAL to verify that the commitments necessary to restart the conversion process equipment and scrubber system were completed and that the actions taken provided reasonable assurance of the WEC's ability to safely operate the facility (NRC 2016-TN5590). By letter dated October 20, 2016, the NRC staff informed the WEC there were no safety issues with the licensee's plan to restart the conversion process equipment and scrubber (NRC 2016-TN5610). On February 27, 2017, the NRC staff completed a follow-up inspection of the

issues identified by the WEC in July 2016 and evaluated by the NRC's AIT, as described above. The NRC issued an Inspection Report (NRC 2017-TN6596), which documented four apparent violations that were considered for escalated enforcement in accordance with the NRC's Enforcement Policy. The NRC's Inspection Report offered the WEC a choice to (1) attend a Pre-decisional Enforcement Conference, (2) provide a written response, or (3) request an alternate dispute resolution (ADR) session with the NRC in an attempt to resolve any disagreement regarding whether violations occurred, the appropriate enforcement action, and the appropriate corrective actions.

- In response, the WEC requested an ADR to resolve the enforcement aspects and to discuss corrective actions. The ADR process culminated in the issuance of a confirmatory order (NRC 2017-TN6597) requiring corrective actions and enhancements that the NRC staff determined would address the underlying cause of the scrubber event. The confirmatory order was closed via a final confirmatory inspection report issued on March 11, 2020 (NRC 2020-TN7013).

- HFSS#2 Leakage Event

- In July 2018, the WEC informed the SCDHEC of the discovery of contamination within the sub-slab soils beneath Hydrofluoric Spiking Station (HFSS) #2, which resulted from a leak. Uranium concentration was 4,001 ppm at a depth of 170.18 cm (67 in.) beneath the hole that penetrated the concrete (SCDHEC/WEC 2019-TN6554). To evaluate the extent of the contamination and condition of the subsurface beneath HFSS#2, the WEC completely disassembled each HFSSs (there are two HFSSs in the facility), and removed the liner in each berm to inspect the floor (WEC 2020-TN6521). After receiving the SCDHEC's approval, the WEC remediated the station and returned it to normal operation (WEC 2020-TN6521).
- The WEC collected soil samples after receiving approval from the SCDHEC on the work plan for the subsurface investigation of the HFSS#1 area. The WEC found that fluoride and nitrate levels did not exceed the CFFF action levels; technetium-99 (Tc-99) was not detected, but uranium was detected at levels exceeding the remedial action levels (WEC 2020-TN6521). After evaluating the residual contamination and taking into consideration the operating configuration of the HFSS, the WEC concluded that the concrete floor slab acts as a barrier between the residual contamination and an industrial worker. The WEC's highest dose calculated using a 100-year timeframe was 0.324 millirem per year (mrem/yr). The WEC will leave the material in place; the decommissioning cost estimate was updated to include the removal of contaminated material (WEC 2020-TN6521).
- The WEC redesigned both spiking stations and diked areas to prevent spills of process solution from damaging the concrete. The concrete is protected with a floor coating that is impervious to acidic materials, which guards against undetected deterioration of the concrete floor (WEC 2020-TN6521). In addition, the WEC replaced tanks, installed removable polypropylene catch pans, replaced couplings and piping, installed automatic shutoff valves to remove hydrofluoric system pressure, and modified the berms (WEC 2020-TN6521; WEC 2021-TN7170).

- Storage Drum Leakage Event

- In May 2019, during a routine inspection of intermodal (also referred to as sea-land) containers holding drums of uranium-bearing materials, the WEC discovered the structural integrity of the storage containers and the drums within them had been compromised (NRC 2019-TN6472; WEC 2020-TN6844). Rainwater had penetrated the roof of the containers that were located in the Southern Storage Area OU and the flooring, drum lids, and drums of the storage containers were compromised.
- As part of the implementation of the CA, the WEC developed Addendum 1 to the Phase I Remedial Investigation Work Plan (RIWP) to address remediation activities in the Southern Storage Area OU (WEC 2019-TN6552).
- The WEC has emptied all the intermodal storage containers containing accountable uranium and uranium contaminated materials from the southern storage area. Some containers were sent offsite for recycling and others were reloaded and sent offsite for disposal as low-level waste. As of November 2020, the WEC had removed 62 intermodal containers (WEC 2020-TN6844). Drums potentially containing PCE were separated and are currently stored at the CFFF site. As the intermodal containers were removed, the WEC sampled the soil and removed contaminated soil in accordance with its site remediation procedure, RA-433, “Environmental Remediation.” The WEC has remediated soils in which the uranium levels were detected above the US EPA residential cleanup standard. With the exception of intermodal container C-21, the soil-sampling results for Tc-99, fluoride, and PCE were below the residential screening levels identified in the WEC’s site remediation procedure (WEC 2019-TN6552). In February 2021, the WEC reported that soil samples for the footprint underneath intermodal container C-21 exceeded the residential screening level for PCE (0.0023 mg/kg). Soils were excavated, and affected areas were sampled again. These results were below the residential screening level for PCE (WEC 2021-TN7046). The affected soil was removed from CFFF and transported to an approved disposal site (WEC 2019-TN6552, WEC 2021-TN7170). The WEC has removed the remaining intermodal containers that do not contain radioactive materials (NRC 2022- TN7252).
- The WEC also explained that procedures have been revised to prohibit future storage of uranium-containing materials in intermodal containers (WEC 2019-TN6552).

2.1.3.2 Additional Facility Changes

The WEC made additional facility changes to reduce impacts to the environment, including the following:

- In early 2012, the WEC extended the controlled access area fence to allow better control of incoming and outgoing shipments of materials related to CFFF operations (WEC 2019-TN6510).
- The WEC has increased its storage limits for UF₆ cylinders and built a concrete storage pad on previously disturbed land.
- The WEC no longer uses anhydrous ammonia in its ADU process.
- The WEC replaced the liners of four WWTP lagoons between 2008 and 2012 with an 80-millimeter HDPE.
- In July 2019, the WEC stopped the practice of incinerating SOLX materials containing residual quantities of PCE. In April 2020, the WEC eliminated its use of PCE in the SOLX

process and replaced it with dodecane (WEC 2020-TN6844). In its response to the NRC staff's requests for additional information (NRC 2020-TN6788), the WEC explained its plans to resume the incineration of SOLX materials containing dodecane in the future. The WEC will submit a revised air permit application to the SCDHEC reflecting the change, which would include new emissions calculations (WEC 2020-TN6844). The anticipated new air permit would also reflect the elimination of plating activities that occurred in 2020 (WEC 2020-TN6844).

- In March 2020, the WEC decommissioned the grid strap nickel plating process and associated equipment. The hazardous waste generated from the cleaning operations was shipped offsite (WEC 2020-TN7044).
- In March 2020, the WEC reported the completion of the fifth and last shipment of the V-1454 bulk mixture (consisting of tributyl phosphate [TBP] solvent/tetrachloroethylene/kerosene/uranium) to Energy Solutions (WEC 2020-TN7044).

2.1.3.3 *Additional Ongoing Changes*

Ongoing changes to reduce impacts to the environment are threefold:

- As discussed in Section 1.5.2.2.1, in June 2019, the WEC began to execute the phases of remediation activities identified in the RIWP, and committed to in the CA with the SCDHEC. The WEC installed a series of wells throughout the groundwater monitoring network to improve monitoring of liquid effluents. As of January 2021, the WEC had installed 19 lithologic borings, 4 surface water staff gauges, and had upgraded 29 monitoring stations (wells W-69 through W-97) including four new floodplain wells (W-94 through W-97) (WEC 2020-TN6526). An additional 12 permanent monitoring wells (wells W-98 through W-100, W-102 through W-105, and W-107 through W-112) were installed using sonic drilling as part of the implementation of Phase II of the RIWP under the CA (WEC 2021-TN6919). Pressure transducers were installed in monitoring wells to evaluate surface water-groundwater interactions (WEC 2021-TN7131). Fourteen additional groundwater monitoring wells (W-113 to W-126) and five additional pressure transducers in wells were installed to obtain additional monitoring information identified as necessary to further characterize and monitor remediation efforts in Phase II sampling (WEC 2021-TN7114). As of February 2022, the WEC's fieldwork under the RIWP included the installation of 57 new groundwater monitoring wells and a sentinel groundwater monitoring well network around the chemical area manufacturing building.
- On September 29, 2021, the WEC decommissioned the East Lagoon (WEC 2021-TN7134) after completing activities identified in the East Lagoon Closure Plan and committed to in the CA (WEC 2020-TN7020). The East Lagoon Closure Plan was integrated into Phase II of the RIWP, which the SCDHEC approved on October 14, 2020 (SCDHEC 2020-TN7012) with the exception of three issues unrelated to the East Lagoon Closure Plan that needed more clarification. The WEC addressed the three exceptions, which involved soil gas survey sampling locations, soil samplings in borings, and sediment samplings in borings (WEC 2020-TN6917), which the SCDHEC subsequently approved on November 5, 2020 (SCDHEC 2020-TN7005). On October 7, 2021, the SCDHEC performed the final inspection of the East Lagoon closure (WEC 2021-TN7132) and approved completion of the closure plan (WEC 2021-TN7157). In accordance with the East Lagoon Closure Plan, the WEC removed contaminated sludge from the lagoon and collected soil samples from beneath the lagoon liner at 16 locations that were selected according to a grid and at 10 additional locations based on liner conditions observed after the sludge had been removed (WEC 2021-TN7146). Soil samples were also collected beneath the East Lagoon concrete sump

(WEC 2021-TN7114). These soil samples were analyzed to identify the constituents of potential concern (COPCs) that are included in the plan (WEC 2020-TN6844). The results of the soil analyses show that residual concentrations in soil for nonradiological and radiological COPCs do not exceed the industrial screening level. However, limited areas of soil containing radiological concentrations that exceed the residential soil screening levels were identified; these areas were left in place to avoid undermining existing structures or excavating below the groundwater level. The WEC also reports that soil containing radiological concentrations above residential soil screening levels will be addressed as part of the decommissioning of the site and that the DFP was updated to include this information, as described in detail in Section 2.3 of this EIS (WEC 2021-TN7170). The screening levels are discussed further in Section 2.2.2.1.2.

- The U.S. Ecology Idaho, Inc. (USEI) disposal facility is a Subtitle C Resource Conservation and Recovery Act (RCRA) hazardous waste disposal facility permitted by the State of Idaho to receive low-level radioactive waste and is not licensed by the NRC. Idaho is not an NRC Agreement State, however, Idaho regulations and the Grand View facility permit stipulate that acceptance of NRC-licensed material for disposal is contingent upon the NRC's approval of the requested alternate disposal method. The USEI disposal facility has received several shipments of low-level radioactive waste from the CFFF,² which are discussed below.
 - On December 16, 2020, the NRC granted the WEC an exemption from 10 CFR 70.3 and 10 CFR 30.3 issued a conforming license amendment to allow the WEC to transfer waste containing byproduct and special nuclear material from the CFFF to the USEI disposal facility near Grand View, Idaho (85 FR 81525-TN7164). The actual volume of waste shipped was 694 m³ (24,500 ft³)(86 FR 16239-TN7168). The NRC also approved USEI's exemption request from 10 CFR 70.3 and 10 CFR 30.3 to allow USEI to receive and possess the material from CFFF (85 FR 81525-TN716). The waste the WEC shipped to the USEI facility was (1) from the East Lagoon, including the East Lagoon liner, (2) soils excavated from below the liner, (3) solid calcium fluoride (CaF₂) sludge previously dredged from various onsite lagoons on the site and placed in a storage pile, and (4) UF₆ cylinders previously used for shipping that underwent the internal wash/rinse process after last use, but remained internally contaminated with special nuclear material.
 - The WEC was also granted exemptions from the NRC regulations at 10 CFR 70.3 and 10 CFR 30.3 on March 12, 2021 (86 FR 16239-TN7168), October 12, 2021 (86 FR 57705-TN7167), and March 21, 2022 (87 FR 16772-TN7217) to allow the transfer of additional hazardous waste from the CFFF to the USEI facility. The March 2021 exemption allows the WEC to transfer 733 m³ (25,900 ft³) of solid contaminated CaF₂ sludge from the "Operations" pile to USEI, under the volume approved in December 2020 exemption. The total amount of CaF₂ material, from the December 2020 approval and the additional material would not exceed the approved volume of 1428 m³ (50,400 ft³) (86 FR 16239-TN7168). The October 2021 exemption allows the WEC to transfer 133,000 ft³ of calcium fluoride (CaF₂) sludge generated from CFFF site operations and previously stored in onsite lagoons to USEI (86 FR 16239-TN7168). The March 2022

² Currently, CFFF waste containing calcium fluoride with greater than 30 pCi/g of uranium is sent to USEI. The CFFF waste containing calcium fluoride with less than 30 pCi/g of uranium is sent to an offsite concrete plant through a permitted recycling activity (WEC 2019-TN6510; NRC 2020-TN6935). The 30 pCi/g uranium limit was developed by the WEC for its procedures implementing 20 CFR 20.2002, "Method for Obtaining Approval of Proposed Disposal Procedures" (10 CFR 20.2002-TN283; WEC 2019-TN7137).

exemption allows the WEC to transfer sludge dredged from various lagoons at the CFFF, the sanitary lagoon liner, soil and other debris associated with the demolition and removal of the calcium fluoride storage pad, and surface-contaminated waste including uranium hexafluoride shipping cylinders and Sanitary Lagoon to USEI (87 FR 16772-TN7217). The NRC staff's environmental assessments (EA) supporting the approvals of the shipments appeared in the *Federal Register*: December 2020 (85 FR 79228-TN7166), March 2021 (86 FR 13915-TN7165), October 2021 (86 FR 56729-TN7169), and March 2022 (87 FR 13766-TN7196).

- The WEC also anticipates permanently closing the Sanitary Lagoon and replacing it with a fully contained aboveground treatment system. The Sanitary Lagoon Sludge Characterization Work Plan was submitted to the SCDHEC on January 28, 2021 and approved on May 28, 2021 (WEC 2021-TN6921 and the SCDHEC 2021-TN7145). Since receiving approval for the Sanitary Lagoon Sludge Characterization Work Plan, the WEC completed radiological and chemical characterization of the sludge in the Sanitary Lagoon and submitted the Sanitary Lagoon Sludge Characterization Report on November 29, 2021 (WEC 2021-TN7133). The data collected from the sludge characterization will be used in determining requirements for the closure of the Sanitary Lagoon and disposal of the sludge waste. The WEC will prepare a closure plan for the Sanitary Lagoon to be submitted to the SCDHEC under the terms of the National Pollutant Discharge Elimination System (NPDES) permit (WEC 2021-TN6921).
- In December 2018, during a pre-application meeting with the NRC, the WEC described plans to remodel its administration building, which they anticipated would require a license amendment (NRC 2018-TN6925). However, the WEC has since stated it does not plan to request authorization for those changes (NRC 2019-TN6474). All future license amendment requests require the NRC's review and approval which would include a safety analysis and the appropriate environmental review.

2.2 Effluent and Environmental Monitoring Programs

The WEC manages effluent waste streams and conducts radiological and nonradiological effluent and environmental monitoring and sampling.

2.2.1 Facility Effluents

Operations at CFFF generate gaseous and liquid effluents. This section briefly describes the two effluent waste streams and how the WEC manages them. Solid waste generation, management, and disposal are discussed in Section 3.14 of this EIS.

2.2.1.1 Gaseous Effluents

Under the WEC's license renewal application (LRA), operations at the CFFF would continue to generate gaseous effluents. According to the WEC, the annual average discharge rate for uranium, based on discharge rates from 2003 to 2018 is 444 uCi/yr (see Table 2.1-1 and Section 2.1.4 of WEC 2019-TN6510). These effluents would come mainly from the process stacks, equipment, and from fugitive dust and would consist of fluorides (NF₄F and HF), ammonia (NH₃), and uranium compounds. The gas effluents are treated by HEPA filters, scrubbers, or both prior to discharge through the 42 exhaust stacks at the CFFF, which are typically short stacks or roof vents that release gaseous effluents into the air. In the fuel manufacturing facility and laboratory, the ventilation system include treatment to remove uranium prior to discharging effluents to the atmosphere (WEC 2019-TN6510).

The emissions are treated by HEPA filters, scrubbers, or both prior to release to the environment. HEPA filtration is used on systems that have the potential to discharge radioactive materials. The stacks that have the potential to emit radiological effluents are continuously sampled for uranium to ensure concentrations are below the WEC's action level, which is set lower than regulatory limits and would trigger further investigation by the WEC (2019-TN6510). HEPA filters and scrubbers are commonly used pollution control equipment employed at CFFF.

The WEC also operates gas-fired boilers, calciners, and oil-fired diesel generators, all of which generate air emissions. The WEC operates under air quality operating permit (No. SOP-1900-0050) from the SCDHEC (2012-TN6778). Table 2-1 presents the most current information about releases of nonradiological air pollutants as provided in the WEC's air permit renewal application (WEC 2019-TN6777). The SCDHEC has set potential-to-emit (PTE) limits for criteria pollutants and toxic air pollutants from the WEC in the draft air permit (SCDHEC 2019-TN7177, SCDHEC 2019-TN7183). The WEC proposed emission rates that are consistent with the *South Carolina Air Quality Control Regulation 61-62.1, Section II(F)* in its application to renew the air permit. The proposed emission rates are approved by the SCDHEC (WEC 2019-TN6777) and are shown in Table 2-1.

Table 2-1 Emission Summary for CFFF Nonradiological Air Pollutants

Air Pollutant	Facility-wide Emissions (T/yr)	
	WEC's Application ^(a)	SCDHEC Approved Limits ^(b)
PM ₁₀	8.79	9.627
PM _{2.5}	8.79	9.627
SO ₂	3.04	3.106
NO _x	45.00	50.475
CO	16.00	25.233
VOC	4.13	4.268
Nitric Acid (HNO ₃)	2.6	2.57

(a) Source: WEC 2019-TN6777;

(b) Source: SCDHEC 2012-TN6778, 2019-TN7177

The WEC provided emission rate estimates and results of air dispersion modeling that the SCDHEC uses to assess whether the facility can comply with South Carolina air quality control regulations (Regulations 61-62) (WEC 2019-TN6997). The draft permit also requires source testing of the incinerator and scrubbers to verify emission rates are below PTE limits (SCDHEC 2019-TN7177). The WEC's air operating permit renewal application is currently under review by the SCDHEC (WEC 2019-TN6777). On September 12, 2019, the SCDHEC provided public notice of the draft for a 30-day comment period (SCDHEC 2019-TN6598).

2.2.1.2 Liquid Effluents

Operations at CFFF generate two liquid effluent streams: process liquid wastes and sanitary waste sewage, as shown in Figure 2-6. The liquid process wastes are generated primarily from the ADU process, and, to a lesser extent, from the mechanical side of the fuel fabrication process where fuel rods are bundled to form assemblies, as well as from laboratory and controlled area sinks. The ADU process liquid waste is treated to remove uranium and nonradiological components, such as ammonium fluoride. The ADU process liquid waste is sampled for levels of uranium and other contaminants prior to consolidation with other waste streams. Treatment includes filtration, flocculation (i.e., clumping), lime addition, distillation, and

precipitation (WEC 2019-TN6510). The other process stream is sanitary waste sewage, which is initially treated in an extended aeration package plant. The effluent is chlorinated and mixed with the process liquid waste. The combined liquid waste is treated onsite at the WWTP prior to discharge through a pipeline into the Congaree River (WEC 2019-TN6510). The liquid effluent must meet the NRC's regulatory limits in 10 CFR Part 20, Appendix B, Table 2 (TN283), and must also meet the limits established in the NPDES permit. The average combined liquid waste is measured to be 100,000 gal/d over the 10-year period from 2007–2017 (WEC 2019-TN6510).

The WWTP currently includes a system of five lagoons—North, South, West I, West II, and Sanitary. The East Lagoon was decommissioned in September 2021 (WEC 2021-TN7134). Figure 2-4 shows the location of the five lagoons. These lagoons are for settling solids from treated process wastewater prior to discharging liquid effluents to the Congaree River. Treated wastewater from the West I and West II lagoons is sent to the North Lagoon or South Lagoon for further treatment. The treated sanitary wastewater from the West I and II Lagoons is mixed with the stream from the North or South Lagoons, receives further treatment (aeration, dichlorination, pH adjustment), and is then pumped to the Congaree River, in accordance with the CFFF site's NPDES permit. The licensee monitors wells W-18R, W-22, W-29, and W-30, which are part of the Wastewater Treatment Area, in accordance with the NPDES permit. The WEC stated that wells W-6 and W-28 are sampled to comply with the SCDHEC CA requirements (WEC 2020-TN6844).

The WEC stated that new maintenance requirements were implemented for the North, South, West I, and West II Lagoons in 2020. These include monthly visual inspections of the exposed portions of the lagoon liners to identify potential degradation of the liners, such as holes and tears (WEC 2020-TN6844). Additionally, every 2 years, the lagoon liners are inspected by a professional engineer. The inspections are planned during a period of the lowest water and sludge level achievable after a dredging campaign. The licensee committed that, at a minimum, the inspection include observation of the impoundment liners for damage, such as rips, tears or punctures; spillway integrity; and changes in the discharge of all outlets of hydraulic structures, which pass underneath the base or through the dike, of the surface impoundment, including abnormal discoloration, flow or discharge sediment; and any other changes that may indicate a potential compromise to impoundment integrity (WEC 2020-TN6844). The WEC stated that additional inspection is also performed to observe signs of erosion, cracks or bulges, seepage, or wet or soft soil in the dams, dikes, and toe areas. The additional inspection also includes observation of changes in geometry, the depth and elevation of the impounded water, sediment, slurry, or freeboard, and changes in vegetation, such as overly lush, dead, or unnaturally tilted vegetation or other vegetation growing in or on the basin or basin dikes; and evidence of animal burrows (WEC 2020-TN6844). The lagoons are also inspected on an annual basis by a South Carolina registered professional engineer with knowledge relevant to impoundment stability.

Two lined settling ponds exist within the West Lagoons Area. West II Lagoon receives treated wastewater from the Waterglass and SOLX uranium removal processes, as well as still bottoms from ammonia distillation (WEC 2020-TN6844). The effluent from West II Lagoon typically flows to West I Lagoon. Calcium fluoride solids settle out from the treated wastewater in both lagoons. The West Lagoon Area OU contains monitoring wells W-39 and W-43, which are required by the CFFF site's NPDES permit. The WEC also samples wells (W-65 and W-66) to comply with the SCDHEC CA requirements (SCDHEC/WEC 2019-TN6554). The analytical results for all COPCs, including uranium and Tc-99, are used for comparison with previous sampling results and serve as one method for detecting potential leaks (WEC 2020-TN6844).

The main constituents of the process liquid waste streams are uranium and ammonium fluoride. Uranium is removed in the Waterglass treatment process, where the aqueous waste stream is contacted with sodium silicate solution. Sodium silicate entraps (floculates) insoluble uranium and precipitates soluble uranium out of the liquid ammonia wastewater. The precipitated uranium is processed through a filter plate system and dewatered before being returned to the conversion process (WEC 2021-TN7170). The ammonium fluoride is mixed with lime and caustic to create an insoluble calcium fluoride, which is then physically removed by settling. Calcium fluoride is either recycled or disposed of offsite if uranium content is less than 30 pCi/g. Additional information about the release criteria for calcium fluoride is discussed in Section 3.14.1.3. The ammonia is recovered and returned to the ADU process (WEC 2019-TN6510). The WEC samples the treated liquid waste stream for pH, total suspended solids, ammonia, fluoride, and radioactivity before it is discharged into the Congaree River.

Table 2-2 summarizes the uranium and Tc-99 discharged into the Congaree River since the last license renewal in 2007. The WEC started sampling for Tc-99 in 2010 after elevated gross beta results were found in groundwater wells and determined to be from Tc-99. The 2020 effluent monitoring report indicated that the measured concentration for liquid effluent from July 1 through December 31, 2020, was 12.0 pCi/L for uranium, compared to the NRC limit of 300 pCi/L, and was 21.0 pCi/L for Tc-99 compared to the NRC limit of 60,000 pCi/L (WEC 2021-TN6904).

Table 2-2 Measured Uranium and Tc-99 Discharged to Congaree River (Sources: WEC 2019-TN6510, WEC 2019-TN6950, WEC 2020-TN7016, WEC 2020-TN6912, WEC 2021-TN6904)

Year	U (mCi)	Tc-99 (mCi)
2007	10.5	Not Sampled
2008	10.2	Not Sampled
2009	10.3	Not Sampled
2010	8.12	19.2
2011	6.92	14.1
2012	3.1	18.5
2013	5.2	9.2
2014	3.8	10.1
2015	4.3	10.1
2016	3.9	4.0
2017	4.1	7.2
2018	3.4	1.1
2019	3.8	1.1
2020	3.8	5.8

The treated liquid waste stream is discharged into the Congaree River through a submerged pipe, located within the riverbed about 6 m (20 ft) from the shore. The flow rate into the river is 405,000 liters per day (L/d) (107,000 gallons/day [gpd]) based on rates averaged during the 3-year period from 2017–2020 (EPA 2021-TN7052).

The East Lagoon formerly received and stored treated liquid waste streams from the Deionized Water building and rainwater from tank containments, prior to closure in 2021. The East Lagoon also provided overflow from other lagoons or for containment for spills or emergency

events (NRC 2019-TN6472). When the lagoon was full, its contents were pumped into the North or South Lagoon. As discussed previously, the WEC has decommissioned the East Lagoon in accordance with the SCDHEC-approved closure plan (WEC 2020-TN6844; NRC 2020-TN6935, WEC 2021-TN6918). The process also included removal and disposal of the lagoon liner and evaluation of the subsurface soils beneath the liner to identify necessary remedial actions in consultation with the SCDHEC (NRC 2020-TN6935; WEC 2020-TN7015). As shown in Figure 2-6, the treated liquid waste streams from the process sumps are now directed to a storage tank, and the former location of the East Lagoon has been backfilled with virgin materials, and the area was seeded for erosion control (WEC 2020-TN7015, WEC 2021-TN7170).

The Sanitary Lagoon, as shown in Figure 2-4, receives sanitary and contaminated water processed in the Package Plant. The wastewater is treated (aeration, dichlorination, pH adjustment) prior to being pumped to the Congaree River. Groundwater monitoring well W-17 is downgradient of the Sanitary Lagoon, and data from this well and wells W-10, W-26, W-42, W-46, and W-48 are used to identify leaking or leaching from the sludge in the lagoon (WEC 2020-TN6844). Wells W-99 and W-100 were recently installed in the upper and lower zones of the surficial aquifer near the southwest corner of the Sanitary Lagoon to collect groundwater quality data downgradient from the lagoon (WEC 2021-TN7112). Additional sediment sampling in the CFFF site drainage ditch west of the lagoon was also recently completed (WEC 2021-TN7114). As described in Section 2.1.3.3, the WEC anticipates permanently closing the Sanitary Lagoon.

2.2.2 Facility Monitoring Programs

The WEC conducts radiological and nonradiological effluent and environmental monitoring and sampling to comply with the SCDHEC's NPDES permit, the SCDHEC CA (SCDHEC/WEC 2019-TN6554), and its NRC license, as described in more detail in this section.

The WEC proposed three new safety license conditions to facilitate the NRC's oversight of the sampling and monitoring program (WEC 2021-TN7106). The new proposed license conditions are:

- S-16 The WEC shall enter into its Corrective Action Program (CAP) exceedances of Federal and State standards for the maximum contaminant levels (MCLs) under the U.S. Environmental Protection Agency's (EPA's) National Primary Drinking Water Regulations.
- S-17 The WEC shall submit its environmental sampling and monitoring program (Section 10.1.4 of the LRA) to the NRC for review and approval upon South Carolina Department of Health and Environmental Control approval of the Remedial Investigation Report, or within five years of the license renewal (whichever comes first).
- S-18 Within 90 days of submittal of the CA final written report to the South Carolina Department of Health and Environmental Control, the WEC shall submit its environmental sampling and monitoring program described in Section 10.1.4 of the LRA to the NRC for review and approval.

2.2.2.1 Monitoring for the NRC License

2.2.2.1.1 Effluent Monitoring Program

Section 2.2.1 of this EIS describes the liquid and gaseous effluents released from the operations of the CFFF. As required by 10 CFR 70.59 (TN4883), “Effluent Monitoring Reports,” the WEC submits semiannual reports about its effluents to the NRC (e.g., WEC 2019-TN6550, WEC 2020-TN7016, WEC 2020-TN6911, WEC 2020-TN6912). Using the sampling results, the CFFF calculates the estimated dose to the public. The CFFF conducts representative stack sampling from 42 stacks to monitor gaseous effluents. Sampling and monitoring methods and frequencies are determined by the CFFF following NRC criteria in NUREG-1520, Revision 1. The sampling program is acceptable to the NRC staff because it meets the NUREG-1520 criteria. The CFFF also samples its treated liquid effluents before they are discharged to the Congaree River. The NRC’s limits for liquid and gaseous effluents are provided in Table 2 of Appendix B to 10 CFR Part 20 (NRC 2021-TN7180). Effluent concentration limits for water are 6×10^{-5} $\mu\text{Ci/mL}$ for Tc-99 and 3×10^{-7} $\mu\text{Ci/mL}$ for uranium isotopes (NRC 2021-TN7180).

2.2.2.1.2 Environmental Monitoring Program

The WEC samples air, surface water, groundwater, the Congaree River, sediment, soil, and vegetation as part of its environmental monitoring program (WEC 2019-TN6423). Monitoring and sampling criteria have changed since the initial licensing of the CFFF and these changes are incorporated into the WEC environmental monitoring program. Changes to the environmental monitoring program must be reflected in updates to the license application and are subject to review by the NRC during inspections (WEC 2019-TN6423). The NRC’s inspection reports are publicly available. Action levels to be considered when assessing monitoring results are defined in CFFF Procedures RA-434, “Environmental Data Management” and RA-433, “Environmental Remediation”. Action levels for water and soil/sediment samples are listed in Table 2-3 and are based on drinking water standards, U.S. Environmental Protection Agency (EPA) residential and industrial soil screening levels, and NRC guidance.

Table 2-3 Action Levels Considered when Assessing Water and Soil/Sediment Monitoring Data at CFFF

Contaminant	Drinking Water Maximum Contaminant Levels	Residential Soil Screening Levels	Industrial Soil Screening Levels
Fluoride	4 mg/L	600 mg/kg	3,100 mg/kg
Nitrate	10 mg/L	130,000 gm/kg	130,000 mg/kg
Tetrachloroethylene (PCE)	0.005 mg/L	0.0023 mg/kg	100 mg/kg
Technetium-99	900 pCi/L	19 pCi/g	89,400 pCi/g
Total Uranium	30 $\mu\text{g/L}$	12.69 pCi/g ^(a)	2,933 pCi/g ^(a)
Uranium-234	n/a	13 pCi/g	3,310 pCi/g
Uranium-235	n/a	8 pCi/g	39 pCi/g
Uranium-238	n/a	14 pCi/g	179 i/g

(a) From WEC 2021-TN7114
Source: CFFF Procedures RA-434 and RA-433

Since June 2018, the WEC proposed substantial changes to its environmental monitoring and sampling program, adding monitoring wells and adding sediment, soil, surface water, and groundwater sample locations. Table 2-4 and Table 2-5 summarize the proposed

environmental sampling program. A significant change is the direct analysis for uranium and Tc-99 for all types of samples, except air particulates, instead of the analysis of gross alpha and gross beta activity as surrogates. Past laboratory analyses indicated that gross beta was a reasonable indicator of Tc-99; however, a direct correlation between gross alpha and uranium concentrations attributed to CFFF operations was not clear because of naturally occurring alpha emitters (WEC 2021-TN7170). Because there is naturally occurring uranium in the environment, the CFFF will perform isotopic analyses for uranium to more accurately delineate areas of subsurface residual radioactivity that will need to be remediated during decommissioning to meet the unrestricted release criteria. Gross alpha analysis is retained for air particulates due to limitations in the sampling methodologies.

Additionally, the WEC has agreed to three new proposed safety license conditions related to the WEC's environmental sampling and monitoring program. If the CFFF license is renewed, a new license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon the SCDHEC's approval of the Remedial Investigation Report (SCDHEC/WEC 2019-TN6554), as required by the CA (see Section 1.5.2.2.1 of this EIS), or within 5 years of the license renewal, whichever comes first (WEC 2021-TN7106). Another license condition S-18 requires the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval within 90 days of submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106). The Remedial Investigation Report would document the results of the WEC's remedial investigations per the SCDHEC-approved RIWP. The data gathered through the remedial investigations, analysis, and findings would inform the WEC's environmental monitoring and sampling program to be submitted to the NRC. The WEC would also be required by new license condition S-16 to enter exceedances of Federal and State drinking water standards into its Corrective Action Program (CAP) (WEC 2021-TN7106). The applicable standards would be the maximum contaminant levels (MCLs) established under the U.S. Environmental Protection Agency's (EPA's) National Primary Drinking Water Regulations (66 FR 76708-TN5061) The MCL for uranium is 30 µg/L, based in part on the chemical toxicity of uranium. The WEC uses the MCL to calculate an activity-based limit of 84 pCi/L in recognition of the fact that an impact on the environment from the facility will likely come from enriched rather than naturally occurring uranium. The proposed imposition of these safety license conditions would ensure that the WEC groundwater sampling and monitoring program, which supports the remedial investigation activities under the CA with the SCDHEC, remains in place at CFFF.

Table 2-4 Environmental Sampling Program

Type of Sample	Number of Locations	Analyses	Minimum Sampling Frequency
Air Particulates	4	Alpha	Continuous (Collection Weekly)
Site Surface Water	7	Uranium, Tc-99	Quarterly
Soil	5	Uranium, Tc-99	Annually
Vegetation	4	Uranium, Tc-99, Fluoride	Annually
Congaree River Fish	1	Uranium, Tc-99	Annually
Well Water	118	Uranium, Tc-99	Semiannually
Congaree River Water	4	Uranium, Tc-99	Quarterly
Sediment	3	Uranium, Tc-99	Annually

Source: Table 10-1 from WEC 2019-TN6423; WEC 2021-TN7106

Table 2-5 Environmental Sampling Quantities and Detection Levels

Type of Sample	Analyses	Typical Sample Quantity	Nominal Minimum Detection Level
Air Particulates	Alpha	571 m ³	6.0E-14 µCi/mL
Surface Water	Uranium	1 L	0.5 pCi/L
	Tc-99	1 L	50 pCi/L
Well Water	Uranium	1 L	0.5 pCi/L
	Tc-99	1 L	50 pCi/L
River Water	Uranium	1 L	0.5 pCi/L
	Tc-99	1 L	50 pCi/L
Sediment	Uranium	100 g	0.5 pCi/g
	Tc-99	100 g	1 pCi/g ^(a)
Soil	Uranium	100 g	0.5 pCi/g
	Tc-99	100 g	1 pCi/g ^(a)
Vegetation	Fluoride	100 g	Variable (based on dilution level)
	Uranium	100 g	0.5 pCi/g
	Tc-99	100 g	1 pCi/g ^(a)
Fish	Uranium	1 kg	0.5 pCi/g
	Tc-99	100 g	1 pCi/g ^(a)

(a) These values were updated in the WEC's responses to the RAIs (WEC 2020-TN6844)
 Source: WEC 2019-TN6510 (Table 6.1-2 Revised Environmental Report)

Air Sampling

In addition to effluent monitoring of the stacks, the WEC continuously monitors ambient air at four onsite locations (see Figure 2-7) for alpha activity (WEC 2019-TN6423). This is the same ambient air monitoring performed for the 2007 license renewal.

Soil and Vegetation Sampling

During the proposed license renewal period, the WEC will collect four co-located soil and vegetation samples annually and evaluate them for uranium and Tc-99 content (WEC 2019-TN6423). A fifth soil sample will be analyzed to monitor for potential migration of uranium from the groundwater to surface water (Sample #5). The vegetation samples will also be analyzed for fluoride. The soil and vegetation samples are collected at the same locations as the ambient air samples (see Figure 2-7).

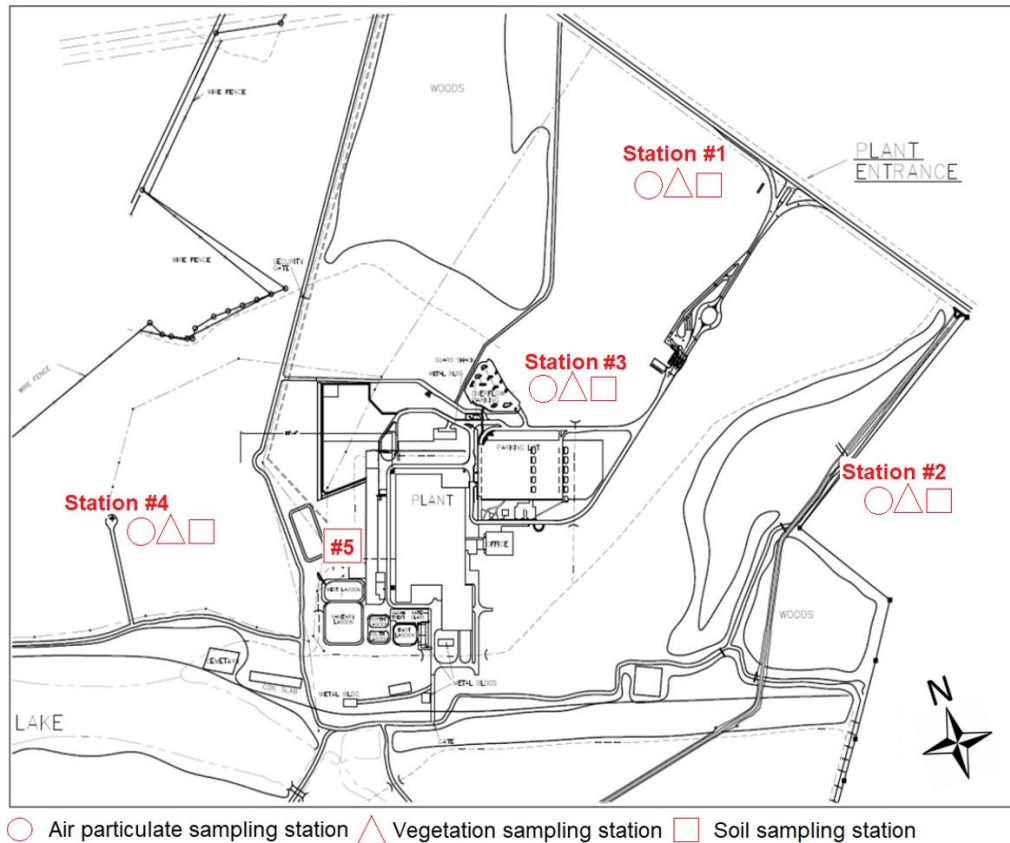


Figure 2-7 Sampling Locations for Air, Vegetation, and Soil (Source: WEC 2019-TN6423, with enhancements to label clarity)

Surface Water and Sediment Sampling

The WEC will take seven surface water samples quarterly from the locations shown in Figure 2-8 (WEC 2019-TN6423). The WEC will analyze the samples for uranium and Tc-99. The samples are collected at the entrance of Upper Sunset Lake, the causeway between the Upper and Lower Sunset Lakes, the spillway from Lower Sunset Lake into Mill Creek, the location where Mill Creek exits the WEC property, and the confluence of two onsite ditches (“C” valve/“roadway”). A new sample location was added at Gator Pond and another location was added to monitor a newly identified ditch that runs from Lower Sunset Lake and rejoins Mill Creek near the point where the creek crosses the CFFF property line. The ditch was identified on maps and its location was confirmed during the Phase II remedial investigation activities. As discussed earlier in this section, if uranium and Tc-99 levels in surface water samples exceed Federal or State regulatory limits, the WEC is required to enter the exceedance of drinking water standards into its CAP under the new proposed license condition S-16 (WEC 2021-TN7106). Through its CAP, the WEC will determine what, if any, actions need to be taken. Examples of corrective actions that may be implemented include additional sampling, reanalysis of the sample, or adding sampling locations to define the extent of contamination. The WEC will collect three sediment samples from Gator Pond, Lower Sunset Lake, and at or near the point of discharge into the Congaree River (see Figure 2-8). The two onsite sediment sample locations were added to the monitoring program to monitor the potential accumulation of contamination in the sediment of onsite surface water bodies. Samples will be collected annually and will be analyzed for uranium and Tc-99 (WEC 2019-TN6423).



Figure 2-8 Surface Water and Sediment Sampling Locations (Source: WEC 2019-TN6423)

Congaree River Sampling

During the proposed license renewal period, the WEC will collect quarterly Congaree River water samples from four locations: (1) at the Blossom Street Bridge 16 km (10 mi) upstream of the CFFF discharge point; (2) 457 m (500 yards [yd]) upstream of the discharge point; (3) 457 m (500 yd) downstream of the discharge point; and (4) where Mill Creek enters the Congaree River. Samples will be evaluated for uranium and Tc-99. This is the same monitoring the WEC has conducted since the 2007 license renewal (WEC 2019-TN6423).

From 2010 through 2015, the WEC collected river samples at two additional locations—at the discharge point into the Congaree River and at the highway 601 bridge, which is approximately 30 km (18 mi) from the CFFF site. The samples were collected for additional data points, but the uranium levels were below the EPA drinking water standard so the WEC discontinued the sampling. The gross alpha concentrations ranged from zero to less than 5 pCi/L (WEC 2019-TN6423).

Fish Sampling

During the proposed license renewal period, the WEC will annually collect one fish from near the discharge point into the Congaree River (WEC 2019-TN6423). The fish will be analyzed for uranium and Tc-99. This fish sampling and monitoring program has been in effect at the CFFF since the 2007 license renewal. The SCDHEC also conducted an expanded fish tissue survey in 2019 to evaluate CFFF treated discharges into the Congaree River, but the SCDHEC does not plan to continue this survey because no uranium signals were found and because fluoride was within health limits (see Section 3.5).

Groundwater Sampling

For the proposed license renewal period, the WEC developed a monitoring program for groundwater that is substantially different from its current program because of known groundwater contamination and implementation of the CA. Under the current program, the WEC is required to sample 10 groundwater wells annually and analyze samples for gross alpha, gross beta, and ammonia (WEC 2019-TN6571). The WEC, however, is installing additional groundwater monitoring wells per the SCDHEC-approved RIWP under the CA (see Section 1.5.2.2.1 of this EIS). As of completion of the Phase I of the RIWP, the groundwater monitoring well network consisted of 90 permanent groundwater monitoring wells, including the 29 newly installed wells (WEC 2020-TN6526). As part of the implementation of the Phase II RIWP, the WEC installed 28 additional wells. W-4 was replaced with W-4R, after transducer field data indicated that much of the water entering W-4 was due to surface water infiltration and therefore was not representative of the groundwater). Additionally, the WEC has transitioned from monitoring groundwater for gross alpha and gross beta to monitoring for isotopic uranium and Tc-99 (WEC 2020-TN6875). Going forward, the WEC will sample these groundwater wells and analyze for uranium and Tc-99 to determine (1) whether the source of the current shallow groundwater contamination is leaks from plant operation and/or (2) if existing contamination of uranium or Tc-99, from a known or unknown source, is migrating. The WEC continues to monitor for gross alpha and gross beta, but is relying on the site-specific COPC monitoring results for isotopic uranium and Tc-99 to evaluate radionuclide concentrations in groundwater now that there are data from four separate sampling events (WEC 2020-TN6875).

The groundwater monitoring wells at the CFFF fall into into four categories—perimeter wells, NPDES wells, sentinel wells, and area of impact wells:

- Perimeter wells will help the WEC detect a potential release before it migrates toward the site boundary. The perimeter wells are the outermost monitoring wells at the CFFF site.
- NPDES permitted wells are those identified in the NPDES permit to detect leaks and potential contaminant migration from the site WWTP.
- Sentinel wells are the wells that detect a potential source or contaminant migration in an OU.

- Area of impact wells are those that monitor for known areas impacted by uranium and Tc-99. The CFFF will monitor, at a minimum, three wells for each area impacted by uranium and Tc-99. One well is located to detect maximum concentration of uranium and Tc-99 and two wells are located downgradient of the impacted area. These well locations are expected to change if the area of impact moves.

Based on previous groundwater assessment activities, COPCs in groundwater are chlorinated volatile organic compound (CVOCs), nitrate, fluoride, uranium, and Tc-99 (WEC 2020-TN6875). Four types of CVOCs were detected in the upper and lower zones of the surficial aquifer: PCE, trichloroethylene (TCE), cis-1,2-dichloroethene, and vinyl chloride (VC) (WEC 2020-TN6875). Tetrachloroethylene is the COPC used previously at the facility in the solvent extraction process; PCE has been identified as the source of the CVOC plumes at the site. TCE, cis-1,2-dichloroethene, and VC are degradation/daughter products of PCE. The site discontinued use of PCE in April 2020.

The groundwater monitoring wells fall into one or more categories. Figure 2-9 shows the locations of the groundwater monitoring and sampling wells, including the wells that are planned to be installed as part of the implementation of the Phase II RIWP.

The WEC stated that analytical results for all COPCs, including uranium and Tc-99, are compared with previous sampling results and the comparison of data sets provides another method for detecting potential leaks (WEC 2020-TN6844).

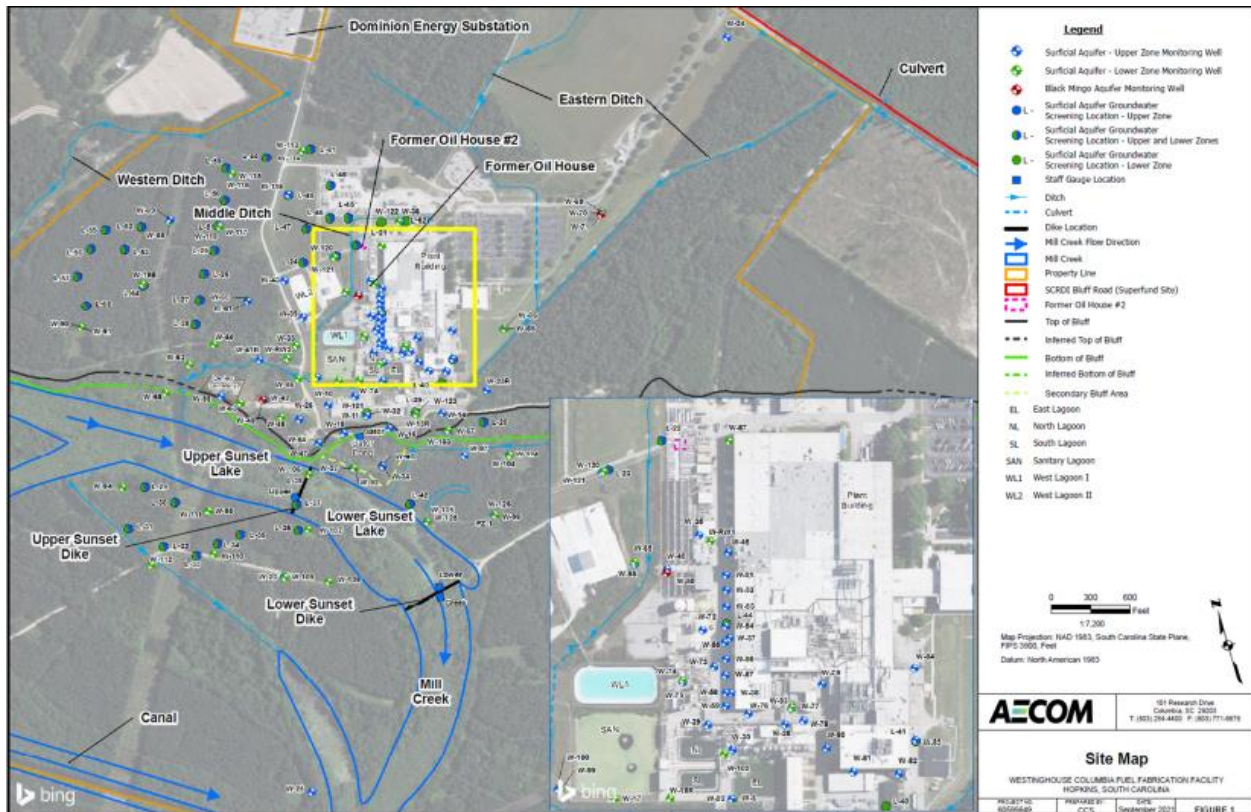


Figure 2-9 Groundwater Well Locations at the CFFF Site (Source: WEC 2021-TN7170)

2.2.2.2 *Monitoring for the SCDHEC NPDES Permit*

As part of the NPDES permit (SC0001848) issued by the SCDHEC, the WEC monitors its discharges to the Congaree River and collects groundwater monitoring samples. The WEC's NPDES permit sets the requirements for its discharge into the Congaree River, including submission of monthly discharge monitoring reports. To comply with its current NPDES permit requirements, the WEC conducts semi-annual monitoring of groundwater conditions for water-table elevation, pH, specific conductance, fluoride, nitrate, VOCs, gross alpha, gross beta, fission, activation products, and tritium (SCDHEC 2017-TN5607). The WEC provides annual reports to the SCDHEC that include the sampling results. The frequency of the reports could change as part of the NPDES permit renewal application. The WEC will also submit these annual NPDES groundwater sampling reports, or as established by a renewed NPDES permit, to the NRC during the proposed license renewal period (WEC 2019-TN6423).

The NPDES permit must be renewed every 5 years. The NPDES permit was last modified in May 2017 and expired in March 2018; however, the WEC submitted a renewal application in September 2017 (WEC 2017-TN5621) and is operating under the old permit while the State completes its review. The draft NPDES permit underwent a 30-day public comment period ending on October 12, 2019 (SCDHEC 2019-TN6598). The new permit had not been issued before publication of this EIS. The monitoring requirements of the NPDES permit are subject to change, including the number of wells monitored, the frequency of monitoring, and the constituents that are monitored. The draft NPDES permit for public comment currently requires the WEC to monitor 40 wells related to the lagoons. The WEC will notify the NRC any time the NPDES permit is renewed, revoked, or revised, and if the WEC receives an NPDES Notice of Violation (WEC 2019-TN6423). The WEC also has a general NPDES permit for stormwater runoff/discharges associated with industrial activity, but not construction activities. The permit requires the WEC to have a Stormwater Pollution Prevention Plan.

2.2.2.3 *Monitoring for Consent Agreement with the SCDHEC*

In February 2019, the SCDHEC and the WEC entered into a CA (#19-02-HW) to address radiological and nonradiological contamination at the CFFF site and establish protocols for communicating and responding to future releases (SCDHEC/WEC 2019-TN6554). The CA is described in Section 1.5.2.2.1 of this EIS.

Under the CA, the WEC developed and is maintaining a CSM (following procedure RA-435) (see Section 1.5.2.2.1 of this EIS). The CSM is a graphical visualization of the CFFF site's hydrogeology, including the location of existing and past contamination releases to the environment and the constituents of concern. An example of the visualization capability of the CSM is shown in Figure 2-10, which includes the location of wells that are monitored and sampled.

The WEC has installed permanent monitoring wells consistent with the implementation of the RIWP (WEC 2019-TN6553; WEC 2020-TN6707), and installation of new monitoring wells is now complete (WEC 2021-TN7112; WEC 2022-TN7155).

New environmental monitoring data are included to update the CSM on a periodic frequency (RA-435). The CSM would provide insight about any contamination observed or measured in the site's environment (WEC 2021-TN6920). The WEC would use data obtained from the CSM to inform decisions involving environmental monitoring and sampling. Monitoring data would be compared against previous results to detect potential contaminant releases consistent with the

procedures necessary to decommission have not been previously approved by the Commission and these procedures could increase potential health and safety impacts on workers or the public. The decommissioning plan describes in detail how the facilities and grounds will be decontaminated, so that they can be released for unrestricted or restricted use.

Adequate planning and funding must be in place for the eventual decommissioning of the CFFF site. The WEC is required to submit its DFP to the NRC at intervals not to exceed 3 years in accordance with 10 CFR 70.25(e)(2) (TN4883). As required by 10 CFR 70.25(e)(1), the DFP must contain a detailed cost estimate for decommissioning, including consideration of the volume of onsite subsurface material containing residual radioactivity that will require remediation. In the LRA, the WEC stated that its remediation process would be used to "...prevent migration of licensed material offsite and/or to minimize decommissioning impacts..." (WEC 2019-TN6423). The WEC submitted its 2019 DFP and updated it to reflect recent environmental investigations (WEC 2019-TN6926; WEC 2019-TN7234). The NRC considered the current contamination at the site and the remediation actions the WEC would implement when reviewing the DFP for approval. The NRC staff approved the revised DFP in August 2020 and amended the license accordingly (NRC 2020-TN7002).

2.4 Alternatives to the Proposed Action

This section describes the alternatives to the proposed action, including the no-action alternative and the 20-year license renewal alternative.

2.4.1 No-Action Alternative

Under the no-action alternative, the NRC would deny the WEC's request to renew CFFF's SNM-1107 license for an additional 40 years. The WEC, however, can continue to possess and use special nuclear material at the CFFF under its current materials license until it expires on September 30, 2027. The NRC staff previously evaluated the environmental impacts of the operation of the CFFF until September 2027 when it approved the WEC's license renewal in 2007 (NRC 2007-TN6528). The NRC staff concluded in the 2007 license renewal EA that the continued operation of the CFFF would not result in a significant impact on the environment (NRC 2007-TN5598).

Notwithstanding the previous finding, the NRC staff considered the potential environmental impacts of the no-action alternative in light of the information that led to the NRC's decision to prepare an EIS. Known onsite contamination is currently being addressed by the WEC as part of the implementation of a CA with the SCDHEC. The data gathered through the WEC's remedial investigations were used in the development of the CFFF's CSM and monitoring well network. The WEC would also use the data analysis results for comparison with previous results to detect potential leaks consistent with the WEC's Environmental Data Management Procedure RA-434. Procedure RA-433, "Environmental Remediation," would also be used to assess the remediation activities that are protective of human health and the environment. The new proposed license conditions S-16, S-17, and S-18 are not within the scope of the no-action alternative. Therefore, the nature/type of potential environmental impacts of the no-action alternative would be similar to those of the proposed action (i.e., the 40-year license renewal process), but the impacts would differ in light of the uncertainties associated with the outcome of the ongoing remedial investigations per the CA process. The WEC, however, could choose to incorporate the new license conditions and commitments into its current materials license.

Upon license expiration, the WEC would be required to start the decommissioning process, including any site remediation, or request and obtain a renewed license. The environmental impacts of this alternative are discussed in Section 3.17 of this EIS.

2.4.2 License Renewal for 20 Years

The NRC staff considered a shorter license renewal term of 20 years, as an alternative. In SRM-SECY-06-0186 (NRC 2006-TN6558, NRC 2006-TN6985), the Commission approved license terms for up to 40 years for new fuel cycle facilities licenses and license renewals that are required to submit integrated safety analysis summaries in accordance with 10 CFR Part 70, Subpart H (TN4883). Additionally, the Commission approved license terms for less than 40 years on a case-by-case basis where there are concerns about safety risk to the facility or where a licensee introduces a new process or technology. The NRC staff evaluated a 20-year license renewal term as an alternative based on the effects on the environment from the 2015 historic flooding event and multiple leaks or spills that have resulted in the contamination of the subsurface at the CFFF site since the last license renewal in 2007, and the remedial investigations under a CA with the SCDHEC (see section 1.5.2.2.1 of this EIS).

The nature/type of potential environmental impacts from continued licensed operations for an additional 20 years would be similar to those from the proposed action (i.e., proposed 40 years of continued operation). The new proposed license conditions S-16 and S-17, and S-18, to which the WEC has agreed, would also apply under the 20-year license renewal (WEC 2021-TN7106). License condition S-16 would require the WEC to enter exceedances of Federal and State standards for drinking water into the CAP (WEC 2021-TN7106). License condition S-17 would require the submission of the environmental monitoring and sampling program to the NRC for review and approval after the SCDHEC approves the Remedial Investigation Report, or within five years of the license renewal (whichever comes first) (WEC 2021-TN7106). License condition S-18 would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval within 90 days of submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106). The data gathered during the WEC's remedial investigation activities was used to develop the CSM and would be used in the development of the WEC's environmental monitoring and sampling program and remediation strategies. Procedure RA-433, "Environmental Remediation," outlines the decision-making process for remediating releases of licensed material and/or contamination offsite that is protective of human health and the environment. In the event of a release, RA-433 requires updating and analyzing data in the CSM, including the migration pathways and potentially affected receptors. The data analysis results would also be compared with previous results to detect potential leaks, consistent with the WEC's Environmental Data Management Procedure RA-434.

Upon license expiration, the WEC would be required to start the decommissioning process, including any site remediation, or request and obtain a renewed license. Therefore, the timing of decommissioning would be different if license renewal was granted for 20 years, but the nature/types of impacts from decommissioning would be similar. Whether the CFFF operates for 40 years or less, the WEC must maintain the necessary funding to assure they can successfully complete decommissioning and meet NRC's regulatory requirements. The environmental impacts of this alternative are discussed in Section 3.17 of this EIS.

2.5 Comparison of Potential Environmental Impacts

In the evaluation of environmental impacts in this EIS, the NRC staff uses the designations found in NUREG-1748 (NRC 2003-TN1983), which categorizes the significance of potential environmental impacts as follows:

- **SMALL:** The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource considered.
- **MODERATE:** The environmental effects are sufficient to alter noticeably but not destabilize important attributes of the resource considered.
- **LARGE:** The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource considered.

Chapter 3 presents the NRC staff’s detailed evaluation of the environmental impacts from the proposed action, the no-action alternative, and the 20-year license renewal alternative. EIS Table 2-6 compares the significance level (SMALL, MODERATE, or LARGE) of potential environmental impacts of the proposed action and alternatives.

Table 2-6 Summary of Resource Impact Determinations for the Proposed Action and Alternatives

Resource Area	Impact Determination
Land Use	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL
Geology, Seismology and Soils	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL
Surface Water	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL
Groundwater	
Proposed action	SMALL to MODERATE
No-action alternative	SMALL to MODERATE
20-year license renewal alternative	SMALL to MODERATE
Ecological Resources – Terrestrial and Aquatic	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL
Climatology, Meteorology, and Air Quality	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL
Noise	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL
Historic and Cultural Resources	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL
Visual and Scenic Resources	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL

Resource Area	Impact Determination
Socioeconomics	
Proposed action	SMALL
No-action alternative	MODERATE
20-year license renewal alternative	SMALL
Public and Occupational Health	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL
Transportation	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL
Waste Generation and Management	
Proposed action	SMALL – operations; SMALL to MODERATE - decommissioning
No-action alternative	SMALL to MODERATE
20-year license renewal alternative	SMALL – operations; SMALL to MODERATE - decommissioning
Accidents	
Proposed action	SMALL
No-action alternative	SMALL
20-year license renewal alternative	SMALL
Environmental Justice	
Proposed action	No disproportionately high and adverse human health and environmental effects
No-action alternative	No disproportionately high and adverse human health and environmental effects
20-year license renewal alternative	No disproportionately high and adverse human health and environmental effects

2.6 Recommendation

Based on its review, the NRC staff has determined that the proposed action, renewal of license SNM-1107 authorizing continued operations at the WEC's CFFF in Hopkins, South Carolina, for a period of 40 years would result in SMALL impacts on most resource areas (see Table 2-6) except for groundwater resources and waste generation from decommissioning for which the impacts would be SMALL to MODERATE. Chapter 3 of this EIS describes the analyses for each resource area, how the resource may be affected by the proposed action, and the incremental contribution of the proposed action when considered with cumulative effects of reasonably foreseeable past, present, and future actions.

Therefore the NRC staff recommends that the WEC's license be renewed to continue operating the CFFF in Hopkins, South Carolina, for a term of 40 years. This recommendation is required by 10 CFR 51.91(d) and is based on (1) the LRA, which includes the ER and supplemental documents and the WEC's responses to the NRC staff's RAIs; (2) consultation with Federal, State, and Tribal agencies and input from other stakeholders, including comments on the draft EIS; (3) independent NRC staff review; and (4) the assessments of impacts determination in this EIS.

3.0 AFFECTED ENVIRONMENT, ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES

This section provides a discussion of each environmental resource and describes the region of interest or area for potential impacts, and assesses the potential impacts of the proposed action, the Westinghouse Electric Company, LLC's (WEC) proposed continued operation of the Columbia Fuel Fabrication Facility (CFFF) for an additional 40 years and alternatives. This section also describes mitigation measures for the reduction or avoidance of potential adverse impacts that (1) the licensee has committed to in its license renewal application (LRA), or (2) additional measures the U.S. Nuclear Regulatory Commission (NRC) staff identified as having the potential to reduce environmental impacts, but that the applicant did not commit to in its application.

This chapter addresses the potential environmental impacts on the following resource areas: land use, transportation, geology and soils, water resources, ecology, noise, air quality, historic and cultural resources, visual and scenic resources, socioeconomics, public and occupational health, waste management, and environmental justice, and presents a discussion of accidents.

The NRC staff uses the Council on Environmental Quality (CEQ) regulations-based standards of significance for assessing environmental impacts, as described in the NRC guidance in NUREG-1748 (NRC 2003-TN1983) and summarized as follows:

- **SMALL:** The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.
- **MODERATE:** The environmental effects are sufficient to alter noticeably but not destabilize important attributes of the resource.
- **LARGE:** The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

This section of the environmental impact statement (EIS) also summarizes the cumulative impacts that can result from individually minor but collectively significant actions taking place over a period of time. The NRC's regulations implementing the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. § 4321 *et seq.*; TN661) in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 51, "Environmental," Section 51.91(d), require that the final EIS "include a final analysis and a final recommendation on the action to be taken..." (10 CFR Part 51-TN250). A proposed project could contribute to cumulative effects when its environmental impacts overlap with those of other past, present, or reasonably foreseeable future actions. Section 3.19 discusses the cumulative impacts analysis in more detail.

3.1 Land Use

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts on land use from the proposed action.

3.1.1 The CFFF Site and Vicinity

The CFFF site is located in Hopkins, South Carolina, on an approximately 469-hectare (ha) (1,151-acre [ac]) site in Richland County, approximately 13 km (8 mi) southeast of the City of

Columbia. CFFF operations and support activities occur on about 28 ha (68 ac) or 5 percent of the entire site; the remaining portions of the site are mainly undeveloped and consist of swamps and wetlands, woodland areas, and hardwood forests (see Figure 2-2).

In the undeveloped portions of the site, forested areas are used for timber production and hay fields are harvested. Recreational facilities for employees include a fitness trail and a picnic pavilion (WEC 2019-TN6510).

There is an electrical substation, owned by Dominion Energy, on approximately 2.8 ha (7 ac) of the CFFF site near Bluff Road. The land was purchased from the WEC in 2005 (WEC 2019-TN6510).

In 2012, the WEC notified the NRC that it had completed a uranium hexafluoride (UF₆) storage pad project, located within the controlled access area (WEC 2012-TN5522). The concrete storage pad holds additional cylinders of UF₆ and was built on previously disturbed land.

Within an 8 km (5 mi) radius around the CFFF site, 90 percent of the area falls in Richland County, while the remaining 10 percent falls within Calhoun County (WEC 2019-TN6510).

The CFFF site is bordered by privately owned property to the east, south, and west. Manufacturing facilities are located about 0.5 km (0.3 mi) from the site boundary, at the nearest point. Farms, single-family dwellings, and light commercial activities are located chiefly along nearby highways. Within a 1.6 km (1 mi) radius of the CFFF site, agricultural use makes up 44 percent of the land use (see WEC 2019-TN6510, Figure 3.1-2). The remaining 56 percent is classified as “other” (WEC 2019-TN6510).

The WEC’s March 2019 environmental report (ER) shows manufacturing and distribution business locations within the 8 km (5 mi) site radius (WEC 2019-TN6510, Figure 3.1-3). These businesses and their products are (1) DAK Americas [formerly Carolina Eastman] (man-made production fibers); (2) Nephron Pharmaceuticals (eye drop medications, respiratory medicine, vaccines, and injectable drugs); (3) Knight’s Redi-Mix (concrete batching plant for commercial use); (4) Wallace Concrete Products (manhole production); (5) Schneider Electric (industrial motor control production); (6) Devro Inc. (collagen casings for food); and (7) an Amazon Distribution Center.

Five farms are located within 8 km (5 mi) of the CFFF site. They provide quail, strawberries, fish for pond stocking, and full-service equestrian services (WEC 2019-TN6510).

Two schools (Hopkins Elementary and Hopkins Middle School) are located northeast of the CFFF site, approximately 6.4 km (4 mi) and 7.4 km (4.6 mi) away. Three other schools (Lower Richland High School, Mill Creek Elementary, and Sandhills School) are located to the northeast and north northeast of the CFFF site, slightly more than 8 km (5 mi) away (WEC 2019-TN6510). Nine churches are located within the 8 km (5 mi) radius of the CFFF site.

No hospitals are located within 8 km (5 mi) of the CFFF site. The Alvin S. Glenn (Richland County) Detention Center is located 8 km (5 mi) north of the CFFF site (WEC 2019-TN6510).

Two military bases, Ft. Jackson U.S. Army Base and McEntire Joint National Guard Base, are located, respectively, 11 km (7 mi) north and 10 km (6 mi) northeast of the CFFF site (WEC 2019-TN6510). The Congaree National Park, located 8 km (5 mi) southeast of the CFFF site, is a Globally Important Bird Area, and a federally designated wilderness (NPS 2018-TN6975, NPS 2019-TN6974), and the Congaree River Swamp within the Park is a National Natural Landmark

(NPS 2020-TN6973). The Park also is part of the internationally recognized Congaree Biosphere Reserve and is on the Ramsar Convention list of Wetlands of International Importance (NPS 2018-TN6975; Ramsar 2012-TN6976). The Park contains important high-quality habitats including unique bottomland hardwood forests and well-preserved, species-rich, and dynamic floodplains. These protected floodplains provide a unique ecosystem when the Congaree and Wateree Rivers flood the area, bringing nutrients and sediments to help contribute to the productivity of the area. The diversity of habitats within the Congaree National Park supports a wide variety of biota, including fish, birds, amphibians, reptiles, mammals, insects, and other aquatic life (NPS 2020-TN6577). The Mill Creek Mitigation Bank is located upstream of Congaree National Park. The Mill Creek Mitigation Bank encompasses more than 1,300 ac of protected streams and wetlands, which are being enhanced and restored to provide mitigation credits for Richland County's transportation projects (Richland County 2018-TN7144).

3.1.2 Land Use Impacts

Under the proposed action, the WEC did not request changes to its NRC license related to any new construction or changes to current facility operations or buildings within the controlled access area (WEC 2019-TN6510). The WEC is conducting characterization and environmental investigations, including remedial investigations, under the Consent Agreement (CA) with the South Carolina Department of Health and Environmental Control (SCDHEC) in several areas of the site, including areas that were previously undisturbed (SCDHEC/WEC 2019-TN6554). In December 2018, during a pre-application meeting with the NRC, the WEC shared plans to remodel its administration building, which they anticipated would require a license amendment (NRC 2018-TN6925). However, the WEC has since stated it does not plan to request those changes at this time (NRC 2019-TN6474). For any future license amendment request, the NRC would review the request and conduct a safety analysis and the appropriate environmental review. In the future, the WEC can also undertake activities that do not require prior NRC approval under 10 CFR 70.72 (TN4883), which could potentially result in new construction or land disturbance. Onsite landowners could also change the current use of the land (agricultural, logging).

Current and expected future activities on the undeveloped portions of the CFFF site are logging and farming. Logging operations have been practiced on the undeveloped parcels of the WEC property for decades and have thus been compatible with CFFF operations.

Planning documents for future growth in Richland County as a whole (Richland County 2015-TN6578) and for the southern or "lower" part of the county (Richland County 2014-TN6600) were issued in 2014. The county-wide document provides guidance relative to Richland County's growth over the next 20 years and direction on future decisions so that the county can achieve its vision regarding that growth. The CFFF site is located in an area designated as the "southeast" in the county-wide plan, and Richland County expects that land use around the CFFF site will not change over the next 20 years (Richland County 2015-TN6578). Additionally, development over the next 20 years in the area around the CFFF site is constrained by limited water and sewer service and by environmental constraints (Richland County 2014-TN6600). Within 24 km (15 mi) to the northwest of the CFFF site, several road expansion projects are planned off of and along Bluff Road to encourage development within an existing industrial park. A fiberglass manufacturing facility, the largest in Richland County, came online in 2018 (Wilkinson 2018-TN7022). Future development, including population increases and construction of new impervious surfaces could result in an increase in local traffic, impact public health, and the increase frequency and intensity of flooding events USGS 2016-TN7236; USGS 2019-TN7237).

Installation of groundwater monitoring wells and collection of soil samples at the CFFF site are part of the remedial investigations the WEC is conducting under the CA with the SCDHEC. Installation of the groundwater monitoring wells involve minimal land disturbance. These monitoring wells and collection of surface water and soil samples are part of the remedial investigation being conducted to address known onsite contamination and to develop a Conceptual Site Model (CSM) that is being used by the WEC as a decision-making tool, for example, when determining the extent of contamination, migration pathways, and when and how to remediate. Potential future construction proposed by the WEC could require subsequent environmental review. The use of the land in the surrounding area is not expected to change from its current uses, including the CFFF's operations. Therefore, the NRC staff does not expect a significant impact on land use during continued operations at CFFF for the proposed period of 40 years. Accordingly, the NRC staff considers direct and indirect impacts on land use from renewing the CFFF license for an additional 40 years to be SMALL. Based on these minor impacts on land use, the SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact (see Section 3.19 for additional information).

3.1.3 Mitigation Measures

Because the proposed action would result in minimal land use impacts that are consistent with the current use of the site, no additional mitigation measures have been identified beyond the remedial investigations the WEC is conducting under the CA with the SCDHEC and the new proposed license conditions agreed to by the WEC as part of the review of the LRA. The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either the SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2 and 2.4.2 of this EIS.

3.2 Geology, Seismology, and Soils

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts on the site's geology, seismology, and soils from the proposed action.

3.2.1 Regional Geology

The geology of South Carolina is characterized by the fall line, which marks the division between the older, more-resistant crystalline or metamorphic rocks of the Piedmont and Blue Ridge physiographic provinces and the younger, unconsolidated sedimentary lithologies of the Atlantic Coastal Plain province. On the generalized geologic map of South Carolina (Figure 3-1), the fall line is coincident with the northwesternmost extent of the Coastal Plain map units and passes through the Columbia metropolitan area. Coastal Plain sediments occur as permeable units of gravels, sands, and crystalline carbonate sediments with intervening low-permeability units of silts and clays. The unconsolidated sediments form a wedge, thickening

toward the ocean, that unconformably overlies the consolidated Paleozoic and Triassic rocks (Campbell and Coes 2010-TN6672). In South Carolina, the thickness of the Coastal Plain sediments is 0 m (0 ft) at the fall line, more than 304.8 m (1,000 ft) at the coast adjacent to North Carolina, and as much as 1,219.2 m (4,000 ft) along the coast at the Georgia border (Campbell and Coes 2010-TN6672). The age of the Coastal Plain sediments varies from the Late Cretaceous (100 million years before present [mbp]) to the Holocene (recent).

The South Carolina Coastal Plain is divided into three physiographic sub-provinces based on topography and surficial geology. These are referred to as the Upper, Middle and Lower Coastal Plain, or as the Sand Hill, Inner Coastal Plain, and Outer Coastal Plain, respectively. The topography is characterized by terraces at specific elevations and separated from each other by an erosional escarpment (or scarp). The escarpment to the abutting higher terrace reflects the extent of erosion of the higher (older) terrace during the deposition of that terrace. The Coastal Plain sub-provinces are roughly demarcated by the Orangeburg and Surry scarps, shown in Figure 3-1.

The occurrence of geologic formations within the Coastal Plain reflects the deposition of material at different sea level elevations as the ocean rose or fell during the geologic history of the region. Formations may or may not be found in any specific location of the Coastal Plain province due to the nature of the depositional environment. In general, Cretaceous sediments are found throughout the province, Tertiary sediments extend to the fall line only in the southwestern part of the region, and the Quaternary sediments occur within about 80.5 km (50 mi) of the coast and along the courses of the present-day rivers (including the Congaree River), as can be seen in Figure 3-1. If found in the subsurface, each formation unconformably underlies or overlies the abutting formations.

The fall line marks the division between the older, more-resistant crystalline or metamorphic rocks of the Piedmont and Blue Ridge physiographic provinces and the younger, unconsolidated sedimentary lithologies of the Atlantic Coastal Plain province.

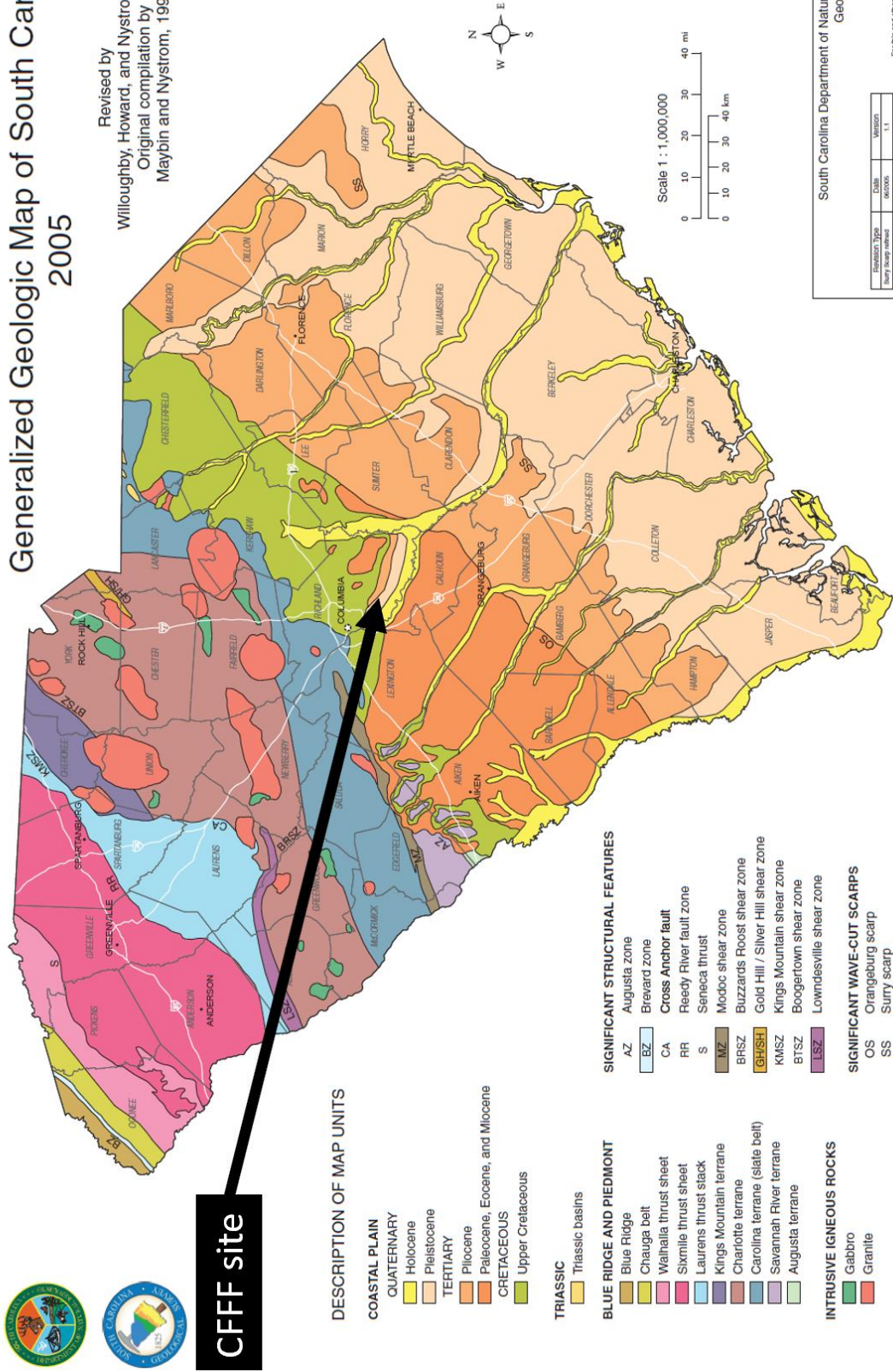
The hydrogeologic framework relates the geologic formations to their hydrologic functions as aquifers and confining units. They evolve over time as data are reinterpreted and new data are obtained. The South Carolina Department of Natural Resources (SCDNR) recently adopted the newer hydrogeologic framework presented by Campbell and Coes (2010-TN6672) for their assessments of groundwater in South Carolina (Wachob et al. 2017-TN6712), and this newer framework will be used in this EIS.

The confining unit is a layer of rock that is less permeable than those above or below it, and which prevents or restricts the vertical movement of water and pressure.

When evaluating the occurrence and flow of groundwater, the regional geologic setting is commonly discussed in terms of a hydrogeologic framework, which relates the geologic formations to their hydrologic functions as aquifers and confining units. Hydrogeologic frameworks evolve over time as data are reinterpreted and new data are obtained. The hydrogeologic description of the CFFF site presented in the ER (WEC 2019-TN6510) and recent CA-related remedial investigation documents (e.g., *Final Interim Remedial Investigation Data Summary Report*, July 2020, WEC 2020-TN6526) appears to be based on a combination of the older frameworks of Colquhoun et al. (1983-TN6711) and Aucott et al. (1987-TN6674).

Generalized Geologic Map of South Carolina 2005

Revised by
Willoughby, Howard, and Nystrom, 2005
Original compilation by
Maybin and Nystrom, 1997



CFFF site

DESCRIPTION OF MAP UNITS

- COASTAL PLAIN**
- QUATERNARY**
 - Holocene
 - Pleistocene
- TERTIARY**
 - Pliocene
 - Paleocene, Eocene, and Miocene
- CRETACEOUS**
 - Upper Cretaceous

TRIASSIC

- Triassic basins

BLUE RIDGE AND PIEDMONT

- Blue Ridge
- Chauga belt
- Walhalla thrust sheet
- Sixmile thrust sheet
- Laurens thrust stack
- Kings Mountain terrane
- Charlottesville terrane
- Carolina terrane (slate belt)
- Savannah River terrane
- Augusta terrane

INTRUSIVE IGNEOUS ROCKS

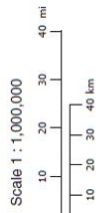
- Gabbro
- Granite

SIGNIFICANT STRUCTURAL FEATURES

- AZ Augusta zone
- BZ Brevard zone
- CA Cross Anchor fault
- RR Reedy River fault zone
- S Seneca thrust
- MSZ Modoc shear zone
- BRSZ Buzzards Roost shear zone
- GHSZ Gold Hill / Silver Hill shear zone
- KMSZ Kings Mountain shear zone
- BTSZ Boogertown shear zone
- LSZ Lowndesville shear zone

SIGNIFICANT WAVE-CUT SCARPS

- OS Orangeburg scarp
- SS Surry scarp



South Carolina Department of Natural Resources,
Geological Survey
Columbia, South Carolina
(803) 886-7700
www.dnr.sc.gov/geology

Revision Type	Date	Version
Survey map release	11/03/05	1.1
Change record	11/03/05	2.0

For this and other publications please visit:
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Figure 3-1 Generalized Geologic Map of South Carolina (Source: Willoughby et al. 2005-TN6717)

The South Carolina Department of Natural Resources (SCDNR) recently adopted the newer hydrogeologic framework presented by Campbell and Coes (2010-TN6672) for their assessments of groundwater in South Carolina (Wachob et al. 2017-TN6712), and this newer framework will be used in this EIS. The stratigraphic correlations of geologic formations and regional hydrogeologic units for South Carolina are shown in Figure 3-2. Additional discussion of groundwater in the region can be found in Section 3.4, Groundwater Resources, in this EIS.

3.2.2 Site-Specific Geology and Impacts

The WEC site is located approximately 18 km (11 mi) southeast of the fall line within the Upper (or Inner) Coastal Plain Province. The site is located at the southeastern edge of the Fort Jackson South quadrangle, as seen in Figure 3-3, which shows the surface geology of the area (Meitzen 2011-TN6678). Surface geology at the site comprises river terrace and floodplain deposits, separated by a bluff (a.k.a., escarpment). The Pleistocene-age terrace deposits are found in the northeastern portion of the site at elevations between 41 and 44 m mean sea level (MSL) (136 and 144 ft MSL); this area contains the CFFF operations and other undeveloped areas. Terrace sediments are described by Meitzen (2011-TN6678) as poorly sorted, silty, fine- to very coarse-grained sand with some gravel containing remnants of preserved channel morphologies and other landform scars. The Holocene-age floodplain deposits are found in the southern portion of the site at elevations between 34 and 35 m MSL (112 and 115 ft MSL). These alluvial sediments of the Congaree River floodplain are described by Meitzen (2011-TN6678) as multiple sequences of channel-fill and overbank deposits, coarser at the base and fining upward clayey, silty, and fine- to coarse-grained sand. The fining upward sequence may be interrupted by coarser channel-fill sequences. Alluvial tributary valley deposits along streams such as Mill Creek contain coarse to fine sediments weathered from the Congaree River terraces. Deposition of the floodplain sediments effectively cut into and completely removed the older river terrace sediments (WEC 2019-TN6510), as illustrated in the cross section shown in Figure 3-3 (at the end of this section).

Based on its ongoing site remedial investigation, the WEC states that the surficial sediments at the CFFF site are 9.1 m to 12.2 m (30 to 40 ft) thick above and below the bluff, and consist of clay, silt, or silty sand at the surface, coarsening downward to coarse sand or gravel above an underlying low-permeability formation (WEC 2020-TN6707). Cross sections provided with the WEC's CSM show the occurrence of clay and silt lenses in the terrace deposits with more continuous layers of clay and silt in the floodplain deposits (WEC 2020-TN6707). Described as an anomaly, 15.2 m (80 ft) of surficial sediments were observed in one of the boreholes drilled in the floodplain (borehole L-1, at the location of well W-95; WEC 2020-TN6707).

Undifferentiated Tertiary sediments are present in the Congaree River valley beneath the floodplain deposits, as shown in Figure 3-2 and Figure 3-3. The Tertiary sediments are bedded sands varying from loose to clayey and compact, said to be thickest in the upper Congaree River valley and thinning toward the lower valley (Meitzen 2011-TN6678). The Tertiary sediments are absent beneath the floodplain and terrace deposits in geologic cross sections provided for the Saylor's Lake quadrangle (where the southern portion of the CFFF site is located) (Shelley 2007-TN6889) and through the northern part of Congaree National Park, as shown by Graham (2014-TN6675).

Period	Epoch	Age	Paleontology zone	South Carolina Formation	South Carolina							
					Inner Coastal Plain (west)	Outer Coastal Plain (west)	Outer Coastal Plain (east)					
Quaternary				Quaternary undifferentiated		surficial aquifer	surficial aquifer					
TERTIARY	Pliocene	Late	Piacenzian	NN 16								
		Early	Zanclean	NN 13-15								
	Miocene	Late	Messinian	NN 11	Ebenezer	Hawthorn Group						
			Tortonian	NN 10								
				NN 7-9								
		Middle	Serravallian	NN 6	Coosawhatchie		Upper Floridan confining unit	Formations absent in eastern SC owing to uplift of the Cape Fear Arch				
			Langhian	NN 5								
		Early	Burdigalian	NN 4								
	Oligocene	Late	Aquitanian	NN 2-3	Upland unit/Marks Head							
				NN 1	Parachucla							
		Early	Chattian	NP 25	Tiger Leap	Tiger Leap absent	??					
			Rupelian	NP 24	Ashley	Ashley absent						
	Eocene	Late	Priabonian	NP 19-20	Tobacco Road Sand Dry Branch (updip) Parkers Ferry/Ocala (downdip)	Updip Upper Floridan aq.	Upper Floridan aquifer (Parkers Ferry/Ocala)					
				NP 18	Harleyville	Harleyville absent	Middle Floridan confining unit					
			Middle	Bartonian	NP 17	Santee	Updip Middle Floridan aq.		Middle Floridan aquifer			
		Early	Ypresian	NP 16		Gordon confining unit	Gordon confining unit					
				NP 15	Warley Hill		Warley Hill absent					
		Paleocene	Late	Thanetian	NP 14							
					NP 13	Congaree			Congaree absent			
					NP 12							
			Early	Danian	NP 11	Fourmile/Fishburne	Gordon aquifer		Gordon aquifer			
					NP 10							
	CRETACEOUS (part)	Late	Maastrichtian	NP 9								
				NP 8	Williamsburg							
				NP 7								
				NP 6								
			Selandian	Danian	NP 5	Lang Syne	Crouch Branch confining unit		Crouch Branch confining unit			
					NP 4							
			Campanian	Cenomanian	NP 3	Rhems						
					NP 2							
					NP 1							
					CC 26 ^A	Sawdust Landing Upper Peedee/Steel Creek			Sawdust Landing absent	Sawdust Landing absent		
					CC 25 ^B	Middle Peedee/Steel Creek	Crouch Branch aquifer					
					CC 24 ^C	Lower Peedee/Steel Creek						
					Santonian	Cenomanian	CC 23 ^A		Upper Donoho Creek		upper Donoho Cr. absent	upper Donoho Cr. absent
							CC 22 ^B		Middle Donoho Creek Lower Donoho Creek	McQueen Branch confining unit	McQueen Branch confining unit	
	CC 21 ^C	Bladen								McQueen Branch CU		
	CC 20 ^D	Coachman										
Coniacian	Cenomanian	CC 19 ^E	Cane Acre		McQueen Branch aquifer generally absent in area	McQueen Branch aquifer						
		CC 18 ^F	Caddin	Caddin absent	Charleston confining unit	Charleston confining unit						
Turonian	Cenomanian	CC 17 ^G	Shepherd Grove	Shepherd absent								
		CC 16 ^H	Pleasant Creek	Pleasant Creek absent								
Cenomanian	Cenomanian	CC 15 ^I	Collins Creek	Collins Creek absent	Charleston aquifer	Charleston aquifer						
		CC 14 ^J										
Cenomanian	Cenomanian	CC 13 ^K										
		CC 12 ^L	Cape Fear	Gramling confining unit	Gramling confining unit	Gramling confining unit						
Cenomanian	Cenomanian	CC 11 ^M										
		CC 10 ^N	Clubhouse		Gramling aquifer	Gramling aquifer						
Early					Not present in South Carolina							

Figure 3-2 Stratigraphic Correlations of Hydrogeologic Units in South Carolina (Source: Campbell and Coes 2010-TN6672). The Black Mingo and Middendorf aquifers identified in CFFF reports are correlated with the Crouch Branch and McQueen Branch aquifers.

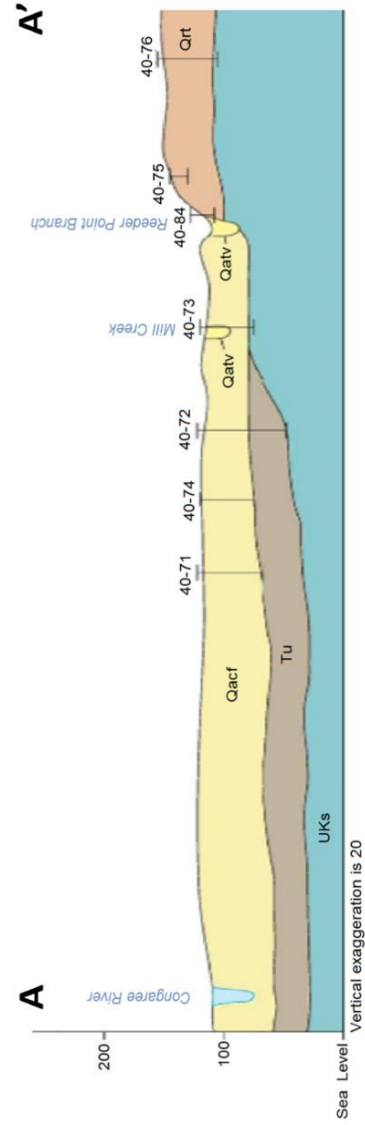
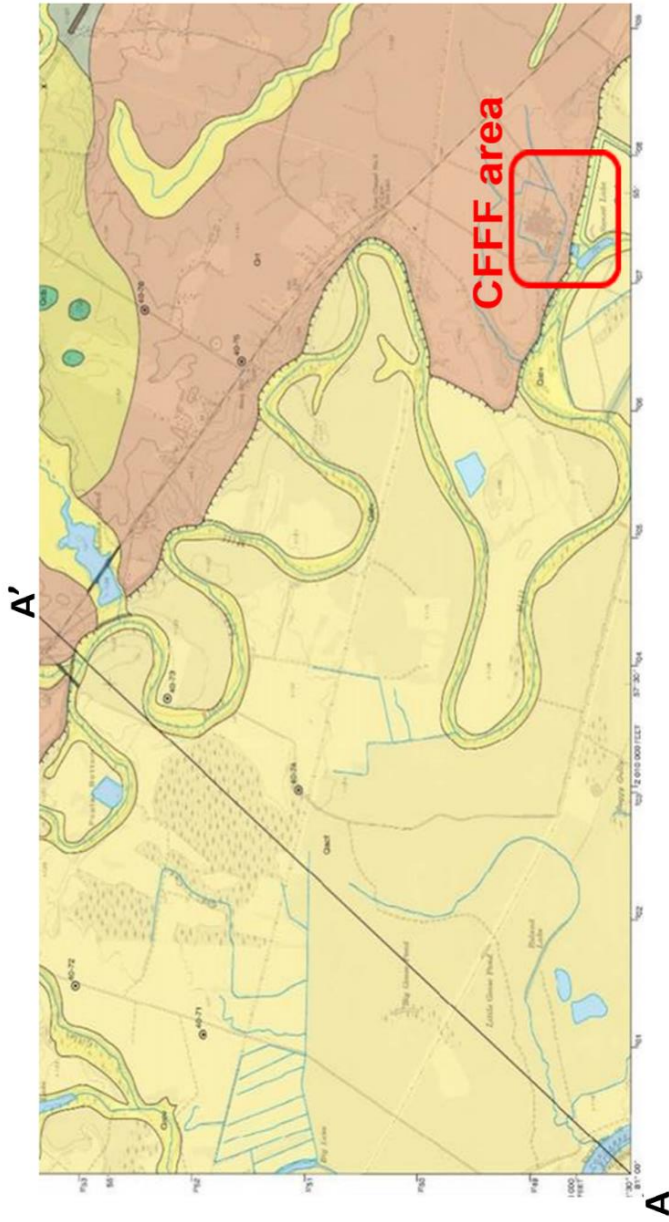


Figure 3-3 Surficial Geology of the CFFF Region: Plan View (top) and Cross section (bottom). Note that “A” and “A’” markings are used on both maps to show where the cross section occurs on the top map. (Source: Meitzen 2011-TN6678)

Sediments at the CFFF site beneath the surficial deposits are interpreted in the WEC's CSM as being units of the Tertiary-age Black Mingo Formation, consisting of the Black Mingo (clay) confining unit and the underlying Black Mingo aquifer, both of which are stated to be continuous across the site (WEC 2019-TN6510, WEC 2020-TN6707). The thickness of the two units of the Black Mingo Formation beneath the CFFF site was previously estimated to vary between 23 and 35.5 m (75 and 100 ft) (AECOM 2013-TN5508). However, no wells or boreholes at the CFFF site penetrate to the base of this formation. Based on borehole logs from the four CFFF site wells installed in the upper part of what is referred to as the Black Mingo aquifer, the Black Mingo confining unit was stated to be 12 to 25 m (39 to 83 ft) thick at the CFFF site (WEC 2020-TN6707). However, the depth of the surficial sediments at borehole L-1 suggests that the confining unit has been eroded in this area and that the minimum confining unit thickness is less than 12 m (39 ft) at that location (WEC 2020-TN6917).

Underlying the Tertiary sediments in the area of the CFFF site are Upper Cretaceous sediments described as a cohesive matrix of clayey, silty, fine- to very coarse-grained sand by Meitzen (2011-TN6678). The basal and upper surfaces of these sediments are stated to be irregular and undulating. The Cretaceous sediments at the CFFF site are interpreted in the WEC's CSM as units of the Middendorf Formation, described as clay interbedded with fine- to coarse-grained sand, including the water-bearing Middendorf aquifer (WEC 2020-TN6707). There is usually not an apparent boundary between the Middendorf and Black Mingo Formations (AECOM 2013-TN5508). The WEC states that the Middendorf aquifer is unconformably underlain by bedrock (WEC 2020-TN6707). No wells or boreholes at the CFFF site have penetrated the Middendorf Formation sediments, although the thickness of the Cretaceous sediments at the CFFF site was reported to range from 38 to 44 m (125 to 145 ft) (WEC 2019-TN6510).

The Black Mingo aquifer system is associated with the Lang Syne, Rehms and Sawdust Landing formations shown in Figure 3-2, but they are eroded in the area of the Congaree River floodplain deposits according to Colquhoun (1983-TN6711). This is consistent with Graham (2014-TN6675), who showed the Lang Syne and Sawdust Landing formations to be exposed in the southern bluffs (south of the Congaree River), but absent in the floodplain. The Tertiary-age Crouch Branch confining unit (see Figure 3-2) is shown extending into southern Richland County by Campbell and Coes (2010-TN6672) and as locally present (not continuous) in the CFFF site area by Wachob et al. (2017-TN6712). Units of the McQueen Branch and Crouch Branch aquifers are interpreted to be present in the CFFF site area by Wachob et al. (2017-TN6712), with the intervening McQueen Branch confining unit said to be thin and sandy such that the aquifers may be connected (Wachob et al. 2017-TN6712). Sediments of the Gramling confining unit overlie bedrock in the area of the CFFF site (Campbell and Coes 2010-TN6672; Wachob et al. 2017-TN6712). The elevation of the top of bedrock at the CFFF site is about -45.7 m MSL (-150 ft MSL) (Newcome 2003-TN6706).

Based on the available literature and CFFF site information provided by the WEC, the NRC staff finds that the sediments identified at the CFFF site as the Black Mingo confining unit are likely to be correlated to the Crouch Branch confining unit in the hydrogeologic framework of Campbell and Coes (2010-TN6672). While this confining unit has been observed in all boreholes at the CFFF site, the lithologic characteristics and thickness of the confining unit vary, consistent with the description of these sediments in the literature. The NRC staff also finds that the underlying aquifers identified as the Black Mingo and Middendorf aquifers are correlated to the Crouch Branch and McQueen Branch aquifer units in the hydrogeologic framework of Campbell and Coes (2010-TN6672), and that these aquifers are likely to be connected with no significant confining unit separating them.

The proposed continued operation of the facility for an additional 40 years would cause no significant disturbance of the subsurface sediments at the CFFF site because the WEC is not proposing changes to its SNM-1107 license related to construction, and no offsite geological resources would be required. Therefore, the NRC staff concludes that direct and indirect impacts on geological resources resulting from the proposed action would be SMALL. In addition, because the proposed continued operation of the CFFF for an additional 40 years would not require the use of any offsite geological resources, the SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact from the proposed action (see Section 3.19 for additional information).

3.2.3 Seismology

Based on the U.S. Geological Survey (USGS) database (USGS 2021-TN6951), between 1900 and 2020, 389 historical earthquakes occurred in the South Carolina Region, which includes South Carolina and parts of North Carolina and Georgia (Figure 3-4). Of those, 384 earthquakes had a magnitude less than 3, 36 earthquakes had magnitudes between 3 and 4, and 11 earthquakes had magnitudes between 4 and 5 (Figure 3-5, USGS 2021-TN6951). The earthquake epicenter closest to the WEC site was located approximately 2 km (1.25 mi) south of the property. That earthquake occurred on May 24, 2007, at a depth of approximately 10 km (6 mi) and had a magnitude of 2.4 (USGS 2021-TN6951).

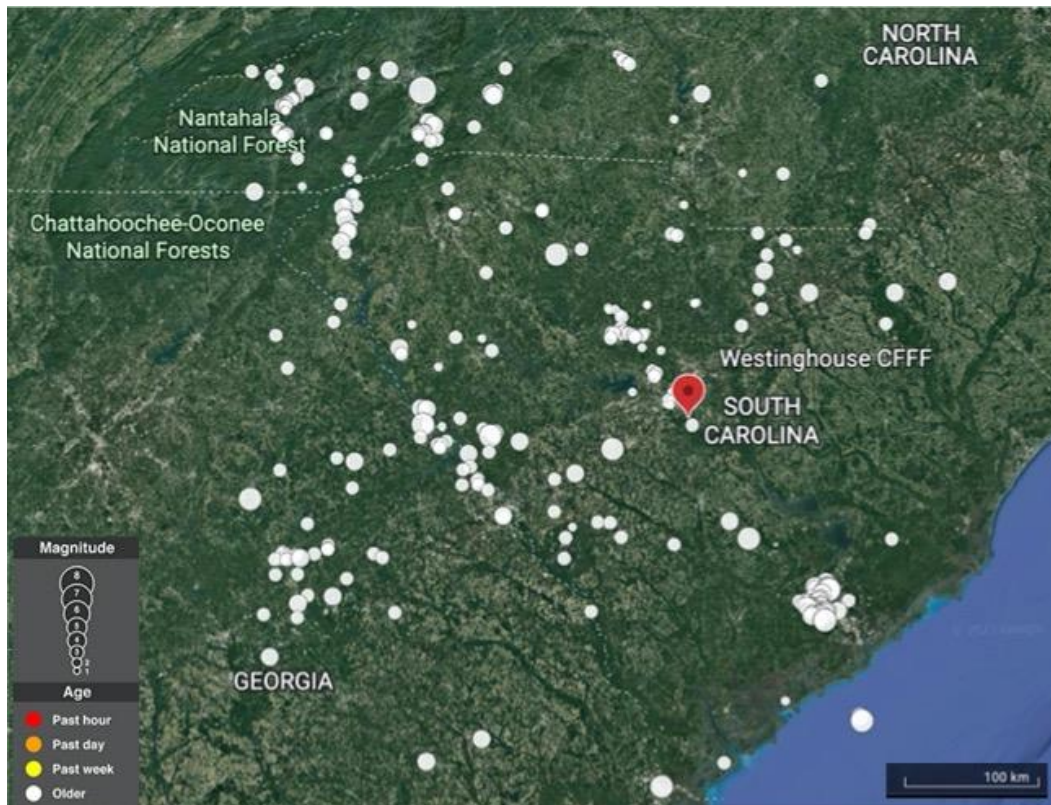


Figure 3-4 Location Map of Earthquake Epicenters for Earthquakes between 1900 and September 1, 2020, for the South Carolina Region (Source: USGS 2021-TN6951). The geographic bounding box for the earthquake search is as follows: Latitude 32.1 – 35.7N and Longitude 79.3-83.5W.

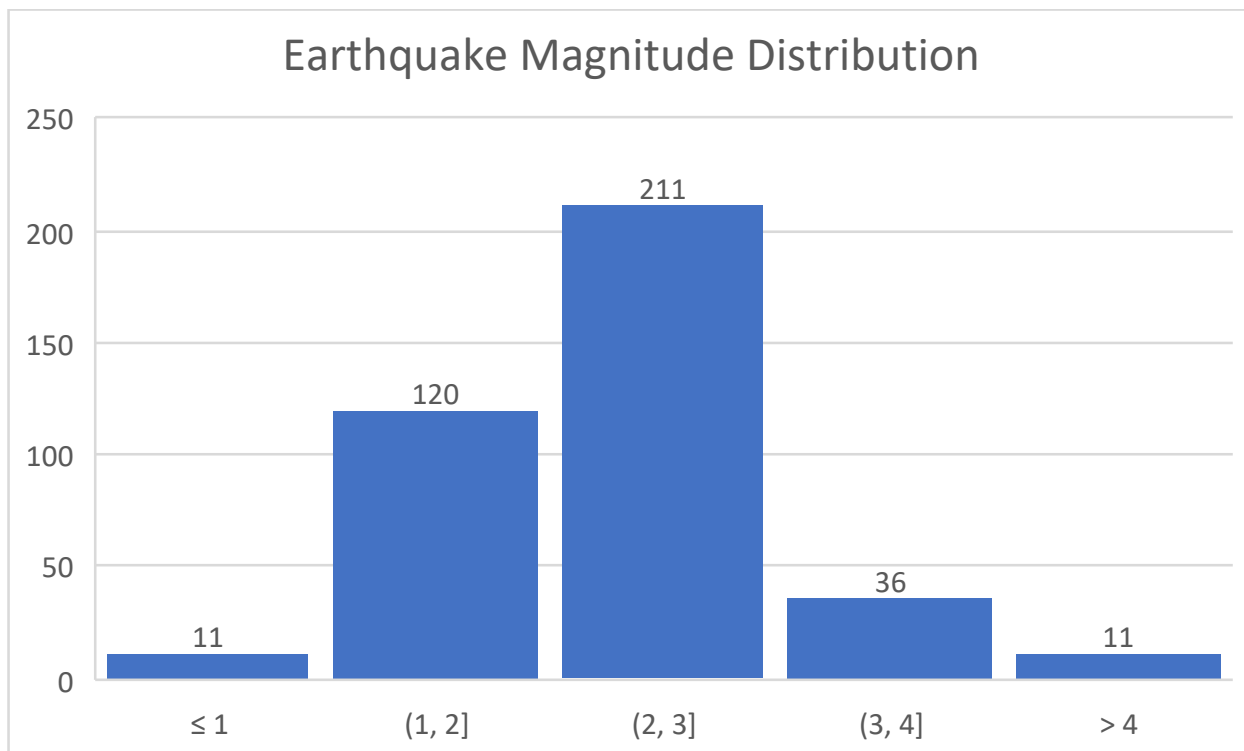


Figure 3-5 Magnitude Distribution for Earthquakes between 1900 and September 1, 2020, for the South Carolina Region (Source: USGS 2021-TN6951)

Earthquakes with magnitudes less than 3 are generally not felt by most people. Earthquakes with magnitudes between 3 and 5 are felt with negligible to slight damage (e.g., damaged chimneys). Generally, earthquakes with magnitudes greater than 6 result in considerable damage.

The NRC staff's research found that the region's largest magnitude earthquake occurred in the Charleston area prior to 1900, on August 31, 1886 (WEC 2019-TN6510; Greene and Gori 1982-TN6890; Bollinger 1972-TN6892). Based on the reported damage, the intensity near the epicenter is estimated to have been an intensity "X" on the Modified Mercalli Intensity Scale, and an estimated magnitude between 7.1 and 7.3 by comparison to similarly intense earthquakes with measured magnitudes (Bollinger 1972-TN6892). It is thought that this earthquake was the largest along the eastern coast of North America during the recorded history timeframe. Extreme shaking would be felt for an earthquake of intensity "X," which would cause some well-built wooden structures to be destroyed and most masonry and frame structures to be destroyed, including foundations (USGS 2021-TN6933).

The intensity or peak ground acceleration reflect the greatest hazard associated with earthquakes. The peak horizontal acceleration is commonly used when estimating seismic hazards and developing building codes. Based on published USGS mapping, the estimated peak ground acceleration at the CFFF site with a 2 percent probability of exceedance in 50 years is 20 to 30 percent of gravity (USGS 2014-TN6891). Such a peak ground acceleration would correspond to an intensity of VII on the Modified Mercalli Intensity Scale for which very strong shaking would be felt and the potential for damage would be negligible for buildings constructed of good design and construction, slight to moderate for well-built ordinary structures, and considerable for poorly built structures (USGS 2021-TN6933).

3.2.4 Soils and Soils Impacts

Mapped soil series³ on and around the CFFF site are shown in the Custom Soil Resource Report for Richland County (NRCS 2021-TN6949). The soil series that have been directly affected by the CFFF itself, or that may be directly affected by operations (e.g., spills, releases), include the Orangeburg-Urban land complex and the Goldsboro sandy loam series. The Orangeburg-Urban land complex series reflects the artificial fill that was brought to the area to construct the facility. It is estimated that the maximum thickness of these soils is on the order of 1.2 m (4 ft). The Goldsboro loamy sand series is less likely to be affected because of the minimum development in the area west of the main facility. Approximately three-fourths of the area shown in Figure 3-6 is covered by soils classified as farmland. The Persanti very fine sandy loam unit composes the largest area of prime farmland (16.6% of the area shown). Other map units classified as prime farmland include the Orangeburg loamy sand, Goldsboro, Faceville sandy loam, and Dothan loamy sand units, which collectively occupy only 2% of the area shown in Figure 3-6. The Congaree, Chewacla, and Toccoa loam units (collectively 38.8% of the area shown) are classified as prime farmland if drained and either protected from flooding or not frequently flooded during the growing season. The Smithboro loam, Cantey loam, and Coxville fine sandy loam units are classified as farmland of statewide importance. These units are collectively 15.7% of the area shown in Figure 3-6.

Annual soil sampling conducted as part of the environmental monitoring program shows low radionuclide levels around the site (see Figure 2-7 for soil-sampling locations under the WEC license) (WEC 2019-TN6423). Total uranium activities at the four soil-sampling stations varied from 0.6 to 4.0 picocuries per gram (pCi/g) during the period from 2007 to 2020, below the 10 pCi/g investigation level (WEC 2019-TN6423; WEC 2021-TN7110). No investigation levels were provided for gross alpha or gross beta concentrations. Concentration of gross alpha was less than 40 pCi/g for all samples from 2007 to 2020 with most samples below 30 pCi/g. Concentration of gross beta was less than about 40 pCi/g with the exception of one sample (68 pCi/g) in 2013. A Tc-99 concentration of 0 (zero) was reported for the 2013 sample, with a nominal detection limit of 50 pCi/g (WEC 2019-TN6423). There were no apparent trends in any of the reported soil quality data during this time period (2007 to 2020) (WEC 2019-TN6423; WEC 2021-TN7110).

Historical operations at the facility have affected the subsoils, primarily within the Orangeburg-Urban land complex and underlying strata. The impacts on the subsurface from operations extend back to 1972, and include both radiological and nonradiological constituents (AECOM 2013-TN5508; WEC 2020-TN6526). Past NRC environmental reviews conducted for the previous WEC license renewals have determined that the impact on the subsurface was not significant (NRC 1977-TN6547, NRC 1985-TN5602, NRC 1995-TN5600, NRC 2007-TN5598). The historical constituents of potential concern (COPCs) released to the soils or the subsurface are nitrate; fluoride; gross alpha (as a surrogate for uranium); gross beta (as a surrogate for technetium-99 [Tc-99]); volatile organic compounds (VOCs), primarily perchloroethylene (PCE), trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-1,2-DCE), and vinyl chloride (VC) (WEC 2019-TN6510); and ammonia, which was related to the 1980 fish kill in Gator Pond (NRC 1985-TN5602). The findings for the previous NRC environmental reviews were based, in part, on low levels of COPCs in soils outside of the building footprint and changes in facility operations that prevented or minimized releases (e.g., changes in the storage of materials containing contaminants).

³ A soil series is a classification of soils with common properties, distinguishable from other soil series.

Plan (DFP).⁴ The WEC contends that deferring the cleanup of residual subsurface soil impacts does not pose a risk of offsite impacts based on contaminant levels observed in groundwater at the nearby wells and continued groundwater monitoring (WEC 2019-TN6510).

Soil sampling for potential contamination in areas near the plant has continued under the CA with the SCDHEC, including soil sampling in the Southern Storage Area operable unit (OU) (WEC 2021-TN7173; WEC 2021-TN7154), beneath and adjacent to the East Lagoon (WEC 2021-TN7151, WEC 2021-TN7146, WEC 2021-TN7114), in a stormwater ditch (WEC 2021-TN7134), and in the Western Storage Area OU (WEC 2021-TN7046; WEC 2021-TN7130; WEC 2021-TN7153). Soils contaminated above screening levels were generally excavated for disposal unless access was limited. Some East Lagoon soils above screening levels were left in place to avoid contact with groundwater and to ensure the structural integrity of nearby buildings/equipment (WEC 2021-TN7146). The WEC follows its environmental remediation procedure, RA-433, (WEC 2020-TN6853) when responding to the detection of potential contaminants of concern in soil samples.

The WEC completed a shallow soil gas survey and soil sampling as part of the remedial investigation process under the CA with the SCDHEC to evaluate the continuing presence of a VOC source in the unsaturated sediments west of the main plant building. The soil gas survey identified two potential VOC source areas (WEC 2021-TN7046). Soil samples were collected based on the results of the soil gas survey at depths from 0.3 m (1 ft) to 2.4 m (8 ft) and confirmed the presence of PCE and TCE in soil at both locations (WEC 2021-TN7130; WEC 2021-TN7153). In response, additional groundwater wells were installed to monitor VOCs in the surficial aquifer and to define the extent of contamination (WEC 2021-TN7153).

Data about the contaminants in the unsaturated sediments between the surface soils and the surficial aquifer are limited. Identified contamination incidents at the CFFF site have resulted in contaminants being released to the surface soils or to near-surface sediments. Contaminants that have reached the groundwater have clearly been transported through the unsaturated zone sediments. Any contaminants remaining in the unsaturated sediments provide a potential source for groundwater contamination. As part of the remedial investigation process under the CA, the WEC completed soil sampling around the CFFF site to evaluate the presence of potential Tc-99 sources (WEC 2020-TN6526). Samples were obtained from the surface to a depth of 2 m (7 ft) at 14 locations. One sample (21.6 pCi/g) exceeded the residential screening level (19 pCi/g) for Tc-99 activity. Soil samples were obtained at 26 locations and 5 depths (from 6 in. to 4 ft.) beneath the East Lagoon liner; two samples (25 pCi/g and 77 pCi/g) exceeded the residential screening level for Tc-99 activity (WEC 2021-TN7146). Because only three of these samples exceeded the residential screening level and all samples were well below the industrial screening level (2,933 pCi/g), these results do not provide any indication of a significant Tc-99 source in the soils and shallow sediments at the CFFF site.

The history of operations at the CFFF indicate that some soils near the plant buildings have been contaminated, and past and ongoing remediation efforts have been directed at removing soils contaminated above action levels. Results from the environmental monitoring program (described above) demonstrate that soils away from the operational areas have been only minimally affected to date. The NRC staff expect that any potential future releases of

⁴ The WEC submitted its 2019 DFP and updated it to reflect recent environmental investigations (WEC 2019-TN6926). The NRC considered the current state of site contamination and expected remediation that the WEC would implement when reviewing the DFP for approval. The NRC staff approved the revised plan in August 2020 and amended the license accordingly (NRC 2020-TN7002).

contaminants would similarly affect soils near the plant. In addition, there would be no significant disturbance of the soils at the CFFF site from the proposed continued operation of the facility for an additional 40 years. Therefore, the NRC staff concludes that direct and indirect impacts on soil resources resulting from the proposed action would be SMALL. Additionally, because the proposed continued operation of the CFFF for an additional 40 years would not significantly affect onsite or offsite soils, the SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact (see Section 3.19 for additional information).

3.2.5 Mitigation Measures

As described above, impacts on geology and soils resulting from the proposed action are expected to be SMALL and localized to those soils near the plant buildings. Soil sampling for radionuclide contamination is expected to continue under the CA with the SCDHEC and as part of the environmental monitoring program under the proposed license renewal. Remediation efforts under the CA are expected to disturb surface soils only near the plant buildings. No additional mitigation measures have been identified beyond the remedial investigations the WEC is conducting under the CA and the new license conditions (WEC 2021-TN7042). The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either the SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2, and 2.4.2 of this EIS.

The WEC's additional commitments address: (1) the use of the CSM in informing decisions about the environmental monitoring program and maintaining the CSM (procedure RA-435); (2) establishing and maintaining remediation procedure RA-433, which is used to prevent migration of licensed material and/or contamination offsite and inform decisions about remediation; and (3) establishing and maintaining Environmental Data Management Procedure RA-434, which is used to manage the site's environmental data and assess potential trends within the environmental monitoring program (WEC 2021-TN7042).

3.3 Surface Water Resources

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts on surface water resources from the proposed action.

The Congaree River is the principal surface water body draining the watershed in which the facility is located. At its closest point, the Congaree River is approximately 5 km (3 mi) southwest of the main manufacturing facility. The Congaree River is formed by the confluence of the Broad and Saluda Rivers upstream in Columbia, South Carolina. Flow in the Congaree River depends on inflows from the Broad and Saluda River Basins. Flow in the Broad River is regulated by the Parr Shoals Dam and Saluda River flow is regulated by the Lake Murray Dam

(NRC 2007-TN5598). The annual average flow of the Congaree River at the Columbia gage (USGS 02169500) is 7,600 cubic feet per second (cfs) for the period from 1990 to 2019 (USGS 2020-TN6676). The average monthly flow varies throughout the year, from 12,000 cfs in March to 4,600 cfs in September, averaged over the period from 1990 to 2020. During the same period, the maximum monthly flow of 33,360 cfs occurred in March 2020 and the minimum monthly flow of 1,085 cfs occurred in October 2007.

The CFFF site is located within the flood basin of the Congaree River (see Figure 3-7). The flood stage for the Congaree River at the Carolina Eastman gauging station (located east of the CFFF site) is 35 m (115 ft) MSL. Flooding occurs when the river level rises above the flood stage and backs up water in the floodplains (WEC 2014-TN6420). Major flood stage at the Carolina Eastman gauge is 38 m (126 ft) NGVD29 (National Geodetic Vertical Datum of 1929), which has been exceeded five times since 1975, most recently in February 2020 (NWS 2020-TN6677). The southern, undeveloped portion of the CFFF site lies on Congaree River floodplain deposits at an elevation of about 34 m (110 ft) MSL and is within the designated flood zone. The developed portion of the CFFF site is above a bluff at an elevation of about 44 m (140 ft) MSL and lies on older terrace deposits (Meitzen 2011-TN6678). Flooding is possible at any time of the year, but on the Congaree River is most likely to occur from June through October due to tropical hurricanes (Richland County 2020-TN6679).

Other surface waters in the CFFF site area include Adams Pond, approximately 5 km (3 mi) to the northwest; Roundabout Lake, approximately 3 km (2 mi) south; Goose Pond, approximately 5 km (3 mi) to the southeast, and Myers Creek, approximately 3 km (2 mi) to the east (NRC 2007-TN5598).

Several surface water bodies within the CFFF site boundary are in the undeveloped portion of the site (Figure 3-8). Mill Creek meanders across the Congaree River floodplain, crosses the CFFF site below the bluff, and continues to flow through the Congaree floodplain, ultimately discharging to the Congaree River about 4.8 km (3 mi) south of the site (AECOM 2013-TN5508; NRC 2007-TN5598). Flow in the natural channel of Mill Creek on the CFFF site has been significantly altered by dikes, levees, and a canal that existed prior to the construction of the CFFF. The majority of Mill Creek flow is diverted at the point where it enters the CFFF site by a cutoff and canal located along the southwestern site boundary (see Figure 3-8). Flow in the canal discharges to Mill Creek at the point where the creek leaves the CFFF site downstream of Sunset Lake and the exit dike (Figure 3-8). The presence of the canal/levee system substantially reduces the flow in the natural channel of Mill Creek across the CFFF site.

Sunset Lake is a shallow impoundment within the Mill Creek channel created by the pre-1950s construction of a man-made earthen berm across the channel (see Figure 3-8). The upstream portion of this lake (Upper Sunset Lake) is now a swampy area; about 3.24 ha (8 ac) of the lower portion (Lower Sunset Lake) is still present as open water (WEC 2019-TN6510). Both lake portions are 1.5–2 m (5–6 ft) deep (WEC 2020-TN6526).

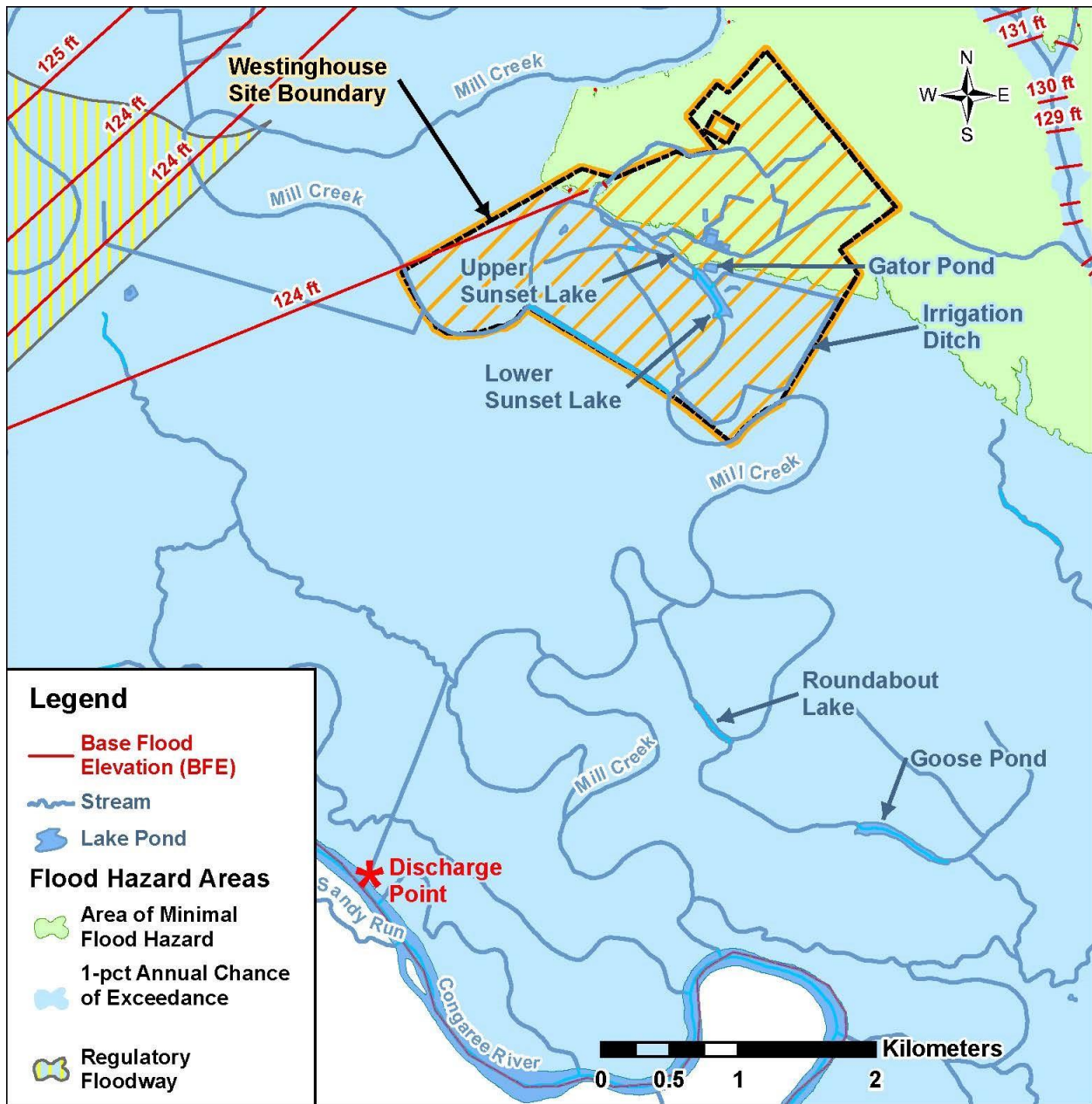


Figure 3-7 Congaree River Flood Hazard Areas (NRC 2019-TN6472)

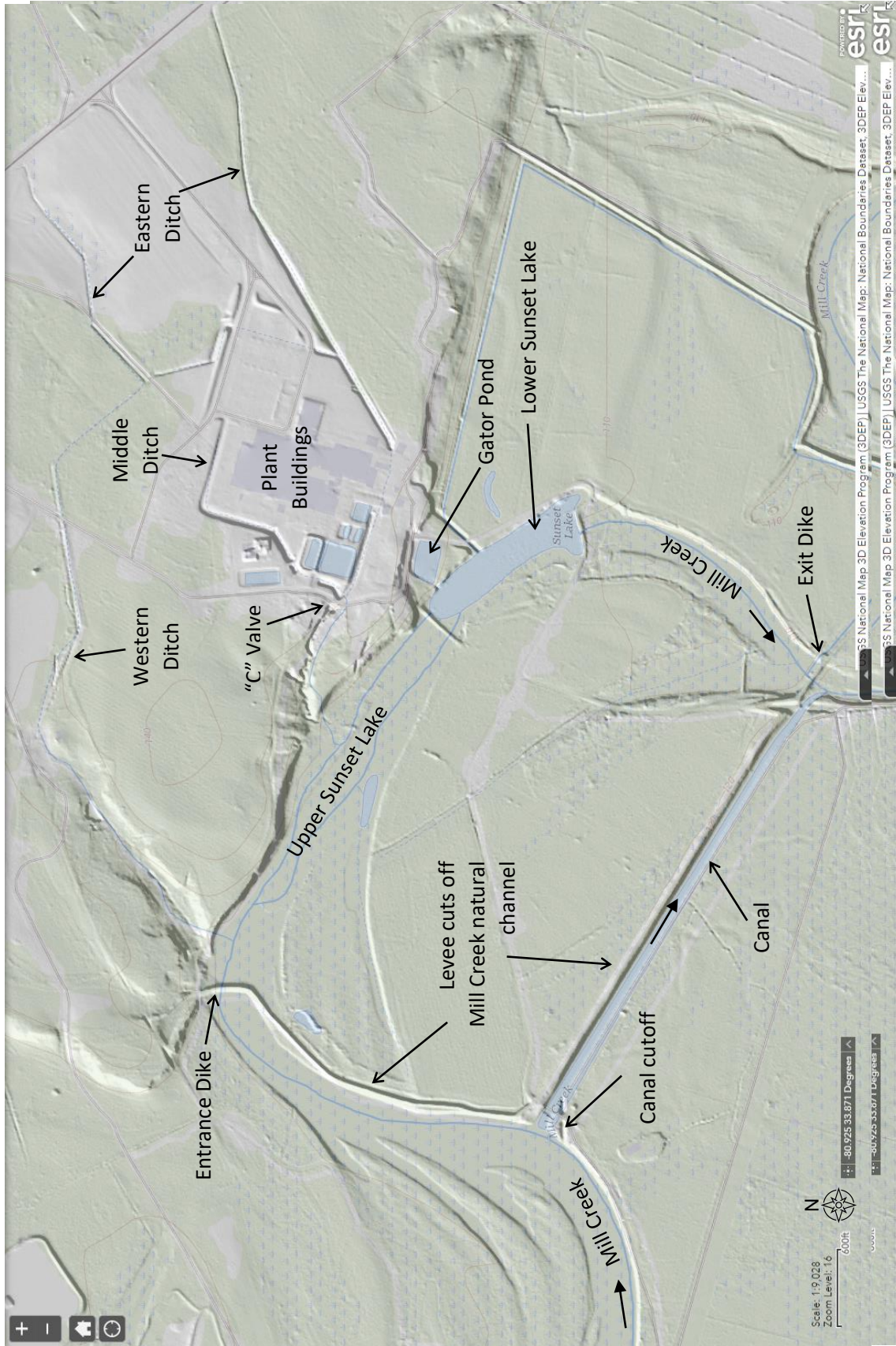


Figure 3-8 Onsite Surface Water Bodies (Source: USGS National Map basemap with shaded elevation (Hillshade Stretched) overlay; CFFF Site labels added)

A man-made pond (commonly referred to as Gator Pond) is located adjacent to the bluff, 152 m (500 ft) southwest of the wastewater treatment plant (WWTP) (see Figure 3-8). The elevation of the pond is about 37 m (120 ft) MSL, which is about 3 m (10 ft) above Sunset Lake lying immediately to the south (WEC 2020-TN6707). Gator Pond is fed by a natural spring, the source of which is likely the shallow groundwater directly beneath the plant site. The pond is about 2.6 m (8.5 ft) deep (WEC 2020-TN6526). Gator Pond discharges to groundwater or spills over into Lower Sunset Lake during periods of high precipitation (WEC 2020-TN6707). Gator Pond existed prior to construction of the CFFF (AECOM 2013-TN5508).

Surface runoff from the higher elevation portion of the CFFF site moves either through overland flow or through a system of drainage ditches and culverts that ultimately discharge into Sunset Lake (see Figure 3-8). Drainage in the eastern and middle ditches converges west of the Sanitary Lagoon and then flows to the west, discharging through the single stormwater outfall (“C” valve, indicated in Figure 3-8) into the Upper Sunset Lake portion of Mill Creek. The drainage ditches also interact with groundwater, discharging to the shallow groundwater where the elevation of water in the ditch is above the water table (the water table is the uppermost surface of groundwater). Where the elevation of the water table is above the bottom of a ditch, groundwater discharges into the drainage ditch; this serves to lower groundwater elevations in the area influenced by the system of drainage ditches. Other significant surface water and groundwater interaction may occur within the plant site (e.g., via seepage from the bluff face, and through potential seasonal variation of the groundwater table in the floodplain surrounding Sunset Lake and Mill Creek).

3.3.1 Surface Water Use and Quality

In 2015, 93 percent of the public water supply in Calhoun, Lexington, and Richland Counties was derived from surface water sources (Dieter et al. 2018-TN6681). Water for CFFF operations comes from the City of Columbia, which obtains water from Lake Murray on the Saluda River and from an intake on the Broad River near the confluence with the Saluda River that forms the Congaree River (SCDHEC 2020-TN6690). The CFFF consumes 4.4×10^7 gallons of water per year (about 0.12 million gallons per day [Mgd]) for potable and process uses, based on the average rates from 2014 to 2018 (WEC 2019-TN6510). Other major industrial water users within the Congaree watershed include DAK Americas (which withdraws water from the Congaree River upstream from the CFFF discharge), Nephron Pharmaceuticals, and Devro (WEC 2019-TN6510). Municipal users also include the City of Cayce and East Richland County Public Service District Gills Creek Plant. The CFFF does not use any water from Mill Creek, Sunset Lake, or Gator Pond.

The following subsections discuss the quality of the Congaree River and the surface water onsite based on recent sampling results. Section 2.2.2 describes the monitoring and sampling program the WEC has in place for surface water onsite and within the Congaree River. Water quality standards are defined in State regulations R.61-68, “Water Classifications and Standards” (SCDHEC 2014-TN6986). The Congaree River and Mill Creek are classified for freshwater uses in R.61-69, “Classified Waters” (SCDHEC 2012-TN6987). The section of the Congaree River from the confluence with Congaree Creek below Cayce, South Carolina, to the confluence with the Wateree River (below Congaree National Park) is listed in the Nationwide Rivers Inventory for its cultural, fish, geologic, historic, recreational, scenic, and wildlife values (NPS 2016-TN6705, NPS 2019-TN6579). The river is popular for recreational floating activities and as a fishery. Under the Wild and Scenic Rivers Act Section 5(d)(1) and related guidance, all Federal agencies must seek to avoid or mitigate actions that would adversely affect river segments listed in the Nationwide Rivers Inventory.

3.3.1.1 Congaree River

Section 2.2.2.1.1 describes the liquid effluents management program at the CFFF site. The CFFF discharges its treated liquid effluent via a pipeline directly into the Congaree River under its National Pollutant Discharge Elimination System (NPDES) permit (Permit No. SC0001848 [SCDHEC 2017-TN5607], currently in the renewal process). The location of the discharge point is shown in Figure 3-7. The NPDES permit imposes effluent limitations and monitoring requirements upon the WEC. Average CFFF discharge was 405,000 liters per day (L/d) (107,000 gallons per day [gpd], or 0.17 cfs) during the period from November 2017 to October 2020 (EPA 2021-TN7052). This discharge rate is less than 0.016 percent of the minimum monthly Congaree River flow observed during the period from 1990 to 2021 (1,085 cfs in October 2007) (USGS 2021-TN7172). A discharge that is a small fraction of river flow can be more easily diluted in the bulk flow of the river. There are no permitted withdrawals from the Congaree River downstream from the CFFF discharge point (SCDHEC 2020-TN6690).

Within the Mill Creek portion of the Congaree River Basin, there are naturally low pH conditions, decreasing trends in total phosphorus concentrations, and upward trends for dissolved oxygen (SCDHEC 2011-TN6708). The portion of the Congaree River that flows through Columbia is impaired for recreational use due to reported *Escherichia coli* (*E. coli*) contamination and for fish consumption due to mercury contamination (SCDHEC 2018-TN6691). Downstream from the CFFF discharge, the Congaree River is impaired for aquatic life use due to copper contamination (at the Devro-Teepak discharge outfall location) and for fish consumption due to mercury contamination (at U.S. Highway [Hwy] 601, downstream of Congaree National Park) (SCDHEC 2020-TN6690). Reeder Point Branch (a tributary to Mill Creek) is impaired for recreational use due to *E. coli* contamination at the Bluff Road (SC 48) location (SCDHEC 2018-TN6691).

As described in Section 2.2.2.1.1 of this EIS, the WEC monitors discharge to the Congaree River and reports the quantities of radionuclides released to ensure that the treated discharge meets the NRC's effluent limits. Since 2007, the amount of uranium released to the river has decreased (see Table 2-2 and Figure 3-9). In 2021, the measured uranium released to the Congaree River was 3.1 mCi with an average discharge during 2015 to 2020 of 3.8 mCi/yr (WEC 2019-TN6510, WEC 2019-TN6950, WEC 2020-TN7016, WEC 2020-TN6912, WEC 2021-TN6904, WEC 2021-7109, WEC 2022-TN7235). The WEC began monitoring for Tc-99 in its treated liquid effluent starting in 2010, with detected levels generally decreasing over time, from 19.2 mCi in 2010 to 3.3 mCi in 2021, as shown in Figure 3-9. The average Tc-99 discharge during 2015 to 2021 was 4.7 mCi/yr (WEC 2019-TN6510, WEC 2019-TN6950, WEC 2020-TN7016, WEC 2020-TN6912, WEC 2021-TN6904, WEC 2021-7109, WEC 2022-TN7235). In the 2019 to 2021 semi-annual discharge reports submitted to the NRC, the maximum uranium concentration reported was 3.2×10^{-8} $\mu\text{Ci}/\text{mL}$ (11 percent of the NRC limit of 3×10^{-7} $\mu\text{Ci}/\text{mL}$) and the maximum Tc-99 concentration was 4×10^{-8} $\mu\text{Ci}/\text{mL}$ (0.07 percent of the NRC limit of 6×10^{-5} $\mu\text{Ci}/\text{mL}$) (WEC 2019-TN6950, WEC 2020-TN7016, WEC 2020-TN6912, WEC 2021-TN6904, WEC 2021-7109, WEC 2022-TN7235).

Water samples collected from the Congaree River between 2010 and 2021, as part of the WEC's environmental monitoring program required by its NRC license, show gross alpha activities were less than 10 pCi/L, as shown in Figure 3-10 (WEC 2019-TN6423, WEC 2021-TN7110). These results are lower than the site's internal investigation level of 15 pCi/L. Samples that are above 15 pCi/L for gross alpha are analyzed for uranium speciation to determine the nature of the contamination (e.g., bioavailability).

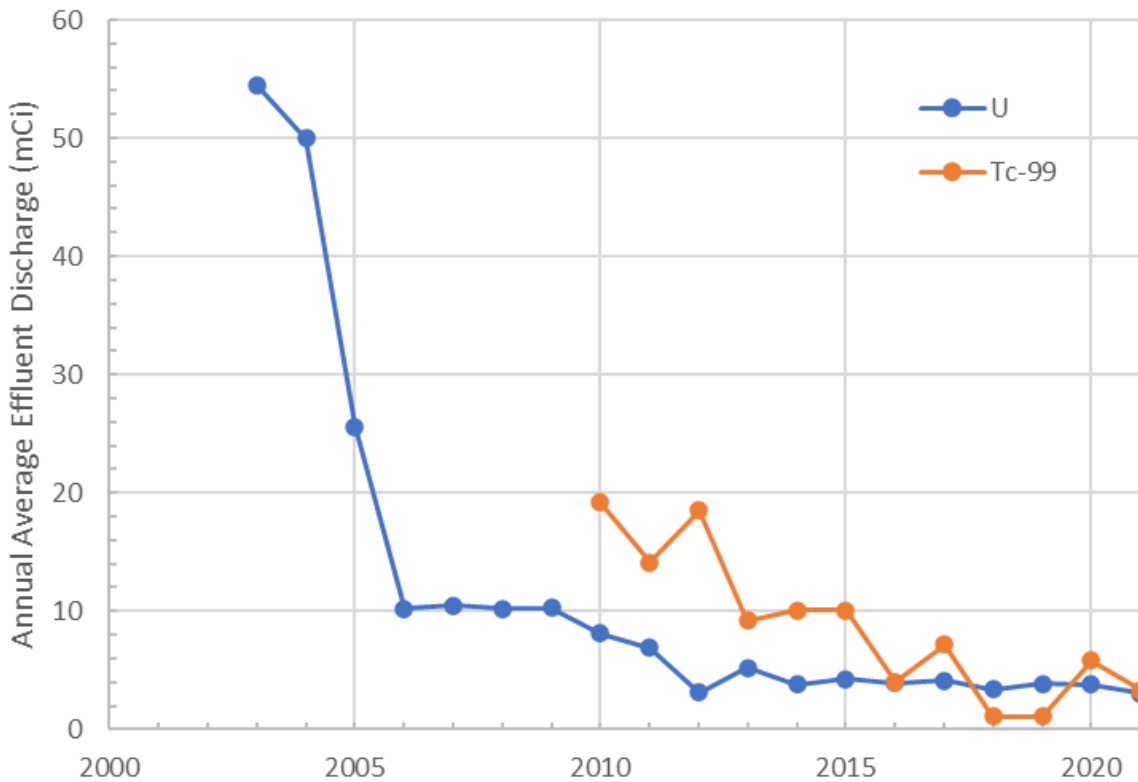


Figure 3-9 Annual Average Uranium and Technetium-99 Discharged to the Congaree River in CFFF Effluents (Sources: WEC 2019-TN6510, WEC 2019-TN6950, WEC 2020-TN7016, WEC 2020-TN6912, WEC 2021-TN6904, WEC 2021-7109)

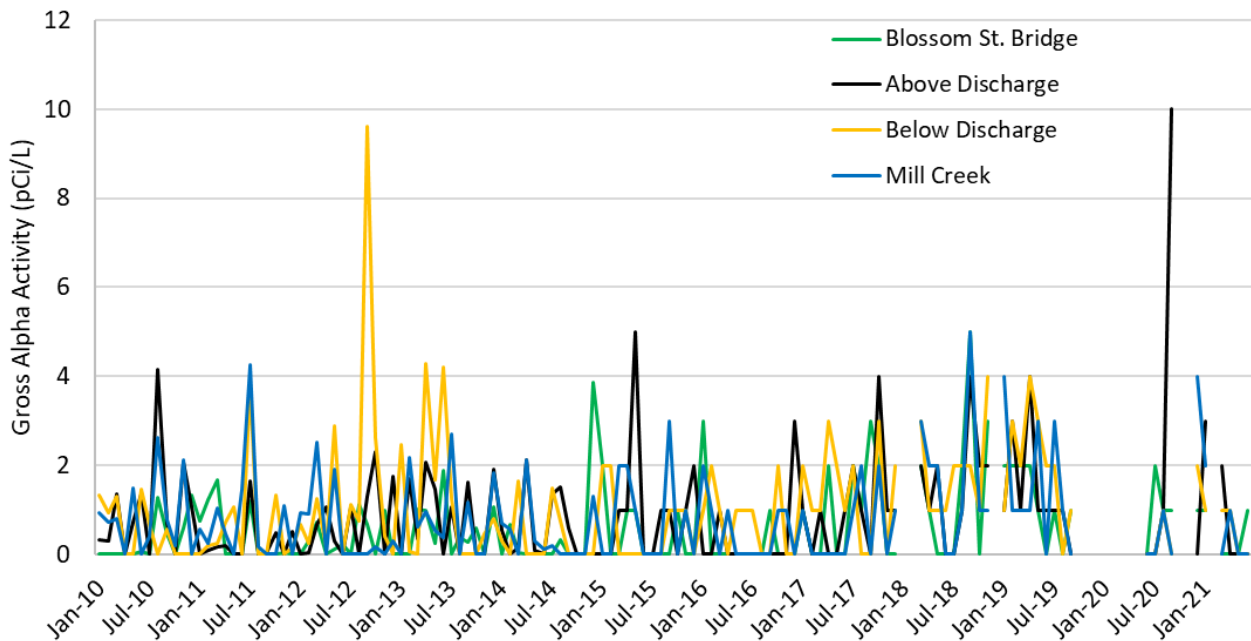


Figure 3-10 Gross Alpha Results for Congaree River Samples (Source: data from WEC 2019-TN6423, WEC 2021-TN7110)

Annual sediment samples taken from the Congaree River from 2007 to 2020 show uranium levels were below 4 pCi/g. During the same time period, gross alpha results ranged from 3 to 17 pCi/g, while gross beta results varied from 10 to 81 pCi/g (WEC 2019-TN6423; WEC 2021-TN7110). Tc-99 at a level greater than zero was measured in two sediment samples with a peak activity of 1.3 pCi/g (WEC 2019-TN6423; WEC 2021-TN7110). There are no regulatory limits for sediments, but these Congaree River sediment activities are less than the residential soil screening levels for uranium isotopes (8 to 14 pCi/g) and Tc-99 (19 pCi/g) (see Section 2.2.2.1.2 of the EIS).

Fish samples collected from 2007 to 2020 show uranium concentrations less than 1 pCi/g. During the same time period, gross alpha results in fish samples were less than 6 pCi/g, while gross beta counts in fish samples ranged from 8 to 65 pCi/g (WEC 2019-TN6423; WEC 2021-TN7110). Fish were not consistently analyzed for Tc-99 because they did not exceed the investigation level of 50 pCi/g. When Tc-99 levels were analyzed in fish, the values ranged from 0.0 to 3.1 pCi/g (WEC 2019-TN6423). The results of a recent fish tissue study conducted near the Congaree River discharge location, described in more detail in Section 3.5.2.2, concluded that neither uranium nor fluoride were detected at levels of concern for fish consumption (SCDHEC 2020-TN6536).

3.3.1.2 *Onsite Surface Water and Floodplains*

The CFFF operates under a NPDES industrial stormwater general permit for stormwater discharges (Permit No. SCR003391), which requires implementation of a Storm Water Pollution Prevention Plan (WEC 2019-TN6510). Stormwater on the CFFF site is collected in a set of surface ditches that eventually discharge into the Upper Sunset Lake portion of Mill Creek (see Figure 3-8). Stormwater on the developed portion of the site is routed via the eastern and middle ditches to a common location (the "C" control valve location) at which stormwater is sampled monthly for radiological and chemical monitoring (WEC 2019-TN6510). No process wastewaters are discharged to storm drains (WEC 2019-TN6510).

Onsite surface water has been contaminated with radiological and nonradiological constituents: VOCs, gross alpha, gross beta, fluoride, nitrate, and ammonia. As described above, the shallow groundwater interacts with the ditches so that water may flow to or from the ditches depending on the relative elevations of the groundwater table and the bottom of the ditches. In the area near the bluff where the groundwater table is likely to intersect with the ditch, contaminants previously released into or retained in the shallow groundwater may discharge into the ditch and migrate through the ditch system, subsequently entering Sunset Lake. Similarly, Gator Pond is spring fed, and the source of the spring or seepage is through the bluff surface derived from the shallow groundwater. Therefore, contaminants found in Gator Pond could also be those previously released into or retained in the shallow aquifer (AECOM 2013-TN5508).

In December 2008 and March 2009, the WEC collected samples at 10 surface water locations within Upper and Lower Sunset Lakes, Gator Pond, and onsite drainage ditches as part of a site investigation (AECOM 2013-TN5508). Results from the Gator Pond sample location (SW-10) indicated levels of gross beta activity at this location equal to the investigation level (for possible speciation) of 50 pCi/L. Results for fluoride and nitrate at the Gator Pond sample location (SW-10) were above or at the respective MCLs. Gross alpha was observed to be above the 15 pCi/L investigation level in samples from the middle ditch (see Figure 3-8) for the location of the middle ditch). Fluoride was above the 4 mg/L MCL in samples collected in the Upper and Lower Sunset Lakes and Gator Pond and in drainage ditch samples collected between the "C" control

valve location and Upper Sunset Lake. Nitrate exceeded the 10 mg/L MCL in Gator Pond (all results are from Table 4-6, AECOM 2013-TN5508).

Monthly surface water samples taken as part of the WEC's environmental monitoring program between 2010 and 2021 were analyzed for gross alpha and gross beta (WEC 2019-TN6423; WEC 2021-TN7110). The results show that gross alpha was below the 15 pCi/L investigation level for all sampling locations except for some of the Roadway samples (11 samples in 2012 to 2014 and one sample in 2016 exceeded 15 pCi/L) and one sample in 2015 at the Exit" location on Mill Creek (see Figure 2-8 of this EIS for sampling locations). During the period from 2010 to 2021, gross beta exceeded 50 pCi/L (the site investigation level for speciation) in one sample at the Roadway location, one sample at the Exit location, and three samples at Gator Pond. Gross beta levels in Gator Pond generally increased between 2010 and 2015 and have been relatively constant (on average) since then (see Figure 3-11). Gross beta activity is attributed primarily to the presence of Tc-99 (see Section 3.4.1.2.2); Tc-99 concentration in Gator Pond has not exceeded the drinking water MCL (900 pCi/L).

One indicator that contaminant releases from the CFFF are affecting the water quality of Mill Creek and Sunset Lake would be the observance of significantly higher concentrations of gross alpha or gross beta at the Exit location than at the Entrance location (see Figure 2-8 of this EIS for these sampling locations). With the exception of the March 2015 sample, there was minimal difference between gross alpha and gross beta at the Mill Creek Exit location and the values observed at the Entrance location, as shown in Figure 3-12 for gross alpha. The lack of a significant difference in the gross alpha and gross beta levels at the Entrance and Exit locations on Mill Creek suggests that radionuclide releases from CFFF operations did not have a significant effect on Mill Creek and Sunset Lake water quality during the period 2010 to 2021.

Surface water quality results were reported by the WEC for samples obtained in 2019 at 12 locations on the CFFF site, including ditch locations, Sunset Lake locations (Upper and Lower Lake areas), and Gator Pond (WEC 2020-TN6526). Analysis results for Tc-99, uranium isotopes, fluoride, nitrate, ammonia, antimony, and a set of VOCs were reported. MCLs were exceeded for fluoride in the Gator Pond sample and for perchloroethylene (PCE) at two ditch locations below the drainage ditch connection ("C" valve) location. Uranium was detected in all but one sample with a maximum observed concentration of 1.78 µg/L, about 6 percent of the 30 µg/L MCL. The largest nitrate concentration (7.3 mg/L) was observed in Gator Pond. Tc-99 was not detected above the minimum detectable concentration (50 pCi/L) in any samples.

Onsite groundwater contamination is likely to be a source of contaminants detected in Gator Pond and in the lower elevation ditch locations. This indicates that onsite groundwater has the potential to more generally affect surface water quality in the wetlands and floodplain within and surrounding the western and southern portions of the CFFF site. As noted above, water may be exchanged between the surface water bodies and the groundwater depending on the relative elevations of the shallow groundwater and the connected surface water bodies (wetlands, ponds, and creeks in the Congaree River floodplain). Additional discussion of these issues can be found in the groundwater resources section of this EIS (Section 3.4).

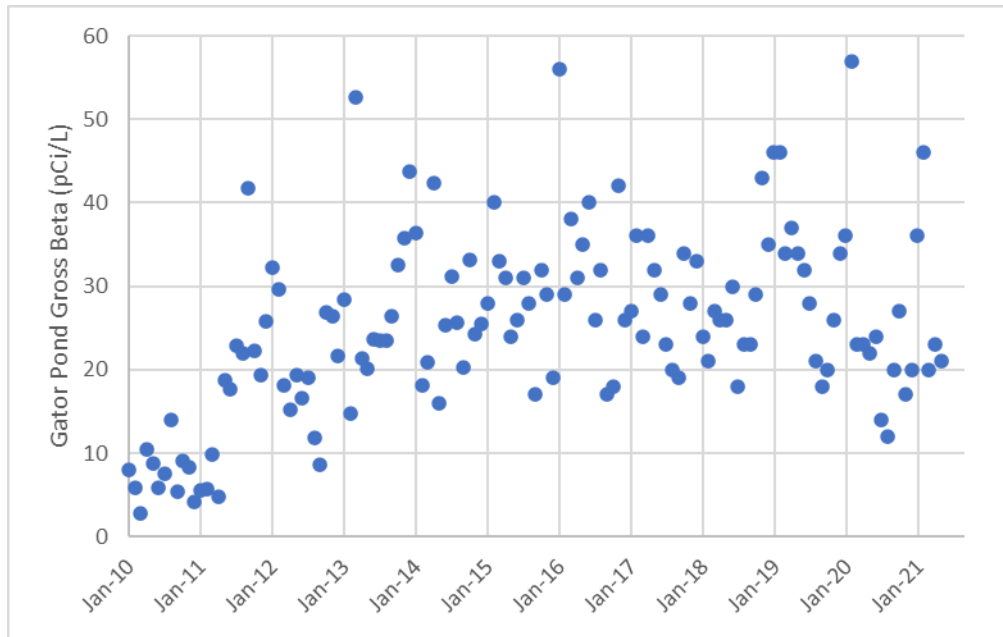


Figure 3-11 Gross Beta in Gator Pond Water Samples (Source: WEC 2019-TN6571 WEC 2021-TN7110)

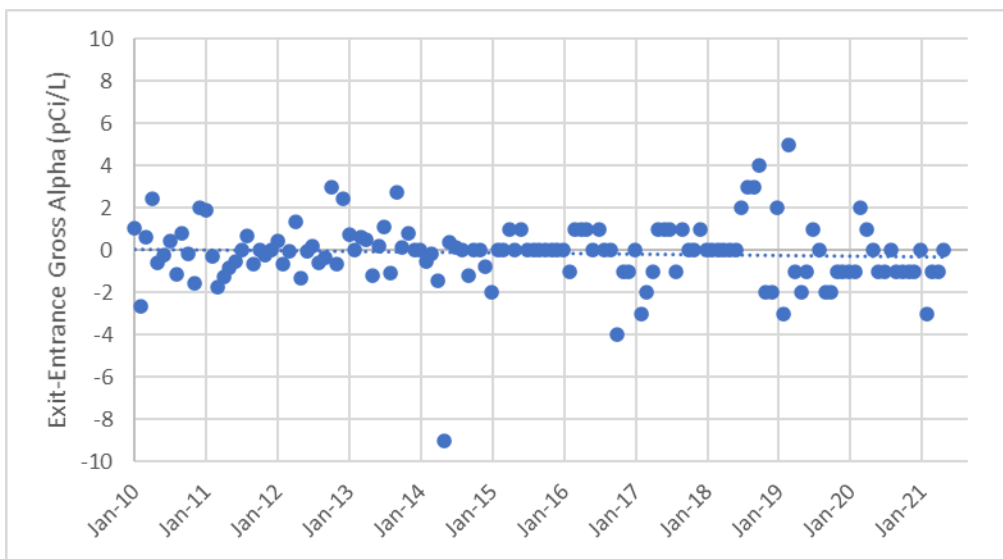


Figure 3-12 Difference Between Gross Alpha at Exit and Entrance Surface Water Sampling Locations on Mill Creek; Dotted Line Shows Linear Fit (Source: WEC 2019-TN6423; WEC 2021-TN7110)

Surface water quality at the CFFF site can be affected by precipitation events. In October 2015, 35.5 cm (12.4 in.) of rainfall over a 4-day period was recorded at the City of Columbia. Significant rainfall occurred at the CFFF site during this multi-day event, which resulted in two process lagoons overflowing beyond containment—the sanitary lagoon spilled over into adjacent lagoons and the West II Lagoon overflowed onto its bermed area. The WEC initiated an emergency discharge to the river to reduce lagoon levels, per procedures allowed under the NPDES permit. The WEC staff conducted in-process sampling for fluoride, ammonia, pH, and

total suspended solids and also took activity samples. There was one elevated total suspended solids reading and the highest activity readings were 100 and 10 pCi/L, which are below NRC effluent limits for uranium (WEC 2019-TN6510). Additionally, unknown levels of biological oxygen demand, fecal coliform, ammonia, calcium, fluoride, and nitrates could have been released from the lagoon overflow to the surrounding water bodies. The WEC notified the SCDHEC of the event, and the SCDHEC did not require any further action by the WEC (2016-TN5723). No supplemental sampling of environmental mediums was conducted during or immediately after the flooding event (NRC 2018-TN6549). During the rain event, the Congaree River rose to an elevation of 37.6 m (123.3 ft) above MSL in the area of the site (WEC 2019-TN6510); however, although depressions may have been locally flooded by the direct precipitation, the Congaree River did not overflow the bluff.

3.3.1.3 Sediment

There is limited data about onsite sediments because there was no requirement in the WEC's NRC-issued license to conduct onsite sediment sampling. In July 2013, as part of a site investigation and based on communication with the SCDHEC, the WEC collected sediment samples from 10 onsite locations (taken in the same locations as surface water samples) (AECOM 2013-TN5508). Two samples were collected adjacent to the dike between Upper and Lower Sunset Lake, seven samples were collected from the ditches draining the site, and one sample was collected from Gator Pond. Samples were analyzed for PCE, fluoride, nitrate, gross alpha, and gross beta (among others). While there are no standards for contaminants in sediments, the WEC uses residential and industrial soil screening levels (see Section 2.2.2.1.2 of this EIS) for comparison. Table 3-1 summarizes the highest concentrations of some contaminants and their locations.

Table 3-1 Results of July 2013 Sediment Sampling Event (AECOM 2013-TN5508)

Contaminant	Concentration	Location ^(a)
Fluoride	220 mg/kg	Gator Pond
PCE	30 µg/kg	Ditch to the west of the WWTP
Gross alpha	377 pCi/g	Between the plant building and the West II Lagoon
Gross beta	295 pCi/g	Gator Pond

(a) Locations of sediment samples are noted on Figure 1-3 in the Remedial Investigation Report (AECOM 2013-TN5508).

Sediment samples were collected in 2019 as part of the remedial investigation (Phase I) under the CA for the CFFF site (WEC 2020-TN6526). Samples were collected in ditches, the Sanitary and East Lagoons, Gator Pond, and at a series of cross sections in Mill Creek from where the creek enters the CFFF site to where it exits, including within Sunset Lake (upper and lower sections). Samples were collected from surface sediments at all locations and from depths of 15 to 30 cm and 30.5 cm to 40.6 cm (6 to 12 in. and 12 to 16 in.) at selected locations. Additional sediment sampling in Mill Creek, Gator Pond, and an onsite drainage ditch was completed in 2020 and 2021 as part of the remedial investigation Phase II activities under the CA, including at depths up to 61 cm (24 in.) (WEC 2021-TN7114).

Uranium isotopes were detected in most of the sediment samples, and uranium residential screening levels were exceeded in samples obtained from two ditch locations, from Sunset Lake (4 locations in remedial investigation Phase I sampling and 8 locations in remedial investigation Phase II sampling), and from the Sanitary and East Lagoons (WEC 2020-TN6526; WEC 2021-

TN7114). One sample in the Sanitary Lagoon exceeded the industrial use screening level for U-235/236 during sampling undertaken as part of the remedial investigation Phase I. During normal operations, this exceedance does not pose a risk to CFFF site workers because they are not exposed to lagoon sediments. In addition, during closure and decommissioning of the lagoon, the WEC would follow NRC requirements and internal procedures to avoid and minimize associated health risks to the workers.

Excluding the lagoon samples collected during the remedial investigation Phase I activities, the largest activity observed in CFFF sediments was 435 pCi/g (for U-234) in a sample from Lower Sunset Lake collected in 2020 (WEC 2021-TN7114). Additional sediment samples collected in Lower Sunset Lake in 2021 as part of the CA activities showed U-234 levels between 34 and 401 pCi/L for samples located within 4.6 m (15 ft) of where the maximum activity (435 pCi/g) was observed, and U-234 levels between 25 and 38 pCi/L for samples located within 12 m (40 ft) of the maximum location (WEC 2021-TN7114). Additional sediment samples collected about 50 m (160 ft) downstream from the maximum observed uranium activity (about 7.6 m [25 ft] upstream of the dike between Upper and Lower Sunset Lakes) had U-234 levels below 15 pCi/L (WEC 2021-TN7114). The sediment samples collected in 2021 indicate that the peak value observed in 2020 (435 pCi/L) represents a localized area of uranium above the residential soil screening levels. The most likely source of uranium contamination in Sunset Lake sediments is from the massive lagoon failure that occurred in 1971, releasing the total contents of the west lagoon (1.5 million gallons) into upper Sunset Lake when the west wall of the lagoon collapsed (WEC 2020-TN6866). Uranium from this accidental release, adsorbed to lake sediments, could account for the residual Sunset Lake sediment contamination observed in the remedial investigation sampling.

Tc-99 was above the detection level in a sediment sample from the East Lagoon, and exceeded the residential soil screening level in the two sediment samples taken from Gator Pond during remedial investigation Phase I (WEC 2020-TN6526) and in all six sediment samples from Gator Pond collected at the shallowest depths during the remedial investigation Phase II activities. The maximum Tc-99 value in the Gator Pond sediment samples was 312 pCi/g (WEC 2021-TN7114). Measured Tc-99 values were below residential screening levels in all sediment samples collected in Mill Creek from 2019 to 2021, with the exception of samples from the area in Lower Sunset Lake where the maximum uranium levels were observed (WEC 2020-TN6526; WEC 2021-TN7114).

Fluoride was detected in most of the sediment samples collected during the remedial investigation Phase I activities; the highest values, excluding lagoon samples, were observed in the Gator Pond samples (concentrations of 38 and 49 milligrams per kilogram [mg/kg]) (WEC 2020-TN6526). Maximum concentrations were 53 mg/kg in the Sanitary Lagoon and 171 mg/kg in the East Lagoon. Chlorinated VOCs were not detected in sediments, with the exception of a single ditch sample that contained PCE (a duplicate sample from the same location was below the detection level). Other volatiles (acetone and 2-butanone) were reported in a number of sample locations, including background locations in the Eastern ditch near the site property line (see Figure 3-8) and in the upstream samples from Mill Creek. Nitrate was detected in about one-half of the samples collected in 2019; maximum values were 2.1 and 2.7 mg/kg in samples taken from the lower ditch locations. Ammonia exceeded 1,000 mg/kg in samples collected in 2019 from the Sanitary and East Lagoons and in three Upper Sunset Lake locations.

3.3.2 Surface Water Impacts

The NRC staff determined the impacts on surface water resources by evaluating the potential effects of CFFF's proposed continued operation of the CFFF for an additional 40 years on the availability of the resources to support other uses and users. Surface water withdrawals and consumptive use of water for CFFF operations directly reduces the quantity of water available for other uses and users of the same resource. Degradation of water quality by the intentional or inadvertent release of contaminants to surface water bodies potentially renders the water resource unsuitable for other users and designated uses.

As noted in Section 3.3.1 of this EIS, the WEC does not use any onsite surface water for its CFFF operations. All water used at the CFFF site is supplied by the City of Columbia, which obtains its water from the Saluda and Broad Rivers that form the Congaree River. The WEC would continue to use this source of water for CFFF operations under the proposed action. The capacity of the city's supply is 160 Mgd, with average daily use of about 65 Mgd (CPD 2008-TN6894). The CFFF's average use of 0.12 Mgd is less than 0.2 percent of the city's current total use. The CFFF water use is also a negligible fraction of flow in the Congaree River, even during low-flow conditions. In addition, about 80 percent of water used at the CFFF is returned to the Congaree River via the plant's permitted discharge. The proposed renewal of the CFFF materials license for an additional 40 years is not expected to involve significant changes in water use.

Because CFFF water use is both a minor proportion of the total City of Columbia water supply and a negligible fraction of Congaree River flow, the NRC staff determined that the proposed continued operation of the CFFF for an additional 40 years would have negligible effects on Congaree River flows and minimal impacts on the availability of water for other users.

Operation of the CFFF has the potential to affect surface water quality through the direct discharge of treated plant effluents to the Congaree River and through the transport of inadvertently released contaminants to the onsite surface water bodies via runoff and groundwater discharge.

3.3.2.1 Congaree River

Potential impacts on the water quality of the Congaree River under the proposed action arise from the continued discharge of treated liquid effluents directly into the river. The WEC discharges its treated liquid effluent directly into the Congaree River in accordance with its NPDES permit. The discharge mixes with the much larger flow of the Congaree River and is diluted as it flows downstream. As described in Section 3.3.1.1 of this EIS, the average CFFF discharge is a small fraction of the Congaree River flow during low-flow conditions (less than 0.016 percent of the minimum monthly river flow observed during 1990 to 2021). CFFF discharge also meets the NRC's effluent limits for radiological components. As described in Section 3.3.1.1 of this EIS, radiological contaminants are present in the effluent at low levels and have trended downward over the past 10 years, with no consistent effect on gross alpha activity resulting from the discharge (see Figure 3-10). In addition, the Congaree River is not impaired downstream of the CFFF discharge by any identified COPCs attributed to CFFF operations. There are also no surface water withdrawals on the Congaree River between the CFFF discharge and the confluence with the Wateree River.

The content and amount of regulated and permitted liquid effluent to be discharged into the Congaree River under the proposed action would be similar to recent and current treated

discharges. CFFF releases would continue to be governed by its NPDES permit for discharge into the Congaree River and the NRC staff expects that the WEC would comply with the conditions set forth in that permit. The WEC has submitted a timely renewal application for its NPDES discharge permit, and the SCDHEC currently is reviewing the application (WEC 2017-TN5621). The NPDES permit must be renewed every 5 years and, therefore, the conditions in the permit could be adjusted as needed. The NRC staff assumes that pollutant limitations and monitoring requirements under the current permit would be applied in a similar manner to discharges that would occur under the proposed action. The WEC discharges from the CFFF would also be expected to continue to comply with NRC regulatory limits and requirements for treated liquid effluents. Additionally, the WEC will notify the NRC any time the NPDES permit is renewed, revoked, or revised, and if the WEC receives an NPDES Notice of Violation (WEC 2019-TN6423).

Because recent and current treated effluent discharges from CFFF have had a minor effect on the water quality of the Congaree River, and because discharge rates and pollutant releases will continue to be regulated and monitored under the NPDES permit and are not expected to change significantly, the NRC staff determined that the proposed continued operation of the CFFF for an additional 40 years would have minor effects on the water quality of the Congaree River and would not affect other users or uses of the river.

3.3.2.2 *Onsite Surface Water*

None of the onsite surface water bodies (Mill Creek, Sunset Lake, and Gator Pond) discussed in this section are a source of drinking water. The water quality of these surface water bodies may be affected by the CFFF operations when contaminants that are spilled or leaked into the environment are subsequently transported to the water bodies by overland flow (stormwater runoff) or groundwater. The NPDES industrial stormwater general permit requires stormwater management, pollution prevention controls, and monitoring of water quality. As described in this section of the EIS, surface runoff and stormwater drainage from the developed portion of the CFFF site are released through a single outfall to a ditch that flows to Upper Sunset Lake. Groundwater discharges to Gator Pond, which contributes water to Lower Sunset Lake by groundwater flow or via spill that occurs during periods of high precipitation. Groundwater may also discharge to site ditches, Sunset Lake, and Mill Creek, depending on groundwater levels in the surficial aquifer. Surface water movement on the CFFF site is attenuated by the Mill Creek and Sunset Lake dikes. Once offsite, Mill Creek meanders across the Congaree River floodplain before reaching the Congaree River.

As described in Section 3.3.1 of this EIS, surface water quality on the CFFF site has been noticeably affected by past plant activities. The WEC's surface water sampling conducted as part of its NRC license requirements has indicated (1) gross alpha and gross beta activities above background levels in the CFFF drainage ditch sampled upstream from the final control valve point of discharge from the plant area (i.e., the Roadway sample location), and (2) elevated gross beta activity in samples from the Gator Pond spring and the pond itself (WEC 2021-TN6920, WEC 2019-TN6423). Sampling conducted as part of the remediation investigation activities under the CA has shown VOC contamination in site drainage ditches; fluoride contamination in site drainage ditches, Gator Pond, and Sunset Lake; and nitrate contamination in site drainage ditches and Gator Pond (AECOM 2013-TN5508; WEC 2020-TN6526). Recent sediment sampling provides additional evidence that the CFFF operations have contributed Tc-99 contamination in Gator Pond and potentially uranium contamination in Sunset Lake (WEC 2020-TN6526; WEC 2021-TN7114).

The principal means by which contaminated surface water could move beyond the CFFF site boundary is through flow in Mill Creek. Mill Creek is currently monitored as part of the NRC license requirements from the entrance at Upper Sunset Lake to the exit from the CFFF property. Results from this monitoring show minor differences in activities at the entrance and exit locations for both gross alpha and gross beta (WEC 2019-TN6423), indicating that radionuclide releases from CFFF operations have a minor effect on water quality in Mill Creek and are unlikely to move beyond the CFFF site boundary at noticeable concentrations and activities. COPCs detected in Lower Sunset Lake during the most recent sampling completed under the CA were present at concentrations well below their MCLs: total uranium at 0.6% of the MCL and fluoride at 1% of the MCL (WEC 2020-TN6526). Contaminated Mill Creek sediments could be transported offsite during flood events. Sediment samples obtained in 2019 from the Upper and Lower Sunset Lake sections of Mill Creek exceeded residential screening levels for uranium (WEC 2020-TN6526). Mill Creek sediment samples obtained between the Lower Sunset Lake dike and the exit dike contained uranium isotope activities below the residential screening levels (the largest activity was about one-half of the residential screening level) (WEC 2020-TN6526). Additional sediment sampling in Mill Creek and Sunset Lake was conducted as part of the remedial investigation process under the CA (WEC 2020-TN6707).

Existing groundwater contamination is likely to continue to affect surface water quality in Gator Pond and Sunset Lake. The degree of interchange between site surface water bodies and groundwater is uncertain, as is the effect on groundwater quality of future remediation activities to be completed under the CA. The Phase II Remedial Investigation Work Plan (RIWP; WEC 2020-TN6707) describes additional investigations of the CFFF site that the WEC will perform to better understand migration pathways and connections between groundwater and surface water. The NRC staff expects the groundwater monitoring activities under the CA to continue as long as there is significant contamination at the site, and site investigation activities to continue to evolve in response to data obtained as part of the remedial investigation process (see Chapter 2.0 of the EIS for additional information about the CA).

The proposed continued operation of CFFF could result in additional inadvertent releases of contaminants. For example, future episodes of significant rainfall, such as the rain event in October 2015, could again cause the lagoons to overflow, possibly resulting in an uncontrolled release of their contents into groundwater or into nearby surface water bodies. However, the NRC staff expects that as happened during the October 2015 event, the WEC would notify the SCDHEC of such an event, and necessary immediate corrective actions would be taken. The WEC would also inform the NRC within 30 days of any violations of their NPDES permit (WEC 2019-TN6423). The NRC staff also assumes that monitoring of surface water quality and potential sediment contamination, including Lower Sunset Lake sediment sampling, would continue as required by the WEC's NRC-issued license.

The WEC is expected to continue to comply with its NPDES permit requirements for stormwater runoff as regulated by the SCDHEC. In addition, the WEC is expected to continue to follow its spill prevention control and countermeasures plan for minimizing the occurrence and effects of inadvertent spills. The WEC has an environmental monitoring and sampling program for surface water and sediments that can help identify potential migration pathways and indicate if there is an upward trend in existing contaminants. The NRC will continue to inspect the WEC's compliance with its NRC-licensed environmental monitoring program. The WEC's ongoing site remedial investigation under the CA will help fill data gaps in migration pathways and address the impacts of past leaks or spills on the surface water. The WEC has also agreed to three new proposed license conditions related to the WEC's environmental sampling and monitoring program. The first proposed license condition, S-16, would require the WEC to enter

groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either the SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2, and 2.4.2 of this EIS.

The WEC has developed a CSM and WEC Procedure RA-435, "Conceptual Site Model Development" to inform decisions about changes to its monitoring protocols based on information learned from investigations and sampling data. The WEC has committed to the use of this procedure to maintain the CSM (WEC 2021-TN7042). The WEC has also established an "Environmental Remediation Procedure" (RA-433) to be followed in the event of a release of contaminants to the ground surface or environmental mediums, the detection of groundwater contamination above MCLs, or the discovery of a past release through soil sampling (WEC 2020-TN6853). The purpose of the remediation procedure is to prevent the migration of contaminants offsite and to minimize the impacts of contaminant releases on future decommissioning activities.

3.3.2.3 *Surface Water Impacts Conclusion*

Past operation of the CFFF has had a noticeable effect on the water quality of the onsite surface water bodies. The only contaminant derived from CFFF operations that is currently present (based on 2019 sampling) in onsite surface water bodies at a concentration above the MCL is fluoride in Gator Pond. However, uranium contamination in the sediments of the upper and lower portions of Sunset Lake currently exceeds the residential screening levels (based on 2019 and 2020 sampling; WEC 2020-TN6526; WEC 2021-TN7114). Tc-99 activity levels in the sediments of Gator Pond and at one location in Sunset Lake (SED-44) exceed the residential screening level (WEC 2021-TN7114).

Based on the existing data, the NRC staff expects that there is a low potential for significant contamination to move offsite via a surface water pathway and to noticeably degrade water quality in Mill Creek downstream from the CFFF site boundary. The proposed continued operation of the CFFF for an additional 40 years could result in future inadvertent releases that may contribute additional contaminants to the onsite surface water bodies. However, the expected continuation of activities and programs currently in place at the CFFF site for inspection, monitoring, and reporting would minimize both the potential for significant impacts on these water bodies and the offsite movement of contaminants. In addition, modification of the natural Mill Creek channel on the CFFF site has substantially isolated Sunset Lake from the broader flow in Mill Creek, which would reduce the velocity of floodwaters in Sunset Lake and thereby reduce the potential for significant sediment transport. Therefore, the NRC staff determined that continued operation of the CFFF under the proposed action would have minor effects on the water quality of Mill Creek outside the CFFF boundary and would not affect other users or uses of the creek.

The NRC staff evaluated the effects of the proposed CFFF continued operation for an additional 40 years on the availability of the potentially affected water resources to support other uses and

users. The NRC staff determined that continued withdrawal and consumptive use of Congaree River water for CFFF operations would have negligible effects on other uses and users of the Congaree River. The NRC staff determined that future discharges to the Congaree River in accordance with the NRC license and NPDES permit would have minor effects on water quality and that these discharges would not affect other users or uses of the Congaree River. Although the proposed continued operations could result in inadvertent releases of contaminants that may noticeably affect the water quality of the onsite water bodies, the NRC staff determined that there is a low potential for exceedances of water quality standards in onsite water bodies and for contaminants to move offsite because of the implementation of activities and programs to minimize the effects of releases on other users of the local surface water resources (e.g., spill prevention controls, the environmental sampling and monitoring program). Therefore, the NRC staff concludes that the impacts on surface water resources from continued operation of the CFFF for an additional 40 years would be SMALL.

Because the past operation of CFFF has had a noticeable effect on water quality of the onsite surface water bodies that continues to be observed in the most recent data, the NRC staff concludes that the cumulative impacts to surface water are MODERATE. However, because proposed continued operation of the CFFF for an additional 40 years would not affect other uses and users of the surface water resources, the SMALL incremental impact from the proposed action would not result in a significant contribution to the cumulative impacts (see Section 3.19 for additional information).

3.3.3 Mitigation Measures

As described above, the WEC currently monitors releases of stormwater runoff and plant effluents to conform with NPDES discharge permit requirements. Similar monitoring requirements are expected to be included in the NPDES permit renewal(s) applicable during the period of the proposed action. The WEC also carries out environmental monitoring of onsite sediments and surface water at both onsite and offsite locations under the terms of its NRC materials license and these would continue through the proposed license renewal period. Continued adherence to the terms of the NPDES permit, including monitoring of discharges to surface waters, and continued effective monitoring of onsite and offsite surface waters as conditions of the NRC license will serve to avoid and minimize impacts on surface water resources. The WEC is expected to continue to follow its spill prevention control and countermeasures plan for minimizing the occurrence and effects of inadvertent spills. In addition, the WEC is expected to follow its environmental remediation procedures to prevent the migration of contaminants offsite and to minimize the impacts of contaminant releases on future decommissioning activities. As described in Section 3.3.1.1, sampling of fish tissue in the Congaree River showed that uranium was not detected at levels of concern for fish consumption. The NRC staff finds that sampling of fish tissue in Mill Creek would provide an additional indicator of the potential impacts of CFFF on the onsite surface water resources. However, as described in Section 3.5.2.2, there is currently no public access to the onsite water bodies for fishing. Therefore, additional fish tissue sampling beyond the current sampling in the Congaree River is not a requirement being imposed upon the licensee.

3.4 Groundwater Resources

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts on groundwater resources from the proposed action.

The geology and hydrogeologic framework of South Carolina and of the CFFF site and surrounding region are described in Section 3.2 of this EIS. As noted in that section, this EIS uses the hydrogeologic framework of Campbell and Coes (2010-TN6672, Chapter B) adopted by SCDNR for their assessments of groundwater in South Carolina (Wachob et al. 2017-TN6712). The names of aquifers and confining units used in this framework differ from the names used in the ER (WEC 2019-TN6510) and recent remedial investigation documents (e.g., WEC 2020-TN6526). Correlations between the names used here and in the ER are explained below.

The CFFF site is located in the Atlantic Coastal Plain physiographic province. The principal aquifers in the province are the surficial aquifer system and the southeastern coastal plain aquifer system. The unconfined (water-table) surficial aquifer system in South Carolina generally consists of sandy terrace deposits of Quaternary age, commonly containing clay and silt (USGS 1990-TN6648). Groundwater elevations in the surficial aquifer typically mimic the ground surface. Recharge occurs primarily from infiltrated precipitation and flow occurring over relatively short distances before discharging to streams or other surface water bodies. The exchange of water between the surficial aquifer and deeper confined aquifers may also occur.

The coastal plain aquifer system in South Carolina consists of a sequence of aquifers and confining units extending from the fall line (located at Columbia in the region of the CFFF site) to the Atlantic Ocean, dipping and thickening toward the coast. The coastal plain aquifer system thickness is zero at the fall line and about 213 m (700 ft) at the far southeast corner of Richland County (Newcome 2003-TN6706). The base of the coastal plain sediments is at an elevation of about -46 m (-150 ft) MSL at the CFFF site (Newcome 2003-TN6706). The unconsolidated formations of the southeastern coastal plain aquifer system were deposited in fluvial, deltaic, and shallow-marine environments during the Cretaceous to late Tertiary periods (USGS 1990-TN6648). Aquifers consist mostly of fine to coarse sands with intervening confining units of silt and clay. Aquifer units may outcrop in the updip (western) portion of their extent, becoming confined as they deepen to the east. Recharge occurs from precipitation in the outcrop areas and deeper groundwater movement occurs on long flowpaths and discharge to overlying aquifers or to surface water bodies. The most important aquifers in Richland County are the Cretaceous-age Black Creek and Middendorf aquifers (Newcome 2003-TN6706), which are correlated with the Crouch Branch and McQueen Branch aquifers in the hydrogeologic framework used in this EIS (Wachob et al. 2017-TN6712). As described in Section 3.2.2 of this EIS, the Crouch Branch confining unit extends into southern Richland County, but may be only locally present in the area of the CFFF site (Wachob et al. 2017-TN6712). The Tertiary-age Gordon aquifer is reported to be absent in Richland County (Wachob et al. 2017-TN6712) or thin and of limited areal extent in the southern part of the county (Newcome 2003-TN6706).

Investigations of groundwater at the CFFF site between 1980 and 2021 (including the activities conducted during the remedial investigation process under the CA with the SCDHEC) have resulted in the logging of more than 100 boreholes and the installation of at least 118 groundwater monitoring wells (AECOM 2013-TN5508; WEC 2019-TN6510; WEC 2020-TN6526; WEC 2021-TN7112; WEC 2022-TN7155). Data from these borings and monitoring wells have been used to identify the extent of groundwater contamination and to interpret the lithology, the occurrence of aquifers and confining units, the hydrogeologic properties, and the groundwater flow at the site, as represented in the WEC's CSM (WEC 2020-TN6707).

A description of the upper sediments in the CFFF site region is provided in Section 3.2.2 of this EIS. The surficial aquifer in the region occurs in the river terrace deposits above the bluff and in the alluvium of the Congaree River flood plain. The WEC's CSM interprets the river terrace and

floodplain sediments at the CFFF site as being a hydrologically continuous unit, 9 to 12 m (30 to 40 ft) thick (WEC 2020-TN6707). The majority of the CFFF wells are installed in the surficial aquifer.

The top of the confining unit underlying the surficial aquifer is at an elevation of about 36 m (110 ft) MSL south of West Lagoon 2 and slopes downward in all directions, as interpreted from the CFFF borehole data (WEC 2020-TN6707, Figure A). This unit is referred to as the Black Mingo confining unit in CFFF reports but is interpreted in the hydrogeologic framework used in this EIS as the Crouch Branch confining unit (see Section 3.2.2 of this EIS). The elevation of the confining unit in lithologic borehole L-1 (at the location of well W-95) was 10.7 m (31 ft) MSL, about 15.2 m (50 ft) lower than the elevation observed at the nearest boreholes. These variations in the elevation of the confining unit are likely to influence groundwater movement and contaminant transport in the surficial aquifer. A revised map of the top of the confining unit will be included in the final report from the remedial investigation field work (WEC 2021-TN7107), as discussed in Section 1.5.2.2.1 of this EIS.

The unconfined surficial aquifer is recharged locally by infiltration from precipitation on the CFFF site and in the vicinity. The average depth to groundwater in the area of the CFFF site is about 4.6 m (15 ft), and a minimum depth of 0.9 m (3 ft) and a maximum depth of 13.7 m (45 ft) have been observed since 1971 (WEC 2019-TN6510). The elevation of the groundwater table generally is a subdued replica of the topography, with some influence from the elevation of the underlying confining unit. As a result, groundwater in the surficial aquifer principally flows from areas of higher topography (e.g., in and around the main facility) to lower topography (e.g., the Mill Creek floodplain). There is a westerly component of groundwater flow in the region to the north of the plant buildings that may occur due to the influence of the confining unit surface. Figure 3-13 shows groundwater elevations in the surficial aquifer during October 2021 and the inferred groundwater flow directions. Groundwater flow is generally to the south and southwest toward the Congaree River floodplain. As discussed in Section 3.3.2.2 of this EIS, groundwater discharges to the surface ditches, where groundwater elevation exceeds the ditch bottom elevation (typically near the bluff), and to Gator Pond. Groundwater may also discharge to other springs or seeps along the bluff. Some exchange of water between the surficial aquifer and both Sunset Lake and Mill Creek is likely, and the rate of that exchange is governed by the relative water levels and the permeability of the lake and creek sediments. The surficial aquifer ultimately discharges to the Congaree River.

Groundwater head data show a hydraulic gradient in the plant building area that indicates downward flow from the surficial aquifer toward the underlying Crouch Branch and McQueen Branch aquifers (referred to as the Black Mingo and underlying Middendorf aquifers in the WEC's documents). The potential for significant downward flow through the confining unit was assessed to be negligible based on the low value of hydraulic conductivity estimated for the confining unit (10^{-7} cm/s) (WEC 2019-TN6510). It is not clear from the available data that the downward flow gradient from the surficial aquifer to the Crouch Branch aquifer exists throughout the CFFF site and vicinity. For example, groundwater head data suggest that the local hydraulic gradient is upward near Gator Pond and may be upward in the Sunset Lake area (WEC 2020-TN6526).

Groundwater flow velocities in the surficial aquifer terrace deposits were previously estimated to range from about 1 to 168 m/yr (4 to 550 ft/yr) with an average value of 47 m/yr (153 ft/yr) (AECOM 2013-TN5508). Saturated hydraulic conductivity values from recent testing in surficial aquifer wells in the terrace and floodplain deposits were reported as part of the remedial investigation under the CA with the SCDHEC (WEC 2020-TN6526). Based on these reported

values, the NRC staff estimated average saturated hydraulic conductivity values of 0.0022 cm/s (6.3 ft/d) for the terrace sediments and 0.011 cm/s (32 ft/d) for the floodplain sediments; conservative values⁵ were estimated to be 0.0088 cm/s (24 ft/d) and 0.028 cm/s (79 ft/d), respectively. Based on Figure 3-13, the staff estimated horizontal hydraulic gradients in the surficial aquifer to be 0.01 to 0.02 ft/ft in the terrace sediments and 0.0005 to 0.001 ft/ft in the floodplain sediments. No porosity data for the surficial aquifer have been reported; the staff assumed a porosity range of 0.25 to 0.3 for the surficial aquifer, which is at the lower end of the range reported for unconsolidated sandy sediments (e.g., Freeze and Cherry 1979-TN3275). Using the data and assumptions above, the NRC staff estimated average groundwater velocities of 23 to 47 m/yr (76 to 153 ft/yr) in the surficial aquifer between the plant and the bluff, and 6 to 12 m/yr (20 to 40 ft/yr) in the floodplain; conservatively, groundwater velocities could be 108 to 216 m/yr (355 to 710 ft/yr) between the plant and the bluff and 18 to 35 m/yr (58 to 115 ft/yr) in the floodplain.

The confined Crouch Branch and McQueen Branch aquifers are of regional extent, and they are capable of providing large quantities of water for industrial and municipal uses, particularly in southern Richland County where these aquifers are thickest (Newcome 2003-TN6706). Recharge to these aquifers occurs regionally where they outcrop, generally northwest of the CFFF site. The limited data from the four CFFF wells completed in the confined aquifer suggest that groundwater in this aquifer flows to the southwest locally. Discharge may be to wells, to the Congaree River, or to other large regional sinks. In Richland County, flow in the Crouch Branch and McQueen Branch aquifers is primarily toward the Congaree and Wateree Rivers, based on potentiometric contours estimated from a limited set of well data (Wachob et al. 2017-TN6712; Czwartacki and Wachob 2020-TN6893). Movement of groundwater between aquifers can be through either the intervening confining layers or, potentially, through open-hole or poorly sealed groundwater wells penetrating the confining layer (NRC 1985-TN5602). As described in Section 3.2.2 of this EIS, the Crouch Branch and McQueen Branch aquifers are likely to be connected with no significant confining unit separating them.

3.4.1 Groundwater Use and Quality

The WEC does not use groundwater for operations at the CFFF site. As noted in Section 3.3.1 of this EIS, service and potable water are provided by the City of Columbia, which gets its water from the Congaree River. Seven percent of public supply water use in Calhoun, Lexington, and Richland Counties is derived from groundwater (Dieter et al. 2018-TN6681), and the nearest public water supply wells are located about 1.6 km (1 mi) northeast (upgradient) of the CFFF site (SCDHEC 2020-TN6690). The closest public water supply wells within the Congaree River floodplain (nominally downgradient) are located about 10.5 km (6.5 mi) from the CFFF site at the Congaree National Park Harry Hampton Visitor Center (SCDHEC 2020-TN6690). The CFFF site is outside all designated public water supply well protection zones (SCDHEC 2020-TN6690). There are no designated sole source aquifers in South Carolina (EPA 2020-TN6709).

⁵ Conservative estimates are expected to be greater than 80% of measured saturated hydraulic conductivity values.

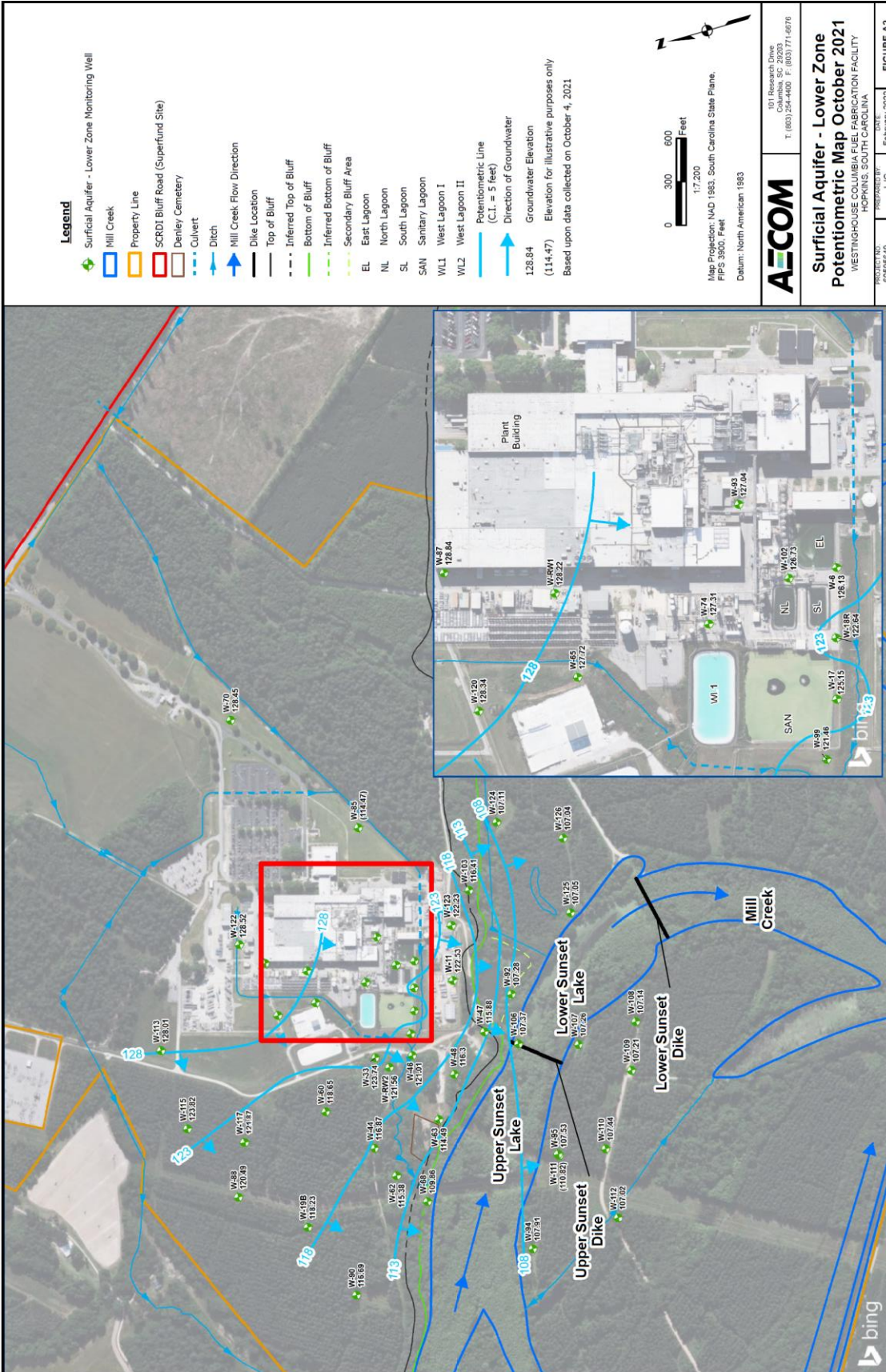


Figure 3-13 Groundwater Elevations in the Surficial Aquifer and Inferred Flow Directions (Source: WEC 2022-TN7155)

Domestic self-supplied water use is significant in Calhoun, Lexington, and Richland Counties (e.g., 6.24 Mgd in Richland County in 2015) and is entirely sourced from groundwater (Dieter et al. 2018-TN6681). As part of the CFFF site remedial investigation under the CA with the SCDHEC, in 2019 the WEC completed a survey of private water supply wells within approximately 1 mi of the site (WEC 2020-TN6526). The WEC identified 25 wells located north of the CFFF site, to the east and west along Bluff Road. The closest of these wells is about 1,340 m (4,400 ft) north of the known extent of any COPCs derived from the CFFF site operations. Based on the head data from the CFFF site wells, the private water supply wells to the north of the site are upgradient so that groundwater does not flow from the site to these water supply wells. The WEC identified four active private water supply wells located west, southwest, and south of the CFFF property and two inactive wells located near the CFFF site boundary to the northwest of the plant buildings (Figure 3-14). The active wells are downgradient from the CFFF site and have the potential to be affected by site contaminants; the nearest well (WSW-03 in Figure 3-14) is about 1,650 m (5,400 ft) from the known extent of current contamination. The four downgradient wells were sampled by the WEC as part of its survey (WEC 2020-TN6526). Low levels of alpha particles were detected in two wells and low-level beta particles were detected in one well. Uranium-238 (U-238) was detected at low levels (<1 µg/L) in three of the four wells. Fluoride, nitrate, ammonia, and antimony were detected in one or more wells at low levels. Other contaminants were below detection limits.

The SCDHEC sampled the Hopkins Community Water System and 13 private drinking water wells in the Hopkins and Lower Richland area during August and September 2018. Well water samples were tested for uranium, radium, gross alpha, gross beta, fluoride, nitrate, metals, and VOCs, and all contaminants of potential concern were found to be below the MCLs or minimum detection limits (SCDHEC 2018-TN6713). Richland County sampled 62 wells in the same area (SCDHEC 2018-TN6713); all results were reported in February 2019 to be below the EPA's drinking water standard for uranium (Richland County Council 2019-TN6682).

The SCDHEC classifies the groundwater at the CFFF site as "Class GB," meaning the groundwater at the CFFF site meets the definition of underground sources of drinking water as defined by State regulations in R.61-68, "Water Classifications and Standards" (SCDHEC 2014-TN6986). The WEC had previously requested that the SCDHEC reclassify the site as a groundwater mixing zone, as defined in R.61-68, but the SCDHEC denied the request (AECOM 2013-TN5508). Therefore, groundwater at the CFFF site must meet the MCLs set forth in R.61-58, "State Primary Drinking Water Regulations" (SCDHEC 2014-TN6988).

Groundwater contamination was discovered at the CFFF site in the 1980s and has been the subject of ongoing investigations. The quality of the shallow groundwater has been affected by nonradioactive and radioactive contaminants from the CFFF operations. Contaminants that have been identified and are monitored as part of the remedial investigation under the CA with the SCDHEC include VOCs, fluoride, nitrate, ammonia, gross alpha, gross beta, uranium, and Tc-99 (WEC 2020-TN6526, WEC 2020-TN6707). Investigations conducted by the WEC have identified the WWTP, CFFF operations, buried piping systems, and the former oil house as potential sources of contamination. The RIWPs identify data needs to address the sources and extent of groundwater contamination (WEC 2019-TN6553, WEC 2020-TN6707).

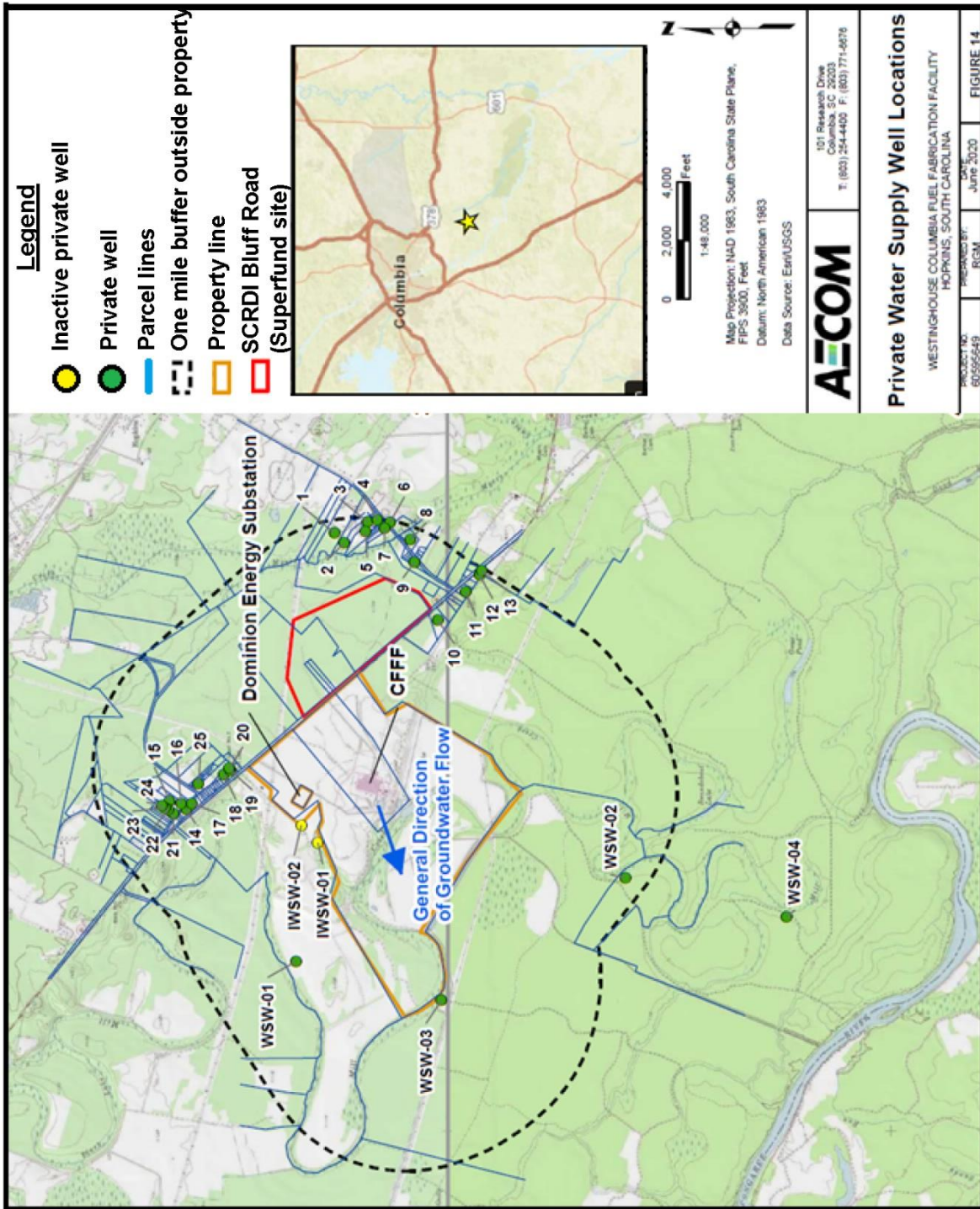


Figure 3-14 Private Water Supply Wells near CFFF Identified by the WEC (Source: WEC 2020-TN6526)

The majority of groundwater quality data has been obtained from the surficial aquifer, which has been directly affected by contaminant releases from the CFFF operations. The following summaries of the various COPCs found in the surficial aquifer are based on a review of data and analyses in the WEC's 2013 Remedial Investigation Report (AECOM 2013-TN5508) and 2014 Baseline Risk Assessment Report (AECOM 2014-TN5511); the 2019 RIWP and addenda (WEC 2019-TN6553); the 2020 Final Interim Remedial Investigation Data Summary Report (WEC 2020-TN6526); the WEC's 2020 Tc-99 Investigation Summary Report (WEC 2020-TN6538); annual groundwater reports submitted to the SCDHEC (WEC 2019-TN6876, WEC 2020-TN6875; WEC 2021-TN7112); monthly CA progress reports submitted by the WEC to the SCDHEC; the WEC's 2019 ER (WEC 2019-TN6510); and supplemental information submitted by the WEC to the NRC.

3.4.1.1 Nonradiological Contaminants

The groundwater at CFFF has been contaminated with chlorinated VOCs and inorganic contaminants from facility operations. Storage of petroleum products and solvents in the former oil house prior to 1980 contributed to the VOC contamination. The oil house has been removed. Studies conducted by the WEC since the assessment in 1994 indicated that the source area is near the West II Lagoon, although not the West II Lagoon itself (WEC 2019-TN6510). Effluents from the CFFF WWTP are suspected of being the source of the nonradiological contaminants—nitrate, fluoride, and ammonia. Four of the WWTP lagoons were relined between 2008 and 2012. The East Lagoon, which received various waste streams (including radioactive elements) had been in service for almost 40 years and was recently closed and restored with clean backfill (WEC 2021-TN7154). Sludge in the East lagoon contained elevated levels of fluoride and ammonia; the Sanitary Lagoon sludge contains elevated levels of fluoride, ammonia, and nitrate (WEC 2020-TN6526). The Sanitary Lagoon sludge also contains elevated levels of uranium and Tc-99 (WEC 2021-TN7133).

3.4.1.1.1 Volatile Organic Compounds

The VOC contaminants in the CFFF site groundwater that are of primary concern are the chlorinated compound PCE and the products of its breakdown in the environment (TCE, cis-1,2-DCE and VC). The WEC installed an air sparging/soil vapor extraction (AS/SVE) system in 1997 to remove the VOC contaminants from the groundwater. Operation of the AS/SVE system was discontinued in December 2010 because of reduced system efficiency in removing contaminants (WEC 2019-TN6510). While the AS/SVE system reduced PCE concentrations from their peak values, concentrations rebounded somewhat after the system was turned off and appear to have been relatively stable since 2013 (Figure 3-15).

The WEC completed groundwater screening for VOCs in 2016-2017 and installed additional groundwater monitoring wells in 2018. Beginning in late 2018, the CFFF also started monitoring VOCs at the site's other existing wells (WEC 2019-TN6510). Results from October and November 2018 indicated that the PCE and TCE concentrations exceeded the 5 µg/L MCL in 15 and 7, respectively, of the 60 wells sampled (WEC 2019-TN6510). The WEC installed additional wells in the upper and lower zones of the surficial aquifer as part of the remedial investigation process carried out under the CA to collect additional data about the occurrence and evolution of the VOC plumes (WEC 2020-TN6526; WEC 2021-TN7112). Concentrations of PCE and TCE were above the MCL at 23 and 8 wells, respectively, out of the 100 surficial aquifer wells sampled in April 2021 (WEC 2021-TN7112). VOC concentration was greater than 50 µg/L in 10 wells in October 2019 (WEC 2020-TN6526). A shallow soil gas survey and soil sampling to evaluate potential chlorinated VOC source areas were part of the Phase II remedial

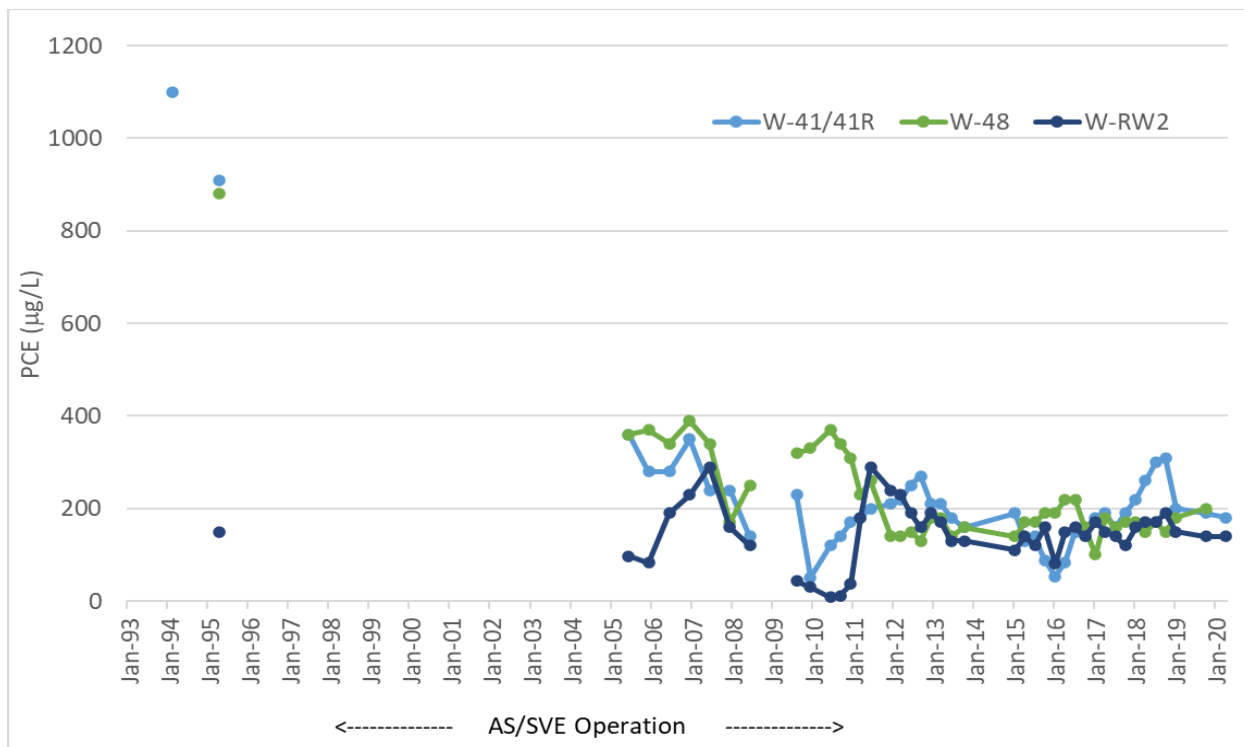


Figure 3-15 PCE Concentrations in the Surficial Aquifer (for reference, the PCE MCL is 5 µg/L). The AS/SVE System Operated from 1998 to 2010 (Sources: AECOM 2013-TN5508, AECOM 2017-TN5512; WEC 2019-TN6510, WEC 2020-TN6526, WEC 2020-TN6875)

investigation (WEC 2021-TN7046; WEC 2021-TN7130; WEC 2021-TN7153). Groundwater screening boreholes and additional groundwater monitoring wells were completed as part of the Phase II remedial investigation to better define the extent of VOC contamination in the surficial aquifer (WEC 2021-TN7131; WEC 2021-TN7151).

The most recent groundwater monitoring results from 2020 and 2021 show a large area of PCE contamination around the plant and west of the plant (and smaller areas of TCE and vinyl chloride contamination) in the surficial aquifer (WEC 2021-TN7112; WEC 2022-TN7155). The PCE contamination is attributed to potential source areas near the former oil house and West Lagoon II (WEC 2020-TN6707; WEC 2021-TN7112). In the CSM, the upper portion of the plume is stated to be controlled by surface topography and flows into the ditch that traverses the area (WEC 2020-TN6707). The lower portion of the plume is stated to flow preferentially at the base of the surficial aquifer and is restricted from moving deeper by the confining unit present at the site (WEC 2020-TN6707). VOC contamination south of the WWTP, north and east of Gator Pond, occurs at concentrations above the MCL in the shallow surficial aquifer. This portion of the PCE plume appears to be the result of the spreading of the main plume. PCE contamination occurring west of the plant was confirmed to be part of the main plume and the spread westward was attributed to a preferential groundwater flow path (WEC 2021-TN7112).

3.4.1.1.2 Fluoride and Nitrate

Activities at the WWTP and plant operations are believed to be the source of fluoride and nitrate in groundwater. The fluoride and nitrate plumes are located in the vicinity of the WWTP lagoons, Gator Pond, and Sunset Lake. Concentrations of fluoride and nitrate in sampled wells continue to exceed EPA MCLs (4 mg/L for fluoride and 10 mg/L for nitrate) in the surficial aquifer between the plant buildings and Sunset Lake (WEC 2020-TN6526; WEC 2021-TN7112). Between 2004 and 2019, the highest concentrations of fluoride were around and above 15 mg/L and were found in the wells surrounding the WWTP, including wells W-7A, W-18R, W-22, W-28, W-30, W-77, and W-78 (AECOM 2013-TN5508; WEC 2019-TN6553, WEC 2020-TN6526). Concentrations of fluoride have gradually trended downward over time from the peak values. Surrounding the WWTP, the highest nitrate concentrations were often higher than 150 mg/L at wells W-18R, W-30, W-32, W-29, and W-7A between 2004 and 2019 (AECOM 2013-TN5508; WEC 2019-TN6553, WEC 2020-TN6526). Well water samples with high nitrate concentrations were obtained from wells W-30 (peak value of 2,900 mg/L) and W-29 (peak value of 980 mg/L) between 2011 and 2013 (AECOM 2013-TN5508). The large concentrations may be related to leaks and subsequent liner replacement of the lagoons that took place between 2008 and 2012. Nitrate concentrations in well water from these two wells have decreased significantly from the peak values; values in October 2021 remain at or above the MCL (WEC 2022-TN7155). In contrast, nitrate concentrations in wells W-18R and W-7A have been trending up; observed values in October 2021 were 550 mg/L and 320 mg/L, respectively. These two wells are located southwest of the WWTP and along the principal shallow groundwater flow direction. Nitrate concentrations have been elevated since at least 2011 at wells W-39 and W-41R located west of the lagoons (AECOM 2013-TN5508); values in October 2021 were 57 and 46 mg/L, respectively (WEC 2022-TN7155). Concentrations at these wells may be influenced by the presence of a surface drainage ditch in this area. Nitrate concentrations above the MCL were also observed in several wells located near the bluff (W-47, W-64, W-67, and W-123) in October 2021 (WEC 2022-TN7155). According to the CSM, potential nitrate sources other than the lagoons may be contributing to the concentrations in these areas (WEC 2020-TN6707).

Characterization efforts for the 2011 CWW pipe leak indicated fluoride in the soil and sludge samples—47 mg/kg and 85 mg/kg, respectively. Liquid collected from the well boring indicated nitrate levels to be approximately 2 mg/L. The contaminated soil and sludge will remain beneath the CFFF Uranium Recycling and Recovery Services (URRS) area until decommissioning, which would begin after the 40-year license renewal period ends, if the WEC does not request a license renewal. Therefore, the fluoride could leach through the contaminated soil into the groundwater. Fluoride and nitrate move with groundwater flow, although nitrate concentrations can be lowered through natural processes such as denitrification (AECOM 2013-TN5508). The WEC will continue to monitor for fluoride and nitrate and submit results to the SCDHEC in its annual groundwater report as part of its NPDES permit. Samples collected from 2019 to 2021 from nine wells along the CWW line (W-51 to W-58) showed fluoride and nitrate concentrations below their MCL values except at well W-59 (WEC 2020-TN6875; WEC 2021-TN7112; WEC 2022-TN7155). Well W-59 is on the southwestern end of the CWW line, close to well W-29 and the WWTP lagoons. Nitrate in these wells may also be from other potential sources identified in the CSM (WEC 2020-TN6707). In October 2021, fluoride and nitrate concentrations in well W-59 were 2.9 mg/L and 20 mg/L, respectively (WEC 2022-TN7155).

During the response to the 2018 HFSS leak, the WEC obtained fluoride concentrations up to 1,180 mg/kg from soil samples beneath the facility. Two of these samples also showed nitrate concentrations above 700 mg/kg. Sentinel wells installed along an east-west line at the

southern end of the main plant buildings were monitored for releases, and fluoride (in wells W-77 and W-78) and nitrate (in well W-77) were detected at concentrations above the MCLs (WEC 2020-TN6526).

Nitrate and fluoride concentrations observed in the surficial aquifer floodplain sediments were less than 1 percent of the 10 mg/L MCL value in 2020 and 2021 (WEC 2021-TN7112; WEC 2022-TN7155). These results do not provide any evidence of significant transport of nitrate or fluoride south of Sunset Lake.

3.4.1.1.3 Ammonia

Historic leaks near the WWTP and nearby product storage areas are believed to have caused the ammonia groundwater contamination. Ammonia was also identified as a COPC for the Chemical Area and Western Storage Area OUs (WEC 2019-TN6553). The 1985 EA indicated the highest concentration was 900 mg/L (at W-7A) in 1981 (NRC 1985-TN5602). There is no established MCL for ammonia. Removal of ammonia from the environment occurs through natural processes, nitrification of ammonia to nitrite and/or nitrate and denitrification of nitrate to gaseous nitrogen. Recent ammonia concentrations are significantly lower than the earlier peak values; the maximum concentration was reported to be 126 mg/L in W-18R (WEC 2020-TN6526). Ammonia concentrations in wells W-32, W-22, and W-7A south of the WWTP appear to be relatively stable at around 50 to 60 mg/L. Recent groundwater monitoring results (WEC 2020-TN6526) show that wells with elevated ammonia concentrations (greater than 1 mg/L) generally have elevated nitrogen concentrations, with the notable exception of well W-27 located just south of Gator Pond. The amount of ammonia and nitrate in groundwater may be correlated when ammonia is being removed via the nitrification-denitrification process.

3.4.1.2 Radiological Contaminants

Previous site investigations indicate that the WWTP lagoons contributed to gross alpha and gross beta contamination, and activities exceeded the screening levels (15 pCi/L for gross alpha, 50 pCi/L for gross beta) in groundwater samples from wells around and south of the lagoons (AECOM 2013-TN5508). Recent groundwater samples showed gross beta contamination remains above the screening level in this area, but gross alpha contamination was less than the screening level in all wells around the lagoons and downgradient, along the groundwater flow path (WEC 2020-TN6526). In the early 1980s, five lagoons (West I, West II, East, North, and South) were lined with 36 mil Hypalon liners, and underdrain systems were installed to detect leaks from the lagoons (NRC 1985-TN5602). The WEC believes its process of removing solids from the bottom of the lagoons was damaging the liners, thereby creating a potential for leaks (WEC 2017-TN5621). The WEC noticed an upward trend in groundwater contaminants, so it replaced four of the lagoon liners (all but the East Lagoon liner) between 2008 and 2012, this time with 80 mil high-density polyethylene (HDPE) liners (WEC 2017-TN5621). As described in Section 3.3.1.3 of this EIS, samples of sludge collected in 2019 from the Sanitary and East Lagoons showed results exceeding the screening levels for uranium, confirming the presence of uranium in the lagoons with the potential to contaminate groundwater, if released (WEC 2020-TN6526). The lagoon sludge samples collected in 2019 were below the detection limits for Tc-99 (WEC 2020-TN6526). The WEC completed closure of the East Lagoon in 2021 (WEC 2021-TN7154). The WEC completed sampling of Sanitary Lagoon sludge (WEC 2021-TN7133) and intends to remove the sludge from the lagoon and close the lagoon (WEC 2020-TN6707). Sanitary Lagoon sludge samples collected in 2021 contained both uranium and Tc-99. In all of those samples, the combined radioisotope activities

exceeded the residential screening and exceeded the Industrial Screening Level in one sample (for the moisture-corrected activities) (WEC 2021-TN7133).

The current CSM recognizes that manufacturing operations in plant buildings are potential sources of groundwater contamination by radionuclides (WEC 2020-TN6707). Recent sampling results showed elevated gross alpha and gross beta contamination in the surficial aquifer next to the exterior CWW line on the western side of the manufacturing building (WEC 2020-TN6526). In 2018, the WEC discovered a leak at one of the HFSSs inside the plant. Soil samples taken beneath and around the spiking station footprint showed total uranium concentrations as high as 10,000 parts per million (ppm). The WEC subsequently completed remediation to remove affected soil below the spiking station to a depth of approximately 2.7 to 3.6 m (9 to 12 ft). Soil samples away from the footprint of the HFSS also showed high total uranium concentrations and indicated the impact of past WEC operations. Uranium concentrations have consistently been above the MCL (30 ug/L) in groundwater samples obtained during 2019 to 2021 from a well (W-77) downgradient from the HFSS release (WEC 2020-TN6526, WEC 2021-TN7112; WEC 2022-TN7155). In 2019, the WEC identified a roof leak on one of the intermodal (sea-land) containers south of the WWTP, which stored drums containing uranium-bearing materials. The WEC's inspection noted that the drums were degraded, and contaminants may have leaked to soils under the container. The WEC has removed waste and containers in the Southern Storage Area Operable Unit, completed risk-based soil sampling in the areas of the containers, and removed contaminated soil in accordance with its site remediation procedure (see discussion in Section 2.1.3.1). No groundwater contamination has been attributed to releases from the Southern Storage Area Operable Unit.

3.4.1.2.1 Gross Alpha and Uranium

Groundwater well sampling results from the WEC's ongoing environmental monitoring program show gross alpha activities have exceeded the 15 pCi/L investigation level (which initiates isotopic speciation when exceeded) in a number of wells around the WWTP lagoons since 2004 (AECOM 2013-TN5508; NRC 2018-TN6549; WEC 2016-TN5723, WEC 2018-TN5722). From 2004 to 2019, gross alpha activity has consistently exceeded the screening level in wells W-18 and W-30, located to the southwest and northeast, respectively, of South Lagoon. From 2007 until the WEC started sampling all wells for uranium in 2018, there have been several instances of wells exceeding a gross alpha activity level of 15 pCi/L, which is the trigger for isotopic analysis. Of those samples for which the WEC completed isotopic analysis, the results showed uranium below the MCL/derived limit. Only one well, W-18, exceeded the WEC-derived activity-based limit for uranium of 84 pCi/L in 2007 (equivalent to the 30 ug/L MCL using CFFF specific activity coefficients), and it had a relatively high gross alpha activity of 115 pCi/L (WEC 2019-TN6546). Gross alpha activities in wells located in the lagoon area and those located away from plant buildings have not exceeded 60 pCi/L since 2010. Beginning in late 2018, the WEC started evaluating isotopic uranium in all samples from the site's existing well network.

The CSM identifies several potential uranium sources that appear to have affected groundwater quality in the surficial aquifer near the main plant buildings (WEC 2020-TN6707). In 2008, a CWW line breach was discovered along the western side of the plant. Soil and water samples collected near the breach indicated radionuclides in the CWW line and the subsurface. While the CWW line was replaced, not all of the contaminated soil was removed (WEC 2019-TN6510). A 2011 pipe leak released uranium to the subsurface beneath the URRS floor. The total volume of material released into the subsurface is not clear. One liquid sample taken from a breached process pipe beneath the URRS area had a total uranium concentration of approximately

98,000 pCi/L (NRC 2019-TN6472). Based on the isotopic analysis, the uranium is from the CFFF operations (mainly U-234). The 2018 HFSS leak (WEC 2019-TN6553) resulted in uranium contamination in soil underneath the concrete floor to a depth of 11 to 12 ft (WEC 2019-TN6510). Contaminated soil beneath the spiking station was removed; confirmatory soil sampling showed a maximum uranium concentration of 2,740 ppm. The WEC stated that uranium contamination in the soil below the concrete floor was observed in soils outside the immediate area of the spiking station that leaked; the WEC concluded that the cause of these high uranium concentrations was previous plant operations (WEC 2019-TN6510, WEC 2019-TN6553).

The WEC added nine new wells (W-51 to W-59) along the west flank of the main manufacturing building in late 2018 (see Figure 3-16) to monitor potential groundwater contamination from the CWW line leaks and other potential releases identified in the CSM (WEC 2020-TN6707). The line of wells closely follows the buried CWW pipe. Isotopic uranium activities were above the activity-based limit (84 pCi/L) and total uranium concentration was above the 30 µg/L MCL in three of the wells (W-55, W-56, and W-59) during 2018 (WEC 2019-TN6876) and in two wells (W-55 and W-56) during 2020 and 2021 (WEC 2021-TN7112; WEC 2022-TN7155). Well W-45, located at the north end of the line of wells along the west side of the building had not been routinely sampled, but has had gross alpha activity levels that slightly exceeded 15 pCi/L (AECOM 2013-TN5508; WEC 2018-TN5722). In 2020 and 2021, samples from W-45 had total uranium concentrations less than 2 percent of the MCL (WEC 2021-TN7112; WEC 2022-TN7155).

Wells along the south and east sides of the Chemical Area OU (W-76 to W-84) were installed in 2019 to detect groundwater contamination resulting from past plant operations, including any potential impacts of the HFSS leak. Groundwater samples obtained from these wells in 2020 and 2021 showed total uranium concentration significantly above the 30 µg/L MCL at well W-77 (346 µg/L in April 2021) and low concentrations (<1 µg/L) at nearby wells (WEC 2021-TN7112; WEC 2022-TN7155).

3.4.1.2.2 Gross Beta and Technicium-99

Gross beta activity has been found in groundwater wells at the CFFF site since the early 1980s and has consistently exceeded the site action level of 50 pCi/L in wells around the lagoons and between the lagoons and the bluff, e.g., in wells W-7, W-10, W-13, W-15, W-17, W-18, and W-32 (AECOM 2013-TN5508). The gross beta action level was used to trigger analyses for Tc-99 (WEC 2019-TN6510). After sampling in 2010, the WEC determined that the gross beta in groundwater was primarily due to Tc-99 based on beta/gamma scans of the samples (WEC 2019-TN6510). Residual Tc-99 present in the enriched uranium received for processing at the CFFF has been postulated to be the source of the Tc-99 on the site (WEC 2020-TN6538). The WEC evaluated potential sources and mechanisms for Tc-99 releases to the environment and initially determined that a liquid release from the cylinder recertification building was the most likely source of the Tc-99 releases (WEC 2019-TN6510). The WEC completed analysis of liquid and solid samples from various plant process streams (including East Lagoon sludge and adjacent soils) to evaluate potential sources of active Tc-99 releases, and concluded that current site operations do not have the potential for significant Tc-99 releases (WEC 2020-TN6538); the SCDHEC concurred with this conclusion (SCDHEC 2020-TN7003). The CSM identifies three potential mechanisms for past releases of Tc-99 from the recertification building as potential sources of Tc-99 groundwater contamination (WEC 2020-TN6707).

Sampling results for 2018 to 2021 indicate groundwater in the surficial aquifer continues to exceed the WEC's 50 pCi/L action level for gross beta (WEC 2020-TN6526, WEC 2020-TN6875). The WEC has evaluated all groundwater samples for Tc-99 activity since 2018. The MCL for Tc-99 (900 pCi/L) is derived from a calculated activity that will yield a dose of 4 mrem/yr to the total body or any critical organ (EPA 2015-TN6716); the Tc-99 MCL corresponds to a gross beta concentration much larger than the action level. While most Tc-99 activities at the CFFF site have been well below the MCL, measurements in two wells that were installed in 1980, but that were not sampled between 2004 and 2017, indicated Tc-99 activities above the MCL during the 2018 to 2021 sampling campaigns. These wells, W-6 and W-11, are screened in the surficial aquifer and located between the WWTP lagoons and Gator Pond (see Figure 3-17). Gross beta activity from 2018 to 2021 varied from 765 to 1,620 pCi/L at well W-6 and from 450 to 2,450 pCi/L at well W-11 (WEC 2020-TN6875). During the same period, Tc-99 activity varied from 861 to 2,830 pCi/L at well W-6 and from 1,230 to 4,200 pCi/L at well W-11 (WEC 2020-TN6875; WEC 2021-TN7112; WEC 2022-TN7155). Gross beta activity in Gator Pond (Figure 3-11) suggests that groundwater contaminated with Tc-99 has been discharging to the pond since routine measurements began in 2010. Groundwater monitoring data during 2020 and 2021 also show Tc-99 activity at well W-47 (west of Gator Pond and downgradient from well W-11) and the presence of Tc-99 in wells W-13R, W-67, and W-97 (east of Gator Pond), as well as at W-77 along the southern boundary of the Chemical Area OU (WEC 2021-TN7112; WEC 2022-TN7155).

3.4.1.3 Confined Aquifer Contamination

As described earlier, only four wells at the CFFF site are screened in the confined aquifer (the Crouch Branch aquifer, referred to as the Black Mingo aquifer in CFFF documents)—wells designated as W-3A, W-49, W-50, and W-17 (WEC 2020-TN6526). The limited water quality data available from the confined aquifer wells show undetectable or very low levels of the monitored COPCs, and no indication that the confined aquifer has been contaminated as a result of CFFF operations.

3.4.2 Groundwater Impacts

The NRC staff determined the impacts on groundwater resources by evaluating the potential effects of the proposed CFFF's continued operations for an additional 40 years on the availability of the resources to support other uses and users. Groundwater withdrawals and consumptive use of water for CFFF operations would directly reduce the quantity of water available for other uses/users of the same resource. Degradation of groundwater quality by the inadvertent release of contaminants to the subsurface potentially renders the water resource unsuitable for other users and designated uses.

The WEC does not currently withdraw groundwater for any CFFF operational needs, and the WEC has not indicated that there are any plans to use groundwater for plant operations in the future (WEC 2019-TN6510). Therefore, the staff concludes that there are no potential impacts on groundwater resources from the withdrawal or consumptive use of groundwater for the proposed continued operation of the CFFF.

As described in Section 3.4.1 of this EIS, the groundwater at the CFFF site has been noticeably contaminated with VOCs, inorganics, uranium, and Tc-99 from inadvertent spills and leaks that have occurred during past operations. As noted previously, groundwater at the CFFF site is classified by South Carolina as an underground source of drinking water, even though the WEC is not currently using groundwater as a source of drinking water. As a result, the State's goal in remediating the site is for the groundwater to meet the applicable water quality standards established in the State's drinking water regulations (see Section 3.4.1 of the EIS).

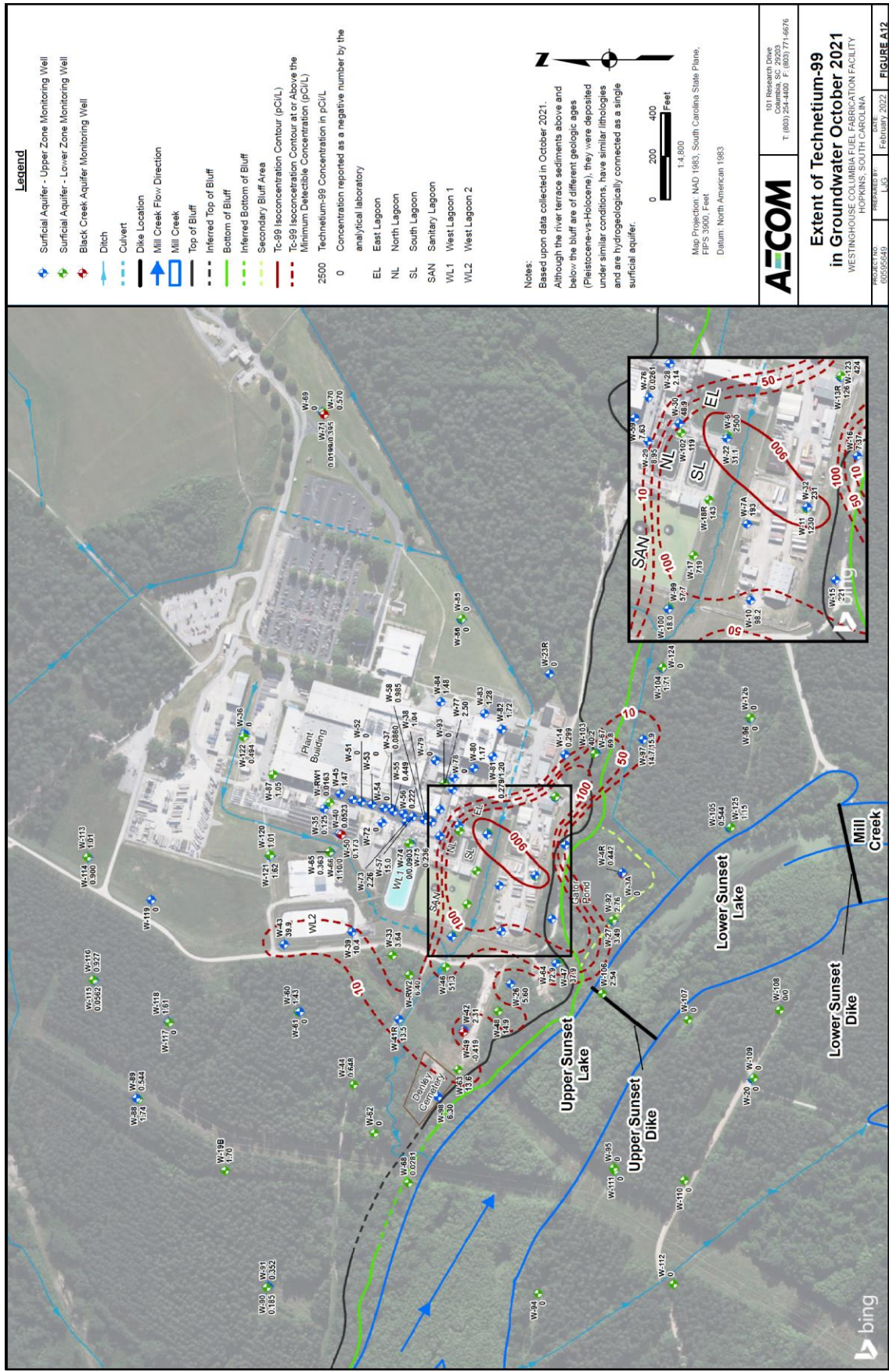


Figure 3-17 Tc-99 in the Surficial Aquifer, October 2021 (Source: WEC 2022-TN7155)

When evaluating the potential impacts on groundwater quality from the proposed continued operation of the CFFF for an additional 40 years, the NRC staff considered the likelihood of future inadvertent releases of contaminants to the subsurface, the transport and fate of existing and potential future contaminants in the groundwater, and the potential effects of contaminated groundwater on other users of the groundwater resources.

3.4.2.1 *Future Releases*

The WWTP has been a source of groundwater contamination since before 1980 and likely will continue to be a potential source of contamination as long as the lagoons remain in operation. Actions taken by the WEC to reduce the likelihood of releases from the WWTP include the replacement of lagoon liners, the closure of East Lagoon in 2021, and the planned future closure of the Sanitary Lagoon. The NRC staff considers it likely that during the proposed 40-year license renewal period, the liners of the wastewater lagoons will need to be replaced again.

Several events involving leaks of contaminants from plant components have occurred since 2008. Actions taken by the WEC to reduce the environmental impacts of these events include remediation of contaminated soils, investigation of the extent of contamination, and expansion of the groundwater monitoring network to detect movement of contaminants and the occurrence of future leak events. Actions taken by the WEC to reduce the likelihood of future events that cause inadvertent leaks of contaminants include eliminating the use of PCE, replacement of components (e.g., leaking pipes), removal of potential contaminant sources (e.g., the former oil house, southern storage area containers, and legacy equipment on the plant roof), and improved procedures (e.g., for materials handling, spill prevention, and inspection). Investigations completed by WEC indicate that Tc-99 levels in the current uranium fuel supply are low and do not constitute an ongoing source of contamination that would result in exceedances of groundwater quality standards. Observed levels of Tc-99 above groundwater quality standards (in wells W-6 and W-11) are thus likely the result of releases that occurred in the past from undetected high levels of Tc-99 in the uranium fuel supply.

Investigations of subsurface contamination from past events have not been definitive in identifying the sources of contaminants, the initiation of contaminant releases, and the total amounts of contaminants released to the environment. For example, the occurrence and magnitude of past releases of VOC contamination and Tc-99 contamination are not well-defined. The NRC staff acknowledges that actions taken by the WEC in response to past contaminant releases have reduced the likelihood of future inadvertent releases with continued operation of the CFFF. With consideration of the history of the site and remaining uncertainties about past leaks, the NRC staff concludes that future inadvertent releases of contaminants to the subsurface are reasonably foreseeable. Furthermore, the NRC staff expects that any future releases may result in groundwater contamination that exceeds MCLs, as has happened on multiple occasions in the past. Continuation of the current extensive groundwater monitoring and implementation of CFFF procedures RA-434, "Environmental Data Management Procedure", and RA-433, "Environmental Remediation", are expected to provide improved detection of and response to any future releases that may occur.

3.4.2.2 *Transport and Fate of Contaminants*

The WEC's best estimate of the current extent of the COPC contaminant plumes in groundwater, the potential sources of contamination, and the hydrologic and geological controls on the movement of the contaminants are embodied in the CSM (WEC 2020-TN6707). As

described in Section 3.4.2 of this EIS (and in the WEC's Phase II RIWP [WEC 2020-TN6707]), contaminants derived from CFFF operations that are currently present in groundwater at concentrations above their MCLs are the VOCs (PCE and TCE), nitrate, fluoride, uranium, and Tc-99.

VOCs contamination is widespread in the surficial aquifer on the CFFF site; recent concentrations exceed the MCL by more than an order of magnitude in wells screened in both the upper and lower portions of the aquifer (WEC 2020-TN6875, WEC 2021-TN7112, WEC 2022-TN7155). Although the existing data do not provide evidence that the VOC contaminants have been transported beyond Sunset Lake, the actual extent of VOC contamination is uncertain due to the relative sparsity of wells in the floodplain sediments. VOC biodegradation is expected to occur over time due to natural processes, but the current extent of contamination and the persistence of the contaminants over time indicate that VOC degradation has occurred at a rate too slow to prevent significant transport of contaminants by groundwater flow. The NRC staff expects these conditions to persist and additional transport of VOC contamination to occur in the future without remedial interventions.

Nitrate contamination is also widespread in the surficial aquifer; concentrations exceed the MCL by more than an order of magnitude in wells screened in both the upper and lower portions of the aquifer (WEC 2020-TN6875, WEC 2021-TN7112, WEC 2022-TN7155). Fluoride is less widespread in the groundwater; recent concentrations have been up to about three times the MCL. Both contaminants may have been transported in groundwater as far as Sunset Lake, although the actual extent of contamination is uncertain due to the relative sparsity of wells in the floodplain sediments. Although natural denitrification processes in groundwater may act to reduce nitrate concentrations, both contaminants are expected to be largely transported by groundwater flow, with any attenuation occurring through dispersive processes (including diffusion).

While uranium has been observed at concentrations above background levels at a number of wells screened in the surficial aquifer and located south of the main plant buildings, concentrations of uranium above the MCL have only been observed in relatively isolated locations close to the plant buildings (WEC 2020-TN6875; WEC 2021-TN7112; WEC 2022-TN7155). The isolated extent of uranium contamination in groundwater may arise from the size of the releases, which are unquantified, but is more likely due to the relatively low mobility of uranium in the subsurface. Uranium tends to adsorb to natural sediments under reducing and near-neutral pH conditions (Long et al. 2008-TN6947). Field measurements from 2020 and 2021 show groundwater pH generally between 5 and 7 with predominantly reducing conditions in the floodplain sediments and both oxidizing and reducing conditions in samples from near the plant buildings (WEC 2021-TN7112). In recent sampling, uranium concentration in groundwater exceeded the MCL by a factor of one to eight at three wells, with no significant pattern related to pH or oxidation-reduction potential. The existing data are insufficient to conclude that uranium concentrations at these wells will not increase in the future because there could be uranium in the unsaturated sediments above the surficial aquifer. Due to the limited mobility of uranium, however, the NRC staff expects that the existing uranium contamination will move in groundwater more slowly than the other contaminants, and that the extent of uranium contamination above the MCL will remain relatively small in the absence of additional releases to the subsurface.

As described in Section 3.4.1 of this EIS, elevated levels of gross beta activity have been observed in the surficial aquifer at the CFFF site since the early 1980s; activities have consistently exceeded the action level of 50 pCi/L over the last 10 to 15 years in a number of

wells south of the lagoons. Gross beta activity in the groundwater has been attributed to several potential past releases of Tc-99, and no estimate is available for the total quantity released (WEC 2019-TN6510). As described in Section 3.3.2.2 of the EIS, water quality measurements in Gator Pond have shown elevated gross beta activity since 2010, apparently a result of contaminated groundwater discharging to the pond via an associated spring. Annual average gross beta activity in Gator Pond has been relatively constant since about 2014 (see Figure 3-11), suggesting a steady contribution of Tc-99 to the pond from the groundwater during this period, and the continuing presence of a Tc-99 groundwater plume.

Monitoring of two wells (W-6 and W-11) that had not been routinely sampled prior to 2018 has shown Tc-99 activity exceeding the MCL by a factor of up to three in well W-6 and by a factor of three to four in well W-11 from 2018 to 2021. Shallower wells at these same locations (W-22 and W-32, respectively) have had Tc-99 activities below the MCL during the same monitoring period. The most recent groundwater monitoring results show the presence of Tc-99 in wells located hundreds of feet from W-6 and W-11 in all directions, as shown in Figure 3-17 (WEC 2022-TN7155). Tc-99 is expected to move in the surficial aquifer along with the groundwater flow; any attenuation of contaminant activities would largely occur through dispersive processes (including diffusion). It is unclear which processes might have influenced the observed Tc-99 activity at the co-located well pair, W-32 and W-11 (shown in Figure 3-18): the gross beta spike in 2004-2005, the steady, elevated activity in W-32 over a 15-year period, the recent decrease in W-11 activities (with no similar decrease at well W-6), and the apparent significant vertical gradient in Tc-99 activities (the bottom of the W-32 well screen is at the same elevation as the top of the W-11 well screen). Similarly, with an estimated average groundwater velocity in the terrace sediments of between 75 and 150 ft/yr (see Section 3.4), any short-term release to groundwater should have been largely swept by advection from the region between the plant and the bluff. With little information about the timing, location, duration, volume, and inventory of past Tc-99 releases, it is difficult to draw conclusions about the processes that have resulted in the observed Tc-99 behavior at the site.

The WEC's use of the CSM to characterize the fate and transport of contaminants is described in "Environmental Data Management Procedure", RA-434. The CSM is currently mainly qualitative and is currently limited to a hydrogeologic description of the site, the potential sources of contamination, and the extent of existing contamination. The NRC staff acknowledges that the CSM is currently investigatory and is intended to evolve as site investigation and remediation proceed and as new data are collected (WEC 2020-TN6526). The WEC intends to use the CSM, as well as plume analytics (WEC 2021-TN7112), as a decision-making tool throughout the life of the facility. However, there are currently a number of uncertainties associated with the fate and transport of contaminants during the period of the proposed action (40 years). For example, the degradation rate of VOCs, the role of the unsaturated zone as a reservoir of contaminants, and the effects of lithologic heterogeneities on groundwater flow and contaminant transport are currently undefined but may be needed to properly interpret existing observations and make inferences about future groundwater quality effects. The NRC staff finds that the current CSM is insufficient for evaluating the future movement and ultimate fate of contaminants in groundwater at the CFFF site that may occur as the result of future inadvertent releases. The WEC plans to enhance the CSM as the remedial investigation under the CA with the SCDHEC is completed. Consistent with the RIWP, the WEC will document the results of all remedial investigation activities in a final Remedial Investigation Report that would also include a summary of the human health and ecological risks from the Baseline Risk Assessment that the WEC will perform after completing the remedial investigation activities. The remedial investigations and the Baseline Risk Assessment

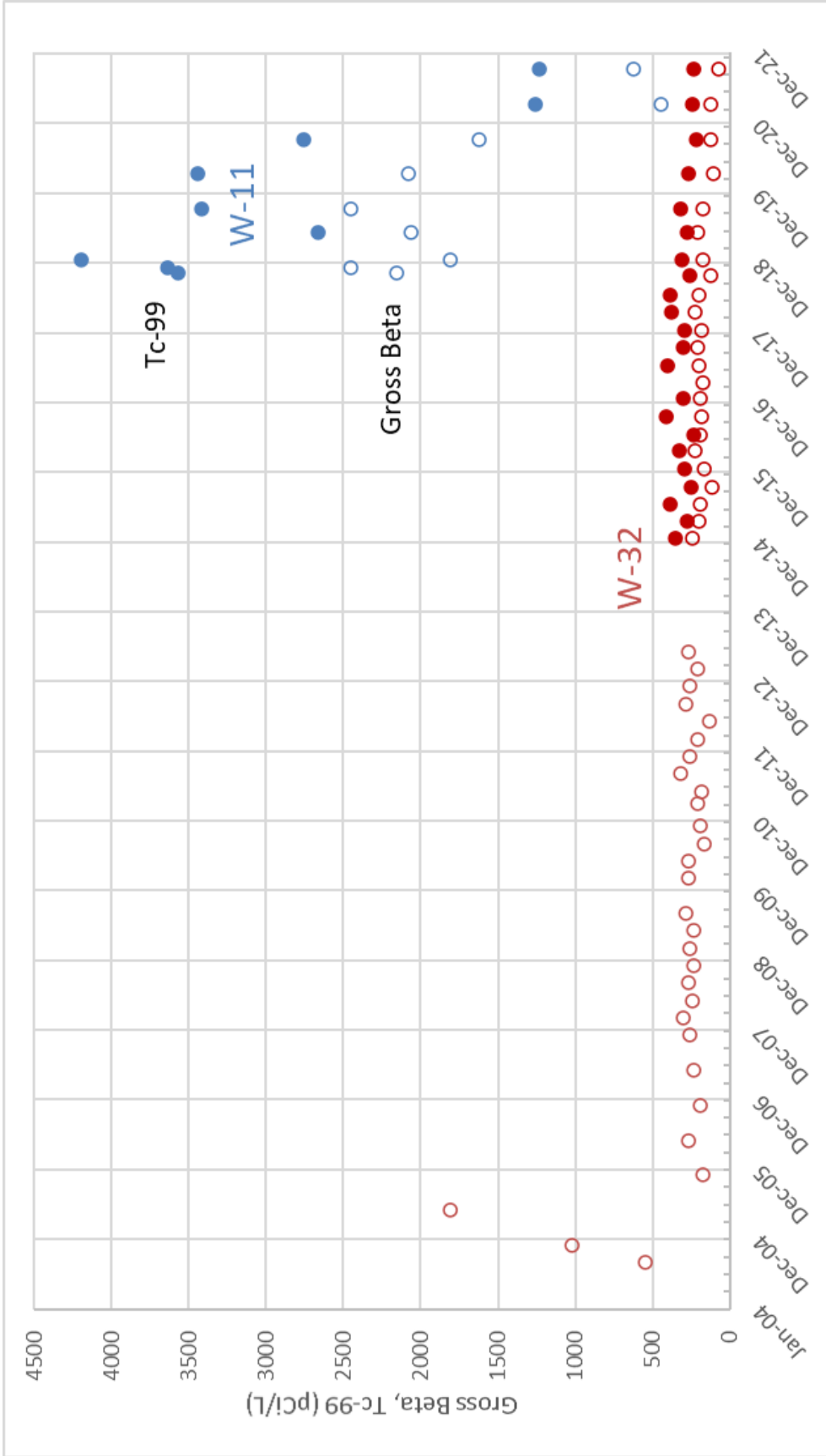


Figure 3-18 Gross Beta (open circles) and Tc-99 (filled circles) Activity at the Well Pair W-32 (red) and W-11 (blue) (Source: WEC 2020-TN6875, WEC 2021-TN7112, WEC 2022-TN7155)

will inform the WEC's evaluation to determine whether additional assessments are necessary for further focused assessment activities and appropriate remedial alternatives, which will be part of a Feasibility Study. The Feasibility Study will be provided to the SCDHEC within 90 days of the SCDHEC's approval of the final Remedial Investigation Report.

3.4.2.3 *Effects on Other Groundwater Users*

The effects on other groundwater users from the existing or potential future degradation of groundwater quality due to the proposed continued CFFF operations for an additional 40 years are reduced by two factors: (1) the locations of the users with respect to the CFFF site, and (2) the results of the ongoing efforts of the WEC under the CA with the SCDHEC to detect, monitor, and prevent or mitigate the movement of contaminants offsite (via the programs and procedures established by the WEC).

As described in Section 3.4.1 of this EIS, the majority of groundwater supply wells in the vicinity of the CFFF site are located to the north of the site along Bluff Road. The regional hydrogeologic information and the CFFF site-specific data to date indicate that groundwater in both the surficial and the confined aquifer flows generally southwestward, toward the Congaree River. Because groundwater beneath the CFFF site tends to flow away from Bluff Road, water quality in the water supply wells along Bluff Road is unlikely to be affected by the CFFF activities.

The offsite, private wells that were identified by the WEC (see Figure 3-14) are located in the general direction of groundwater flow from the CFFF site and could be affected by the existing and any potential future contamination from CFFF activities during the proposed license renewal period if contaminants were transported to these wells. The inactive wells, IWSW-01 and IWSW-02, and the active well WSW-01, all shown in Figure 3-13, are the least likely of the private wells to be affected by groundwater contamination from CFFF activities because they are located north of the CFFF site. As noted above, groundwater generally flows southwestward from the site, toward the Congaree River. The other active, private wells are located about 1.6 to 4 km (1 to 2.5 mi) from the existing groundwater contamination, while the Congaree River itself is about 5 km (3 mi) from the existing contamination. It is unknown whether the private wells are screened in the surficial aquifer or in the confined aquifer.

The existing groundwater sampling data from CFFF monitoring wells indicate that the contaminant plumes resulting from past activities at the CFFF site currently remain within the boundaries of the site property. With the exception of the VOC contamination in the Western Groundwater AOC (see Figure 2-4), detectable groundwater contamination occurs primarily around the WWTP and the Gator Pond and Sunset Lake areas. No significant contamination from COPCs has been observed in the floodplain wells located south of Sunset Lake. These CFFF floodplain wells are about 600 m (2,000 ft) from the downgradient property boundary.

As described in this section of this EIS, average groundwater velocity in the floodplain sediments of the surficial aquifer was estimated by the NRC staff to be 6 to 12 m/yr (20 to 40 ft/yr). This is the velocity at which the center of mass of a mostly non-reactive, non-decaying contaminant plume would travel (e.g., the nitrate or Tc-99 plumes). At this velocity, about 50 years would be required for the bulk of a contaminant plume to travel 600 m (2,000 ft). This could suggest that the existing groundwater contamination is not likely to travel beyond the CFFF site boundary during the period of the proposed action. However, there is significant uncertainty in the estimated groundwater velocities due to the limited data in the floodplain. Conservative estimates of groundwater velocities in the floodplain, discussed in Section 3.4 of

this EIS, were 18 to 35 m/yr (58 to 115 ft/yr). These conservative estimates may be appropriate if the contaminants travel preferentially along higher-velocity flow paths within deposits of more permeable (sand, gravel) sediments. This could result in contaminants traveling offsite more quickly (e.g., with a travel time less than 20 years over a distance of 600 m) than suggested by the average groundwater velocity. Based on the gross beta and Tc-99 data at the site (including the data shown in Figure 3-11, Figure 3-17, and Figure 3-18), the average groundwater velocity estimates are much more likely to be representative of transport at the CFFF site than the conservative estimates.

The identification of past releases of COPCs to the environment and the resulting contamination of water resources on the CFFF site, including the exceedance of water quality standards in site groundwater, led the SCDHEC and the WEC to enter into the CA (see Section 1.5.2.2.1). The NRC staff expects that the WEC will execute the activities laid out in the CA, including the remedial investigation, Baseline Risk Assessment, Feasibility Study, and subsequent remedial and corrective actions, if necessary, as required by the SCDHEC. Through the remedial investigation process defined in the CA that is currently under way, the extent of onsite contamination and the potential for offsite movement of contaminants are being determined. Upon completion of the remedial investigation, the WEC will evaluate remedial alternatives for the site based on criteria that include compliance with applicable water quality standards. With respect to the groundwater resources at the site, the objective of the CA is to prevent the movement of contaminants off the CFFF property and to reduce groundwater contamination to below the MCLs. Because the WEC is currently in the investigatory phase of the CA, the methods by which the groundwater quality objectives of the CA will be met are unknown. The ultimate outcome of the remedial methods is also uncertain. Therefore, although groundwater contamination on the CFFF site currently exceeds water quality standards, the NRC staff does not expect the effects on offsite groundwater users to be significant, because the WEC is continuing to investigate the sources of contamination to monitor the extent and movement of existing contamination and will take corrective actions as required by the SCDHEC through the CA to prevent any significant offsite groundwater contamination.

In addition to the CA process, a groundwater monitoring program has been established at the CFFF site to provide ongoing monitoring of the site's groundwater quality under NPDES Permit No. SC0001848 (SCDHEC 2017-TN5607). The current NPDES permit requires semiannual groundwater level monitoring and water quality analyses for pH, specific conductance, nitrate, fluoride, VOCs, and radionuclides in a network of up to 20 existing wells. The NRC staff expects similar monitoring requirements under the NPDES permit will apply throughout the proposed continued operation of the CFFF. The draft NPDES permit is currently under renewal review by the SCDHEC and also includes requirements for lagoon liner inspections. The WEC reports the groundwater monitoring results to the SCDHEC annually, and will be providing the same results to the NRC annually during the proposed license renewal period. Based on the results of the annual sampling or during a NPDES renewal review, the SCDHEC could adjust monitoring requirements if deemed necessary, including requiring additional assessment of groundwater quality.

Groundwater monitoring of uranium isotopes and Tc-99 is also carried out as part of the environmental sampling and monitoring program for the CFFF's NRC license. Samples are obtained semiannually from 118 wells to monitor known contamination, to detect leaks, and to prevent offsite migration of contaminants. The wells monitored could change during the license renewal period based upon evaluations by the WEC, particularly the monitoring wells for existing or newly discovered plumes that will be used to delineate the boundary of the plumes and identify their center of mass. The NRC will continue to inspect the WEC's compliance with

its NRC-licensed environmental monitoring program. If the license is renewed, a new proposed license condition, S-17, would require the submission of the environmental monitoring and sampling program to the NRC for review and approval after the SCDHEC approves the Remedial Investigation Report, or within five years of the license renewal (whichever comes first). Another proposed license condition, S-18, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval within 90 days of submittal of the CA final written report to the SCDHEC, as described in Chapter 2 at Sections 2.2.2, 2.2.2.1.2, and 2.4.2 of this EIS.

In response to environmental contamination from CFFF releases and pursuant to the CA with the SCDHEC, the WEC has developed a CSM and procedures concerning environmental data management and environmental remediation to help make informed decisions about data needs, changes to its environmental sampling and monitoring programs, and the remediation of contaminant releases. The WEC has explained that the CSM will be used and maintained throughout the life of the facility. Additionally, if the license is renewed, a new proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results above Federal and State drinking water limits into its CAP (WEC 2021-TN7106), as described in Section 2.2.2.1.2. The WEC has also established an "Environmental Remediation Procedure", (RA-433) to be followed in the event of a release of contaminants to the ground surface or environmental media, the detection of groundwater contamination above MCLs, or the discovery of a past release through soil sampling (WEC 2020-TN6853). The purpose of the remediation procedure is to prevent the migration of contaminants offsite (by providing a decision-making process for responding to inadvertent releases) and to minimize the impacts of contaminant releases on future decommissioning activities.

3.4.2.4 *Groundwater Impacts Conclusion*

Past operation of the CFFF has had a noticeable effect on the water quality of the onsite groundwater. Contaminants derived from the CFFF operations that are currently present in onsite groundwater at concentrations above their MCLs are the VOCs (PCE and TCE), nitrate, fluoride, uranium, and Tc-99. Based on the existing data and history of the site, the NRC staff expects future inadvertent releases of contaminants to the subsurface to be reasonably foreseeable, and that any future releases may result in groundwater contamination that exceeds the MCLs. With the exception of uranium, all of the contaminants currently present in groundwater at levels above their MCLs are expected to be mobile in groundwater. The existing groundwater sampling data indicate that the contaminant plumes resulting from past activities at the CFFF site currently remain within the boundaries of the site property and occur only in the surficial aquifer. Based on the existing estimates of average groundwater velocity, the current groundwater contamination is not likely to travel beyond the CFFF site boundary during the period of the proposed action. However, significant uncertainties affect the evaluation of fate and transport. These uncertainties include the location, timing, and magnitude of contaminant sources; explanations of large differences in observed Tc-99 activities in co-located well pairs; the effects of groundwater velocity variation in the heterogeneous sediments; and the ultimate outcome of the groundwater remediation that will occur under the CA process.

The NRC staff evaluated the effects of the proposed continued operation of CFFF on the availability of the affected groundwater resources to support other uses and users. There are no groundwater withdrawals or consumptive use of water for the CFFF operations and no planned discharges to groundwater. The NRC staff determined that the proposed continued operations could result in inadvertent releases of contaminants that may noticeably affect the quality of the onsite groundwater and exceed water quality standards. The NRC staff

determined that there is a low potential for contaminants to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources (e.g., the environmental sampling and monitoring program and the associated procedures committed to by the WEC (WEC 2021-TN7042)). As described above, however, significant uncertainties remain about the ultimate fate and transport of groundwater contamination at the site. Therefore, the NRC staff concludes that the impacts on groundwater resources from continued operation of the CFFF for an additional 40 years would be SMALL to MODERATE.

Because the past operation of CFFF has had a noticeable effect on the water quality of the onsite groundwater that continues to be observed in the most recent data, the NRC staff concludes that the cumulative impacts to groundwater are MODERATE. In addition, although the proposed continued operation of the CFFF for an additional 40 years could noticeably alter onsite groundwater quality, the continued operation would not destabilize or significantly affect the groundwater resource because there is a low potential for contaminants to move offsite (for reasons explained above). Therefore, the SMALL to MODERATE incremental impact contribution from the proposed action would not result in a collectively greater impact on groundwater resources (see Section 3.19 for additional information).

3.4.3 Mitigation Measures

As described above, the WEC currently monitors groundwater levels and water quality to conform with the NPDES discharge permit requirements. Similar monitoring requirements are expected to be included in the NPDES permit renewal(s) applicable during the period of the proposed action. The WEC also carries out environmental monitoring of groundwater under the terms of its NRC license and this would continue through the proposed license renewal period. Continued adherence to the groundwater monitoring requirements of the NPDES permit and NRC license will serve to avoid and minimize impacts on groundwater resources. The WEC is expected to continue to follow the RIWP, develop a Baseline Risk Assessment, Feasibility Study, and identify remediation as described in the CA with the SCDHEC to limit health risks from the existing groundwater contamination and restore site groundwater to compliance with water quality standards. In addition, the WEC is expected to continue to follow its environmental remediation procedure throughout the proposed license renewal period to prevent the migration of contaminants offsite and to minimize the impacts of contaminant releases on future decommissioning activities.

The WEC has also agreed to three new proposed license conditions related to the WEC's environmental sampling and monitoring program. The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either the SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2, and 2.4.2 of this EIS.

3.5 Ecological Resources

This section describes the ecological resources within the vicinity of the CFFF site and the potential impacts of the proposed continued operation of the CFFF for an additional 40 years.

3.5.1 **Terrestrial and Aquatic Resources**

3.5.1.1 *Terrestrial Resources*

The CFFF site is located within the Southeastern Plains (Level III Ecoregion 65) within the transitional area between two Level IV ecoregions: the Atlantic Southern Loam Plains (65l) and the Southeastern Floodplains and Low Terraces (65p) (EPA 2013-TN5033). The region is dominated by oak-hickory forests consisting of smaller tree and common shrub species.

The undeveloped portions of the site include wetlands, woodland areas, and hardwood forests. The area around the facility includes various grasses, rushes, sedges, and weedy herbs and is maintained by mowing, which limits vegetation height. Rodents, birds, reptiles, amphibians, and insects all potentially use the area as habitat based on surveys of the site that were last conducted in the 1970s (see Appendix B of the WEC's March 2019 ER [WEC 2019-TN6510] for a species list). However, wildlife diversity in the area is limited and is likely dominated by species tolerant of human activity because the area in and around the CFFF site has been used as an industrial facility for decades and because vegetation in the area is of limited height and diversity (AECOM 2014-TN5511).

3.5.1.2 *Aquatic Resources*

The main aquatic habitats at the CFFF site include Mill Creek and Sunset Lake. Sunset Lake was created by a man-made impoundment of Mill Creek prior to CFFF construction. A spill gate is used to discharge water from the dam at Sunset Lake back into Mill Creek, which then flows into the Congaree River approximately 10.5 river km (6.5 river mi) downriver from the CFFF site (AECOM 2013-TN5508; NRC 2007-TN5598, NRC 2019-TN6472). The species compositions of Sunset Lake and Mill Creek are unknown because the results from surveys conducted in 1974 were lumped together for Sunset Lake and the Congaree River (NRC 1977-TN6547). The NRC staff identified no existing survey data about these aquatic features during its review. Small fish and invertebrates, however, likely inhabit onsite aquatic habitats. Organisms within the small creeks, drainage ditches, and floodplains present near and adjacent to the CFFF site are likely tolerant of extreme physical conditions given the lack of continuous connectivity with larger water bodies. Bathymetry surveys conducted by the WEC found that Sunset Lake is shallow — at 1.5 to 1.8 m (5 to 6 ft) deep (WEC 2020-TN6526) — and could potentially provide suitable habitat for gamefish (e.g., bass, catfish, sunfish); however, fishing is currently prohibited (NRC 2019-TN6472). Gator Pond is located along the southern edge of the buildings at the CFFF site. This man-made pond does not drain into Mill Creek or Sunset Lake.

The Congaree River occurs outside of the CFFF site (approximately 5 to 6 km [3 to 4 mi] southwest at the closest), but it is part of the affected aquatic environment because (1) the CFFF site is within the Congaree River floodplain, (2) Mill Creek and Sunset Lake drain into the Congaree River, and (3) the CFFF discharges their treated wastewater directly into the Congaree River in accordance with a NPDES permit from the SCDHEC (NRC 2019-TN6472).

The Congaree National Park is downriver from the CFFF site and is well-recognized for having important scenic, cultural, ecological, scientific, and socioeconomic values as discussed by the

National Park Service (NPS 2020-TN6543). The park provides a diversity of riverine, wetland, and upland habitats that include more than 15,000 ac of protected wilderness area. The Congaree River is also known for providing scenic boating and fishing opportunities in a 72 km (45 mi) reach near the CFFF site and within the Congaree National Park.

Surveys within the Congaree National Park indicate that the Congaree River provides habitat to approximately 55 species of fish, 16 species of mussels, and 7 species of crayfish (Congaree Riverkeeper 2012-TN6895). Common recreationally important species include black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), bowfin (*Amia calva*), channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), redbreast sunfish (*Lepomis auritus*), striped bass (*Morone saxatilis*), and yellow perch (*Perca flavescens*) (NPS Undated-TN6992; NRC 2019-TN6472).

To gather additional data about fish populations near the CFFF site, the NRC staff reviewed survey data that were recorded in an online database, FishNet2 (2014-TN6991). This database is a collaborative effort by natural history museums and biodiversity institutions to compile fish survey data. The database included one fish survey in the vicinity of the CFFF site that was conducted in June 2002. However, the survey methodology, sampling protocols, and equipment were not specified. Therefore, a species may occur near the CFFF site but may not have been captured in the survey due to insufficient sampling effort and the various survey methods used. Table 3-2 lists fish species that were observed during the survey.

Table 3-2 Fish Species Collected Near the CFFF Site, 2002

<i>Carpionodes spp.</i>	river carpsucker	20
<i>Hypentelium nigricans</i>	northern hogsucker	1
<i>Moxostoma macrolepidotum</i>	shorthead redhorse	6
<i>Alosa sapidissima</i>	American shad	1
<i>Cyprinella nivea</i>	whitefin shiner	2
<i>Morone americana</i>	white perch	1

Source: FishNet2 2014-TN6991: Survey conducted on June 19, 2002, on the Congaree River, from 1.6 to 2.4 km (1.0 to 1.5 mi) south of Interstate-77, about 8 air km (5.0 mi) south of the City of Columbia.

The stretch of the Congaree River adjacent to the CFFF site is also listed on the Wild and Scenic Rivers Act Nationwide Rivers Inventory, which is administered by the National Park Service. In accordance with an executive memorandum (Office of the President 1979-TN7067), all agencies must “take care to avoid or mitigate adverse effects” on rivers identified in the Nationwide Rivers Inventory, and agencies should consider the potential impacts on outstandingly remarkable values (ORVs) (NPS 2019-TN6579, NPS 2020-TN6543). The proposed action could affect the ORVs related to deterioration of water quality, however chemical discharges are within health standards, as described in the section on aquatic impacts (Section 3.5.2.2 in this EIS). Continued operation of the CFFF could also potentially affect the ORV related to noise disturbance. However, minimal noise from the plant is expected to reach the Congaree River because the CFFF site is approximately 5–6 km (3–4 mi) away.

3.5.2 Terrestrial and Aquatic Resources Impacts

3.5.2.1 Terrestrial Resource Impacts

Potential sources of impacts on terrestrial resources include noise during daily operations, increased turbidity or introduction of pollutants from site runoff and discharges, and some minor land disturbances associated with the drilling of new groundwater monitoring wells per the CA with the SCDHEC.

The NRC and U.S. Fish and Wildlife Service (FWS) (NRC 2019-TN6473; FWS 2019-TN6429) expect the impacts on terrestrial species to be minor. In summary, the NRC staff and FWS determined that the proposed continued operation of the site for an additional 40 years is not likely to adversely affect federally listed terrestrial species because (1) the WEC is not proposing any new construction that would disturb terrestrial habitats; (2) although new groundwater monitoring wells will be drilled, the construction is temporary and only causes minimal land disturbance; and (3) wildlife is habituated to daily operating noises because the CFFF has been in operation for decades. While these findings were made for federally listed species, the NRC staff has determined, based on its review, that they apply more broadly to all terrestrial species.

Terrestrial species can also be affected by CFFF actions that affect water quality and aquatic habitats (e.g., Congaree River). Public comment requests in response to the draft 2019 EA (NRC 2019-TN6472) requested evaluation of the aquatic linkages to terrestrial resources, which are analyzed in the aquatic impacts section (Section 3.5.2.2 of this EIS). The proposed action is expected to result in low impacts on terrestrial resources because the surface waters, where organisms live and drink, would continue to be monitored to ensure compliance with regulatory limits. This includes the treated effluent from manufacturing operations and for sanitary purposes that is directly discharged into the Congaree River. It also includes the known contaminants (e.g., uranium, Tc-99, PCE, and TCE) that were discovered in surface waters onsite (e.g., Sunset Lake) and are being further evaluated and addressed by the WEC through the CA with the SCDHEC.

The proposed action could also benefit wildlife. The WEC volunteered to participate in the Wildlife and Industry Together program, which is sponsored by the South Carolina Wildlife Federation (SCWF 2017-TN6993). Members of the program establish conservation and education goals to improve wildlife health (WEC 2014-TN6421). To become certified by the South Carolina Wildlife Federation, the WEC agreed to conduct wildlife enhancement projects on or near the CFFF site, provide environmental education for employees, and community outreach (NRC 2019-TN6472). For instance, the WEC participated in a special project with the South Carolina Wildlife Federation in 2019 to build and install 25 nesting boxes on the CFFF site for prothonotary warblers (*Protonotaria citrea*).

3.5.2.2 Aquatic Resource Impacts

A primary potential impact on aquatic resources is that associated with the direct discharge of treated wastewater into the Congaree River. Although continued discharges could result in some minor degradation of aquatic habitats, the WEC would be required to comply with the chemical and quantity limits specified in its NPDES permit. Additionally, the volume of discharged effluent would be a small percentage of the overall flow of the Congaree River and, therefore, the concentration of discharged effluent would be quickly diluted. Mobile biota could likely swim around the effluent plume to avoid contact with chemical and other pollutants.

A small portion of drifting or weakly swimming biota (e.g., fish eggs and larvae) could be exposed to the effluent plume, but exposure times would be limited because of the relatively small discharge rate compared to the flow rate of the river. Additional direct impacts on aquatic biota and habitats would be limited given that the WEC does not directly obtain water from surface water bodies.

As discussed in Section 3.6.2.1, the potential impacts of the CFFF discharge into the Congaree River were considered by the NRC staff and NMFS (NRC 2018-TN5588), and both determined that continued operation of the CFFF is not likely to adversely affect listed sturgeon species because (1) pollutant levels from the discharge pipe are monitored and regulated by NPDES permits; (2) pollutant releases to water bodies outside the CFFF site are below the regulatory limits set by the SCDHEC and also within U.S. Department of Energy (DOE) guidelines to protect aquatic and terrestrial life (NRC 2018-TN6428); (3) uranium levels in water samples (below drinking water health limits) and sediment samples (below average U.S. soil levels) are low, and observed levels in fish tissue samples (<1 pCi/g) outside the CFFF site are minimal; (4) dissolved oxygen levels are supportive of aquatic life in the area; and (5) the effluent discharges to the Congaree River are minor (i.e., <001% of average river discharge), quickly dispersed, and are released at ambient temperatures. While these findings concern sturgeon, the same rationale applies to all aquatic species.

A second potential impact on aquatic habitats and biota concerns runoff that may contain sediments, contaminants from road and parking surfaces, or herbicides. Impacts of runoff on aquatic resources are expected to be minimal because of the distance to the Congaree River and site-specific programs that prevent pollution from stormwater runoff. The WEC's continued compliance with its NPDES permit for stormwater runoff would ensure that the effects of runoff on aquatic resources are minimized.

A third potential aquatic concern is that Tc-99, uranium, and TCE were detected in surface water samples taken at the CFFF site in 2019 (WEC 2020-TN6526). Contamination of onsite surface water bodies (e.g., Sunset Lake) is being addressed by the WEC under the CA with the SCDHEC. The NRC staff believes the sources of contamination are adequately addressed in the CA between the WEC and the SCDHEC. For this reason, the NRC staff does not expect surface water pathways to move contamination outside the CFFF site boundary and degrade the water quality in Mill Creek downstream (see Section 3.3.2.3).

A fourth potential concern is the accumulation of uranium and fluoride in fish consumed by recreational anglers. However, observed contamination levels in fish tissue samples have remained well within health standards. As part of its environmental monitoring program, the WEC collects one fish each year from a location near or at the diffuser discharge into the Congaree River. Uranium samples in these fish tissue samples have consistently remained below 0.6 pCi/g, which is barely above the minimum detection level of 0.5 pCi/g (WEC 2019-TN6423).

The SCDHEC conducted additional fish tissue sampling in August 2019 at three locations: (1) by the wastewater diffuser, (2) upstream of the diffuser (as a control), and (3) downstream of the both the diffuser, and the mouth of Mill Creek (another control). This downstream location can detect total CFFF contaminants from the diffuser and onsite contamination of Mill Creek. Samples were taken from combined total of 27 bluegill and/or sunfish from each site; these species were selected because they are insectivores and more susceptible to uranium bioaccumulation. The SCDHEC found (1) no evidence of uranium; (2) that fluoride signals at the diffuser were not statistically different than at the control sites; and (3) that neither uranium

nor fluoride were contaminants of concern for bluegills and sunfish. The SCDHEC website states these findings do not warrant additional fish tissue sampling and evaluation beyond the annual study, unless annual testing presents new information (SCDHEC Undated-TN7138). Although the WEC does not collect any biota samples from onsite surface water bodies, such as Sunset Lake or Mill Creek, there is also currently no public access to those water bodies for fishing or recreation.

3.5.2.3 *Terrestrial and Aquatic Ecology Impact Conclusions*

Any radiological materials potentially released from the CFFF into the environment would be transported through terrestrial or aquatic habitat or wildlife in a variety of ways and could result in biota exposure and public exposure through the food chain. The NRC's radiation protection regulations, by protecting members of the public, also protect nonhuman biota (NRC 2004-TN6431, NRC 2006-TN6430, NRC 2008-TN6432, NRC 2005-TN6649, NRC 2005-TN6650, NRC 2009-TN6651). See Section 3.12 of this EIS for further discussion of the potential for public exposure from radiological materials through both internal and external exposure pathways.

In conclusion, no significant impacts on aquatic or terrestrial resources are expected from the proposed action. This includes impacts related to the discharge of permissible levels of treated wastewater directly into the Congaree River, as well as the recently identified onsite contamination. These impacts are being further investigated by the WEC's Phase II RIWP (WEC 2020-TN6707) under the CA with the SCDHEC. Mitigation responses, if needed, would also be under the governance of the CA with the SCDHEC.

Given that habitat disturbances during operations would be negligible, any disturbed wildlife could find similar habitat in the vicinity, and direct and indirect impacts on aquatic habitats and biota would be minimal, the NRC staff concludes that impacts on ecological resources during the proposed continued operations of the CFFF for an additional 40 years would be SMALL. Based on these minor impacts, the SMALL incremental impact contribution to ecological resources from the proposed action would not result in a collectively significant impact (Section 3.19 for additional information).

3.5.2.4 *Terrestrial and Aquatic Ecology Mitigation Measures*

The proposed action would result in SMALL impacts on terrestrial resources because (1) the WEC is not proposing any new construction that would disturb terrestrial habitats; (2) although new groundwater monitoring wells will be drilled, the construction is temporary and only causes minimal land disturbance; and (3) wildlife is habituated to daily operating noises because the CFFF has been in operation for decades. No additional mitigation measures beyond those described in Section 3.4.3 are identified for terrestrial species.

Similarly, the proposed action would result in SMALL impacts on aquatic resources because discharges to the Congaree River are anticipated to be implemented in accordance with the NPDES permit; there is a low potential for significant contamination to move offsite via a surface water pathway and noticeably degrade water quality in Mill Creek; the WEC has established remediation procedures for detecting groundwater contamination above the MCLs, discovering a past release through soil sampling (WEC 2020-TN6853), and preventing migration of contaminants offsite. No additional mitigation measures beyond those described in Sections 3.3.3 and 3.4.3 are identified for aquatic species.

3.6 Protected Species and Habitat

This section discusses the impacts of the proposed action to renew the CFFF license for an additional 40 years on ecological resources protected under the Federal Endangered Species Act (ESA) of 1973, the Migratory Bird Treaty Act of 1918 (MBTA; 16 U.S.C. § 703 *et seq.*; TN3331), and the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. § 668-668d *et seq.*; TN1447), all as amended. Impacts on State-listed species are also included.

Section 7 of the ESA requires Federal agencies to consult with the FWS or the NMFS regarding actions that may affect listed species or designated critical habitats. Chapter 1 and Appendix A describe the Section 7 ESA consultations that led both the FWS and NMFS to conclude that the proposed action is not likely to adversely affect listed species or critical habitats under either Service’s jurisdiction.

3.6.1 State-Listed Species

Table 3-3 identifies the State-listed species that have the potential to exist on and near the CFFF site. The NRC staff compiled this table from the SCDNR’s Heritage Trust Database (SCDNR 2014-TN6994), input from SCDNR staff (SCDNR 2021-TN7140), and ecological studies conducted on and near the CFFF site (WEC 2019-TN6510). The last ecological surveys at the CFFF site were conducted in 1975. Based on those surveys, the WEC (2019-TN6510) concluded that the southern bald eagle (*Haliaeetus leucocephalus*) and the red-cockaded woodpecker (*Dendrocopus borealis*) may occur on or near the CFFF site (WEC 2019-TN6510).

Table 3-3 State-Listed Species with the Potential to Occur in the Vicinity of the CFFF Site

Common Name	Scientific Name	State Status ^(a)	Habitat
pine brens treefrog	<i>Hyla andersonii</i>	T	Occurs in South Carolina in herb shrub bogs (a.k.a., shrub pocosins) in the sandhills. Colonies are known to exist along power lines and gas line right-of ways (SCDNR 2006-TN6898)
bald eagle	<i>Haliaeetus leucocephalus</i>	T	Occurs in large trees with open views for nesting. Prefers perch and roost sites with minimal disturbance and fresh and brackish marine habitats suitable for foraging (SCDNR 2020-TN6897)
red-cockaded woodpecker ^(b)	<i>Picoides borealis</i>	E	Occurs in mature pine forests; excavates cavities in living pine trees (SCDNR 2006-TN6899)
Rafinesque’s big-eared bat	<i>Corynorhinus rafinesquii</i>	E	Occurs in coastal plain habitat; roosts in dilapidated buildings or tree cavities near water (SCDNR 2006-TN6896)
spotted turtle ^(c)	<i>Clemmys guttata</i>	T	Occurs in shallow bodies of water with a soft bottom and aquatic vegetation, such as small marshes, marshy pastures, bogs, fens, woodland streams, swamps, small ponds, vernal pools, and lake margins
Carolina gopher frog ^(c)	<i>Lithobates capito</i>	E	Occurs in riparian/riverine corridors, wetlands, wetland/upland mosaics in which wetland patches are separated by less than 1 km of upland habitat and upland habitats

Common Name	Scientific Name	State Status ^(a)	Habitat
Carolina pygmy sunfish ^(c)	<i>Elassoma boehlkei</i>	T	Occurs in shallow, quiet water (ponds, pools, streams, and roadside ditches, including tidal freshwater), with a soft detritus-rich substrate and abundant emergent and/or submerged aquatic vegetation
southern hognose snake ^(c)	<i>Heterodon simus</i>	T	Occurs in open, xeric habitats with well-drained, sandy or sandy-loam soils such as sand ridges, stabilized coastal sand dunes, pine flatwoods, mixed oak-pine woodlands and forests, scrub oak woods, and oak hammocks; also old fields and river floodplains
American wood stork ^(c)	<i>Mycteria americana</i>	T	Occurs in coastal areas, swamps, creeks, ponds, and other shallow waters suitable for wading (SCDNR Undated-TN7139)

(a) T = State threatened; E = State endangered.

(b) This species is also federally listed under the ESA.

(c) A recommendation from the SCDNR (SCDNR 2021-TN7140) with habitat descriptions from (NatureServe 2022-TN7141)

Source: NRC 2019-TN6472

3.6.2 Federally Protected Species and Habitats

The implementing regulations for Section 7(a)(2) of the ESA define “action area” as all areas affected “directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR 402.02; TN4312). The action area includes the 469 ha (1,151 ac) CFFF site, the surrounding area where operations noise can be audible to wildlife, and the area where runoff and effluent discharges drain (i.e., 3.2 km [2 mi] downstream of the discharge pipe in the Congaree River) (see Section 3.5.1).

Consideration is given to all direct and indirect effects of the proposed action, to species that migrate through the area, and to species that could colonize the area in the future. For instance, NMFS included Atlantic sturgeon in their determination because this species could recolonize the area in the future if downriver migration routes are established (i.e., via removal of dams or addition of fish passages).

The eight federally listed species that could potentially exist within the CFFF action area remain the same as those identified during development of the 2019 draft EA (NRC 2019-TN6472; Table 3-4). This species list was developed based on ecological surveys of the site, searches of State and Federal ecological databases and interactive maps, and NRC consultations with the FWS and NMFS (NRC 2019-TN6472; WEC 2019-TN6510; FWS 2017-TN5578; FWS 2019-TN6426; NRC 2018-TN5588). The NRC staff did not identify any candidate species, proposed species, or designated or proposed critical habitat within the action area (FWS 2017-TN5578).

Table 3-4 Federally Listed Species with Potential to Occur within the CFFF Action Area

Common Name	Scientific Name	Federal Status ^(a)	Habitat
red-cockaded woodpecker	<i>Picoides borealis</i>	E	Occurs in mature pine forests; excavates cavities in living pine trees.
wood stork	<i>Mycteria Americana</i>	T	Occurs in freshwater and estuarine wetlands; foraging habitat includes freshwater marshes, narrow tidal creeks, or flooded tidal pools.
shortnose sturgeon	<i>Acipenser brevirostrum</i>	E	Spawns in coastal rivers, and forages along riverbeds or other bottom habitats.
Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	E	Spawns in coastal river and resides in the Atlantic Ocean as juveniles and adults; CFFF is not within its critical habitat, but the species could colonize the area in the future if migration routes are restored.
Carolina heelsplitter	<i>Lasmigona decorate</i>	E	Occurs in cool, silt-free, well-oxygenated stream bottoms; pollution-intolerant and generally occur in areas with well-vegetated stream banks.
Canby's dropwort	<i>Oxypolis canbyi</i>	E	Occurs in coastal plain habitats, including natural ponds with a high proportion of pond cypress, Carolina bays dominated by grass-sedges, wet pine savannas, shallow pineland ponds, and cypress-pine swamps or sloughs.
rough-leaved loofstrife	<i>Lysimachia aperulaefolia</i>	E	Occurs in areas in between longleaf pine uplands and bogs of pond pines (pine pocosins) on moist to seasonally saturated sands and on shallow organic soils overlaying sand.
smooth coneflower	<i>Echinacea laevigata</i>	E	Occurs in magnesium- and calcium-rich soils in open woods, glades, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line right-of-ways.

(a) E = federally endangered; T = federally threatened.

Source: NRC 2019-TN6472

3.6.2.1 Federally Listed Species and Critical Habitats Under NMFS Jurisdiction

The shortnose sturgeon has been a listed endangered species since the enactment of the ESA in 1973. Construction of dams during the period of U.S. industrial growth; pollution of many large northeastern river systems; habitat alterations from discharges, dredging, or disposal of material into rivers; and development activities involving estuarine and riverine mudflats and marshes are the primary factors that have contributed to this species' decline (NOAA Fisheries 2021-TN6995).

Based on the available information, the NRC staff concluded that shortnose sturgeon likely occur within the CFFF action area. In its 2017 biological evaluation (NRC 2017-TN5603), the NRC staff evaluated the shortnose sturgeon and began the consultation process with NMFS. During the discussion of shortnose sturgeon, NMFS also recommended that the NRC consider impacts on the Atlantic sturgeon (NMFS 2018-TN5588). Although Atlantic sturgeon are not currently present in the Congaree River, they could be within the next 40 years if downriver migratory routes are re-established (NMFS 2018-TN5588). The NRC staff hereby incorporates by reference its 2017 biological evaluation into this EIS.

See Section 1.5.1.2 of this EIS and Appendix A for a list of documents related to the NRC's ESA consultation with NMFS about shortnose and Atlantic sturgeon. To summarize, the NRC staff requested informal consultation in 2017 with NMFS during the development of the 2018 EA and finding of no significant impact (FONSI) (NRC 2017-TN5603). After several information exchanges with the NRC staff to understand potential impacts of uranium, ammonia, and fluoride, on April 12, 2018, in their biological opinion NMFS concurred with the NRC staff's determination that the proposed action is not likely to adversely affect shortnose, Atlantic sturgeon, and their critical habitats (NRC 2018-TN5588). Regarding uranium, NMFS noted that "sturgeon may be harmed by eating prey that contains high levels of uranium; however, this effect is insignificant because uranium concentrations in sediment samples near the site are below average U.S. soil levels, water concentrations are below drinking water standards, and because fish tissue samples yielded no uranium (NRC 2018-TN5588)." Regarding ammonia and fluoride, NMFS stated that the discharges are below the levels in their permit and also below levels found in research studies that could inhibit growth or cause mortality of sturgeons (NRC 2018-TN5588). NMFS also addressed potential concerns about low dissolved oxygen and determined that the permit requires that the effluent does not fall below South Carolina standards and the dissolved oxygen levels near the site are protective of sturgeon survival and growth for all stages (NRC 2018-TN5588).

The NRC staff requested that NMFS re-concur on its determination in light of the new information contained in the October 2019 draft EA (NRC 2019-TN6419). The NMFS confirmed its position that its previous concurrence remained valid, and that reinitiation of consultation was not required. The NRC staff has identified no information related to the proposed action during the preparation of this EIS that would require the NRC to reinitiate consultation with NMFS.

3.6.2.2 Federally Listed Species and Critical Habitats Under FWS Jurisdiction

In its license renewal application, the WEC is not proposing to construct any new sites on undisturbed grounds. Therefore, the NRC staff concluded that potential impacts on federally listed species or critical habitats would be similar to those determined during the 2006 license renewal review, in which the FWS determined that the action would not result in adverse effects (FWS 2006-TN6427).

In summary, the NRC requested concurrence of FWS on their not likely to adversely affect determination on May 12, 2015 (NRC 2015-TN5594). On May 20, 2015, the FWS agreed with the NRC staff's rationale and provided its concurrence that the proposed 40-year license renewal is not likely to adversely affect federally listed species under its jurisdiction (FWS 2015-TN5579). On June 25, 2019, the NRC staff informed the FWS that new contamination leaks had been identified in 2018 and that new groundwater wells would be drilled onsite to better monitor contamination (NRC 2019-TN6473). Both the NRC and FWS agreed that these new groundwater wells would only cause minimal land disturbances, and the FWS confirmed its previous not likely to adversely affect determination remained valid (NRC 2019-TN6473; FWS 2019-TN6429). After reviewing the October 2019 draft EA, the FWS again confirmed that the proposed action is not likely to adversely affect federally listed species under its jurisdiction (FWS 2019-TN6426). See Section 1.5.1.2 of this EIS and Appendix A for a list of documents related to the NRC's ESA consultation with FWS. The NRC staff has identified no information related to the proposed action during the preparation of this EIS that would require the NRC to reinitiate consultation with the FWS.

3.6.3 Migratory Birds

The MBTA protects a total of 1,007 migratory bird species (75 FR 9282-TN5498). The FWS (2017-TN5578) identified 22 species under the MBTA that may occur in or near the action area and the SCDNR (SCDNR 2021-TN7140) recommended an additional 25 species (Table 3-5). The FWS administers the MBTA to prevent the take, harassment, harm, or collection of migratory birds and/or their eggs and nests (see 50 CFR 10.12; TN5490). The CFFF site includes grasslands, forests, and wetlands that provide habitat for important life history functions of migratory birds (NRC 2019-TN6472). Near the site, migratory birds rely on riparian, forested, grassland, and wetlands areas for foraging, resting, and avoiding predators. Some species also breed near the site.

The WEC actively participates in efforts to protect and enhance the habitat of migratory birds on and near the CFFF site. For instance, in 2019, the WEC (2019-TN7032) partnered with the South Carolina Wildlife Federation to create and install 25 prothonotary warbler (*Protonotaria citrea*) nesting boxes on the CFFF property. Because the WEC is not proposing to construct on any undisturbed areas, the NRC staff concludes that potential impacts on migratory birds would be similar to those experienced throughout the operation of the CFFF site, which have not been significant.

Table 3-5 Migratory Birds That May Occur Near the CFFF Site

Common Name	Scientific Name	Occurrence in Project Area
Acadian flycatcher ^(a)	<i>Empidonax vireescens</i>	Breeding
American bittern	<i>Botaurus lentiginosus</i>	Wintering
American Kestrel	<i>Falco sparverius Paulus</i>	Year-round
anhinga ^(a)	<i>Anhinga Anhinga</i>	Breeding
Bachman's sparrow	<i>Aimophila aestivalis</i>	Year-round
bald eagle	<i>Haliaeetus leucocephalus</i>	Year-round
Baltimore oriole ^(a)	<i>Icterus galbula</i>	Migrating
barn owl ^(a)	<i>Tyto alba</i>	Year-round
black-and-white warbler ^(a)	<i>Mniotilta varia</i>	Migrating
black-throated blue warbler ^(a)	<i>Setophaga caerulescens</i>	Migrating
blue grosbeak ^(a)	<i>Passerina caerulea</i>	Breeding
blue-winged warbler ^(a)	<i>Vermivora cyanoptera</i>	Migrating
brown-headed nuthatch	<i>Sitta pusilla</i>	Year-round
brown thrasher ^(a)	<i>Toxostoma rufum</i>	Year-round
Carolina chickadee ^(a)	<i>Poecile carolinensis</i>	Year-round
Carolina wren ^(a)	<i>Thryothorus ludovicianus</i>	Year-round
Chestnut-sided warbler ^(a)	<i>Setophaga pensylvanica</i>	Migrating
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>	Breeding
great blue heron ^(a)	<i>Ardea herodias</i>	Year-round
great egret ^(a)	<i>Ardea alba</i>	Breeding
fox sparrow	<i>Passerella iliaca</i>	Wintering
Kentucky warbler	<i>Oporornis formosus</i>	Breeding
least bittern	<i>Ixobrychus exilis</i>	Breeding
loggerhead shrike	<i>Lanius ludovicianus</i>	Year-round

Common Name	Scientific Name	Occurrence in Project Area
Mississippi kite	<i>Ictinia mississippiensis</i>	Breeding
painted bunting	<i>Passerina ciris</i>	Breeding
peregrine falcon	<i>Falco peregrinus</i>	Wintering
pileated woodpecker ^(a)	<i>Dryocopus pileatus</i>	Year-round
pine warbler ^(a)	<i>Setophaga pinus</i>	Year-round
prairie warbler	<i>Dendroica discolor</i>	Breeding
prothonotary warbler	<i>Protonotaria citrea</i>	Breeding
red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	Year-round
red-shouldered hawk ^(a)	<i>Buteo lineatus</i>	Year-round
rusty blackbird	<i>Euphagus carolinus</i>	Wintering
scarlet tanager ^(a)	<i>Piranga olivacea</i>	Migrating
sedge wren	<i>Cistothorus platensis</i>	Migrating
short-eared owl	<i>Asio flammeus</i>	Wintering
snowy egret ^(a)	<i>Egretta thula</i>	Year-round
summer tanager ^(a)	<i>Piranga rubra</i>	Breeding
Swainson's warbler	<i>Limnothlypis swainsonii</i>	Breeding
white-eyed vireo ^(a)	<i>Vireo griseus</i>	Migrating
wood thrush	<i>Hylocichla mustelina</i>	Breeding
worm eating warbler	<i>Helmitheros vermivorum</i>	Breeding
yellow-billed cuckoo ^(a)	<i>Coccyzus americanus</i>	Breeding
yellow-breasted chat ^(a)	<i>Icteria virens</i>	Breeding
yellow-throated vireo ^(a)	<i>Vireo flavifrons</i>	Breeding
yellow-throated warbler ^(a)	<i>Setophaga dominica</i>	Breeding

Sources: NRC 2019-TN6472 (without (a)) as recommended by the FWS or (a) Recommended by the SCDNR (2021-TN7140) and occurrence from (Cornell 2022-TN7142) or (Audubon 2022-TN7143)

3.6.4 Bald Eagles

The take of bald eagles is prohibited under both the MBTA and the Bald and Golden Eagle Protection Act of 1940, as amended (50 CFR Part 22-TN6580). The Bald and Golden Eagle Protection Act prohibits anyone from taking or disturbing bald eagles or golden eagles (*Aquila chrysaetos*), including their nests or eggs, without an FWS-issued permit. The bald eagle is also a State-listed threatened species. The WEC concluded that bald eagles could occur on the site based on ecological surveys from the 1970s and because suitable habitat for the bald eagle occurs within the CFFF site, but no bald eagles have been observed on the site (FWS 2017-TN5578; WEC 2019-TN6510). Therefore, the NRC staff concludes that potential impacts would not be significant.

3.6.5 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSA), as amended, requires Federal agencies to consult with NMFS on actions that may adversely affect essential fish habitat. There is no essential fish habitat near the CFFF site for marine and anadromous fishes that are federally managed by NMFS and the regional fishery management

councils based on evaluation of NMFS's online Essential Fish Habitat Mapper; therefore, no consultation with NMFS is necessary (NRC 2017-TN5606, NRC 2019-TN6472).

3.6.6 Protected Species and Habitat Impacts

3.6.6.1 Section 7 ESA Consultation Findings

Eight federally listed species may occur near the CFFF site (see Section 3.6.2 of this EIS). Six of the species are under FWS's jurisdiction. On May 12, 2015, the NRC staff sent a letter to the FWS describing the proposed action and requested FWS's concurrence with the NRC staff's determination that impacts on federally listed species resulting from the proposed action site were unlikely (NRC 2015-TN5594). In a letter dated May 20, 2015, the FWS concurred with the NRC staff's determination that the proposed activity is not likely to adversely affect federally listed species under FWS's jurisdiction (FWS 2015-TN5579).

On June 25, 2019, the NRC staff informed FWS of the additional site investigation activities (NRC 2019-TN6473), including installation of groundwater wells, and stated that those activities were short-term and involved minimal land disturbance. The NRC staff also confirmed that the list of species remained the same (see Table 3-4). The FWS responded that they had no objections to the NRC staff's finding on June 27, 2019 (FWS 2019-TN6429). After the NRC's issuance of the 2019 draft EA, the NRC transmitted a copy of the draft EA to the FWS on October 28, 2019 (NRC 2019-TN6424).

In correspondence dated October 29, 2019, the FWS confirmed that its previous not likely to adversely affect determination still applies to the proposed action (FWS 2019-TN6426). The FWS also requested that they be notified if any new information becomes available regarding adverse impacts on listed species or critical habitat (FWS 2019-TN6426). The impacts on all terrestrial species and habitats, including ESA-listed species under FWS jurisdiction, for this EIS remain the same as previously disclosed to the FWS in the 2019 draft EA (see Section 3.6.2 of this EIS).

On July 31, 2020, the NRC staff notified the FWS of the NRC's intent to prepare an EIS for the WEC's LRA and invited them to participate in the scoping process (NRC 2020-TN6556).

Two of the federally listed species—the shortnose and Atlantic sturgeon—are under NMFS jurisdiction. On August 16, 2017, the NRC staff submitted a biological evaluation to the Southeast Regional Office of NMFS (NRC 2017-TN5603). In its evaluation, the NRC staff determined that the potential impacts would be insignificant and therefore concluded that the proposed action may affect, but is not likely to adversely affect, the shortnose sturgeon. The NMFS (2017-TN5577, NMFS 2017-TN5589) submitted several questions to the NRC staff concerning the WEC's LRA and its potential impacts on the shortnose sturgeon after their review of the NRC evaluation, and the NRC staff provided NMFS with the supplemental information it requested (NRC 2018-TN5730, NRC 2017-TN5606, NRC 2017-TN5605, NRC 2017-TN5611). Included in the NRC staff's responses was the NRC staff's no effect determination for the Atlantic sturgeon because this species and its critical habitat do not occur in the CFFF action area (NRC 2017-TN5611). The NMFS concurred on April 12, 2018 (NMFS 2018-TN5588) that the proposed action was not likely to adversely affect Atlantic sturgeon.

On July 10, 2019, the NRC staff informed NMFS of the WEC's additional site investigation activities under the CA with the SCDHEC (NRC 2019-TN6419). The NMFS confirmed that its previous determination remained valid, and that reinitiation of consultation was not required.

On July 31, 2020, the NRC staff notified the NMFS of the NRC's intent to prepare an EIS for the WEC's LRA and invited them to participate in the scoping process (NRC 2020-TN6520).

This final EIS analyzes the impacts on all aquatic species in Section 3.5.2.2, which includes ESA-listed sturgeons. In summary, there are no new adverse impacts to report in this EIS because (1) impacts from wastewater discharges into the Congaree River remain low and are conducted in accordance with NPDES permit standards (2) contamination in onsite surface water bodies (e.g., Sunset Lake) is being addressed by the WEC under the CA with the SCDHEC; and (3) the NRC staff expects that there is a low potential for significant contamination to move offsite via a surface water pathway and noticeably degrade water quality in Mill Creek downstream from the CFFF site boundary (see Section 3.3.2.3).

Furthermore, as discussed in Section 3.5.2.2, the SCDHEC conducted additional fish tissue sampling in August 2019 due to concerns with CFFF contaminants entering the Congaree River. and found (1) no evidence of uranium; (2) that fluoride signals at the diffuser were not statistically different than the control sites; and (3) neither uranium nor fluoride were contaminants of concern for bluegills and sunfish. No additional fish tissue evaluation was planned due to the results of this study (beyond the usual one per year), but the decision will be re-visited if new information prompts renewed concern (SCDHEC Undated-TN7138). Because shortnose sturgeon also primarily consume invertebrates (NOAA Fisheries 2021-TN6995) and discharges of uranium are regulated, there are no new uranium concerns.

3.6.6.2 Protected Species and Habitats Mitigation Measures

Section 3.5.2.3 of this EIS also describes why no additional mitigation measures are identified beyond those described in Sections 3.3.3 and 3.4.3 for all terrestrial and aquatic ecology resources, respectively, including protected species. For terrestrial species, only minor and temporary land disturbances will be caused by the new groundwater monitoring wells, and wildlife is habituated to CFFF's noises. For aquatic species, discharges into the Congaree River are within NPDES limits, and onsite surface water contamination is being further investigated and subject to potential mitigation by the WEC via their CA with the SCDHEC and associated CSM, RIWP, and remediation procedure with the WEC.

3.7 Climatology, Meteorology, and Air Quality

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts on air quality of the proposed action.

3.7.1 Climatology and Meteorology

An overall summary of the climatological data for Richland County is provided in the March 2019 ER (WEC 2019-TN6510). Meteorological data from the National Weather Service station at Columbia Metropolitan Airport, located 19 km (12 mi) west-northwest of the site, were used to characterize the site in the WEC's ER (WEC 2019-TN6510). Richland County has a humid subtropical climate, characterized by moderate rainfall, high relative humidity, and moderate winds. The county experiences four distinct seasons—Spring, Summer, Autumn, and Winter—because of its mid-latitude location. The average annual mean temperature is 19.3°C (66.7°F); mild winters and freezing temperatures ($\leq 0^{\circ}\text{C}$ [32°F]) occur 77 days per year from November through March. Richland County experiences severe weather events such as thunderstorms, hail, and floods and occasional tornadoes. Winter precipitation, such as snow and freezing rain, occurs one to three times per year from November through March.

3.7.1.1 Temperature

Annual average temperatures for the period of 1950 to 2019 ranged from a minimum of 16.1°C (60.9°F) during 1966 to a maximum of 18.6°C (65.5°F) during 1990. Table 3-6 shows the monthly average temperatures during the period from 1950 to 2019. The average monthly temperature is highest during July (27.1°C [80.8°F]) and lowest during January (6.9°C [44.4°F]) (NOAA NCEI 2021-TN6903). The highest maximum temperature of 45°C (113°F) was observed in Richland County on June 29, 2012, and the lowest minimum temperature of -20°C (-5°F) during January 16, 1994 (WEC 2019-TN6510).

Table 3-6 Average Temperature and Precipitation by Month for Richland County, South Carolina for the Period of 1950–2019 (Source: NOAA NCEI 2021-TN6903)

Average Temperature (°C [°F])												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
6.9	8.7	12.5	17.2	21.6	25.4	27.1	26.4	23.3	17.5	12.1	8.1	17.2
[44.4]	[47.7]	[54.4]	[63.0]	[70.9]	[77.6]	[80.7]	[79.5]	[74.0]	[63.5]	[53.8]	[46.7]	[63.0]
Average Precipitation (cm [in.])												
9.7	9.0	10.6	7.9	8.6	11.4	12.5	12.1	9.7	7.8	6.9	8.9	115.1
[3.8]	[3.6]	[4.2]	[3.1]	[3.4]	[4.5]	[4.9]	[4.8]	[3.8]	[3.1]	[2.7]	[3.5]	[45.3]

3.7.1.2 Precipitation

Precipitation occurs in the Richland County area in the form of rain, snow, sleet, and occasional instances of hail. The average annual rainfall was 115.1 cm (45.3 in.) for the period from 1950 to 2019 (NOAA NCEI 2021-TN6902). Annual rainfall was recorded as 161.3 cm (63.5 in.) in 1959, 171.8 cm (67.6 in.) in 1964, and 161.2 cm (63.5 in.) in 2015. The lowest annual rainfall was recorded as 66.7 cm (26.3 in.) in 1954. The highest daily rainfall was recorded as 21.2 cm (8.4 in.) at the Columbia Owens airport in 2014. The average monthly precipitation is shown in Table 3-6 for the period of 1950–2019.

Richland County experienced an average annual snowfall of 3 cm (1.2 in.) between 1948–2002; the maximum daily snowfall was recorded as 41 cm (16 in.) in February 1973 during this period. Detailed information about the winter precipitation is provided in the ER (WEC 2019-TN6510).

3.7.1.3 Winds

Due to the influence of the Appalachian Mountains, winds are predominantly from the southwest, but change seasonally; winds are from the northeast in fall and winter. Average wind speeds ranges from 2.4 m/s (5.4 mph) to 3.5 m/s (7.8 mph), and higher average winds occur from November to April. Figure 3-19 shows a windrose diagram at the Columbia Metropolitan airport.

3.7.1.4 Severe Weather

Severe weather in Richland County occurs mostly as thunderstorms, commonly occurring during summer months. A total of 615 thunderstorm wind events (wind gusts ≥50 knots) occurred during the period from 1955 to 2019; 54% of them occurred during June and July (NOAA NCEI 2021-TN6908). A total of 3.4 million dollars was estimated for property damage related to thunderstorm events along with 3 deaths and 11 injuries. The highest number of events (19 days) was observed during 2011 with property damage totaling 1.2 million dollars.

Only 15 high wind events were recorded with wind gusts ≥ 70 knots. About 95% of the thunderstorm wind events were recorded with wind gusts below 61 knots. Nineteen events with lightning occurred during thunderstorms, which resulted in 9 injuries and 3.8 million dollars of property damage. Hail, with a diameter ≥ 2.5 cm (1 in.), occurred 112 times from 1959 to 2019 with no reported death or injury.

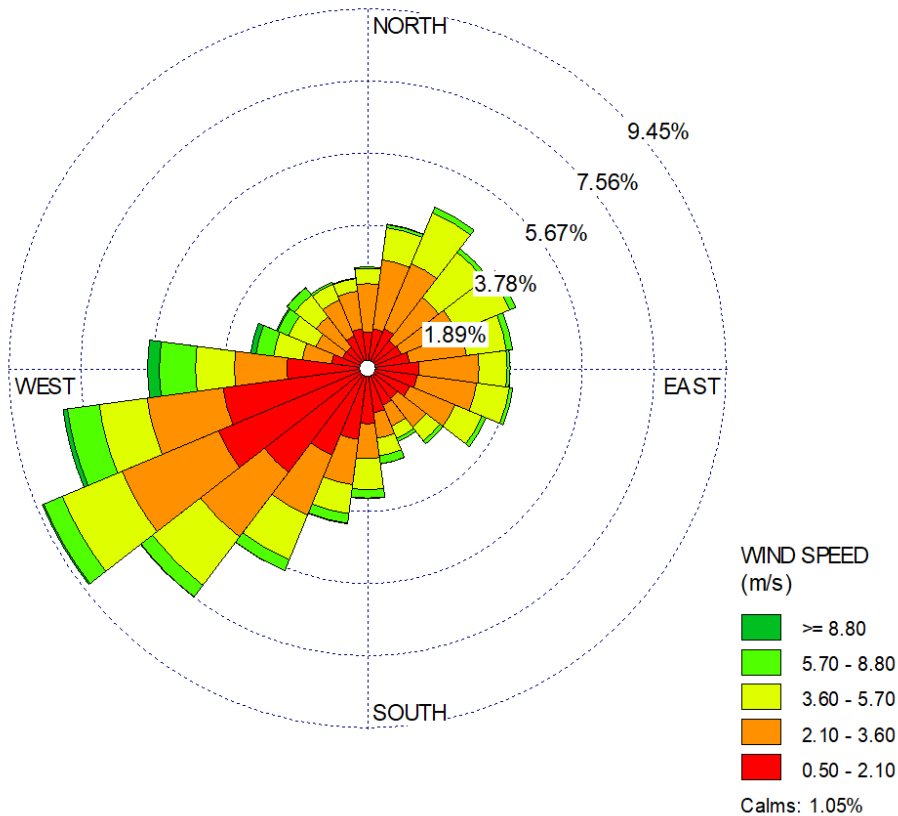


Figure 3-19 Windrose Diagram at Columbia Metropolitan Airport during the Period of 2012–2016 (Source: SCDHEC 2021-TN6909)

South Carolina ranks twenty-third in the United States for annual tornado frequency and experienced an average of about 24 tornadoes each year between 2000 and 2014 (Runkle et al. 2017-TN6689). A total of 38 tornadoes occurred in Richland County between 1950 and 2019, causing 1 death, 20 injuries, and overall property damage of 12 million dollars (NOAA NCEI 2021-TN6906). Tornadoes are rated on a Fujita (F) or Enhanced Fujita (EF) scale in the United States based on their intensity and wind speed. The weakest tornado has a scale of EF0 (or F0) while a strongest tornado is scaled with an EF5 (or F5) grading. Sixteen of the tornadoes that occurred in Richland County had a tornado rating of EF0 (105 to 137 km/hr [65 to 85 mph]) or F0 (<117 km/hr [73 mph]) for light damage potential, and fifteen of the tornado events were rated as EF1 (138 to 177 km/hr [86 to 110 mph]) or F1 (117 to 180 [73 to 112 mph]). Seven tornadoes were rated as F2 (182 to 253 [113 to 157 mph]), which can cause considerable damage.

Hurricanes commonly occur off the coast in the Atlantic Ocean, but hurricane-force winds typically dissipate before reaching the inland location of the site, becoming tropical storms. Hurricanes affect South Carolina at a rate of approximately one every 2 years. Most affect only

the coastal areas. Those that do come inland decrease in intensity by the time they reach the Columbia area, becoming tropical storms. In the period from 1851 to 2020, only 43 tropical cyclones have made landfall on the South Carolina coast (25 hurricanes, 18 tropical/subtropical storms).

In 1999, Hurricane Floyd made landfall near Cape Fear, North Carolina, causing mandatory coastal evacuations for South Carolina residents and more than 38 cm (15 in.) of rain in Horry County; it resulted in a one-month flooding of the Waccamaw River in and around the city of Conway, South Carolina.

On September 21, 1989, Hurricane Hugo, a Category 4 level hurricane, moved inland into Central South Carolina from the east causing severe damage. Hurricane Hugo maintained high-force winds inland with highest wind gusts of 70 mph at Columbia Metropolitan airport and 109 mph at Sumter, South Carolina. The hurricane caused 26 deaths, and directly and indirect storm damage to coastal and inland property exceeded six billion dollars (PNNL 2008-TN7159). Since 1955, Richland County has experienced seven tropical storms and seven hurricanes causing four fatalities and eleven injuries (SCSCO 2021-TN7160). There were 81 days of flash flood events in Richland County from 1950 to 2019, which resulted in 9 deaths, 30 injuries, and total property damage of 30.5 million dollars (NOAA NCEI 2021-TN6907). An historic flooding event occurred over a 4-day period in October 2015; it accounted for about 28 million dollars of property damage in Richland County and the maximum damage occurred in Woodland Terrace and Myron Manor (NOAA NCEI 2021-TN6907).

During the October 2015 flooding event, Columbia received a total of 31.5 cm (12.4 in.) of rain, which caused flooding of low-lying areas near the site. Roads to the CFFF were closed, and the city water supply was interrupted, leading to a 3-day closure of the CFFF. The main manufacturing building was not affected by the flood, and the WEC determined that there were no safety issues caused by the flooding (WEC 2019-TN6510).

Table 3-7 summarizes the severe weather events discussed above.

Table 3-7 Summary of Severe Weather Events in Richland County (Sources: NOAA NCEI 2021-TN6908, NOAA NCEI 2021-TN6907, NOAA NCEI 2021-TN6906)

Severe Weather Events	Date Range	Events	Injuries	Deaths
Tornadoes	1950-2019	38	20	1
Thunderstorm winds	1955-2019	615	11	3
Hail (diameter ≥ 2.5 cm [1 in.])	1959-2019	112	--	--
Flash flood	1950-2019	157	30	9

3.7.1.5 Atmospheric Dispersion

Onsite meteorological data for the period of August 1, 1972, through July 31, 1973, were used to generate the joint frequency distribution (JFD) for wind speed, wind direction, and atmosphere stability and reported in the March 2019 ER (WEC 2019-TN6510). The March 2019 ER report indicates that the atmospheric stability classifications using this data set with stable conditions 47% of the time, neutral conditions 43%, and unstable conditions only 10% of the time (WEC 2019-TN6510). The stable and neutral atmospheric conditions at the site could be conducive to buildup of pollutant concentrations.

The atmospheric dispersion factors (χ/Q) were estimated annually at downwind distances up to 80 km (50 mi) in 16 compass directions at the 15 m (50 ft) level using the JFD data set, as provided in Table 3.6-5 of the March 2019 ER (WEC 2019-TN6510). These factors were calculated using the Gaussian plume model and diffusion coefficients based on Pasquill-Gilford stability classification along with building wake effects for turbulence. Because the CFFF effluent discharge points are generally lower than 2.5 times the height of adjacent solid structures, the discharge was conservatively assumed to occur at ground level. The annual average χ/Q was computed as 7.67×10^{-6} s/m³ at the nearest residence (1,000 m [3,300 ft] northeast) and as 1.54×10^{-5} s/m³ at the nearest site boundary (550 m [1,800 ft] north-northwest) (WEC 2019-TN6510; NRC 1985-TN5602).

Additional χ/Q values were generated for the year of 1990 using the XOQDOQ model (NUREG/CR-2919; Sagendorf et al. 1982-TN280) with input of STAR meteorological data at the Columbia Metropolitan Station. The ranges of the χ/Q values for 1990 were similar to those provided by the WEC in the ER (WEC 2019-TN6510) that were based on 1972–1973 meteorological data. The maximum annual average χ/Q value during 1990 was 1.7×10^{-5} s/m³ at 800 m (2,625 ft) in the northeast direction. Figure 3-20 shows the distribution of these χ/Q values along different directions and downwind distances. These XOQDOQ-simulated χ/Q data during 1990 were used for dose assessment, as shown in Section 3.12 of this EIS.

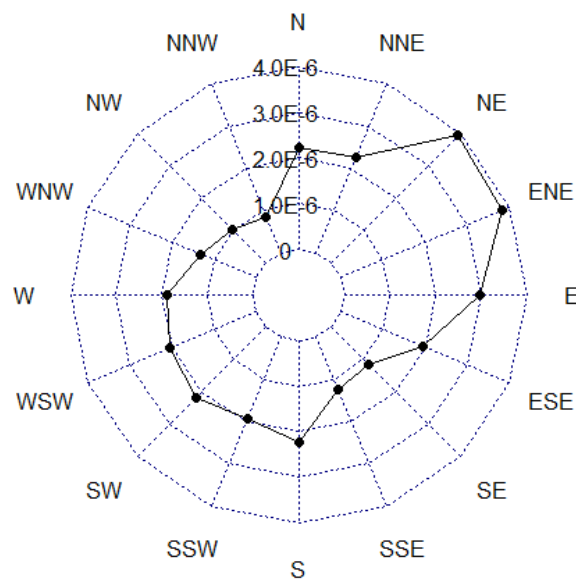


Figure 3-20 Radar Plot of χ/Q Values at 1 Mile from the Site Boundary

3.7.1.6 Climate Change

Temperature and precipitation are two parameters that can be used to characterize climate change. Average annual temperatures increased by 1.0°C (1.8°F) for the contiguous United States over the time period 1901 to 2016, and temperatures are expected to continue to rise (GCRP 2017-TN5848). Average temperature for South Carolina increased about 0.56°C (1°F) since the beginning of the 20th century (Runkle et al. 2022-TN7161). Columbia experienced an annual average of 3.5 days per year with temperatures exceeding 38°C (100°F) during the time period of 1991–2020, compared to an average of 2.4 days per year during time period of 1961–1990. More warming is projected by 2100, based on a high emissions scenario, with hottest years being about 8 to 12°F warmer than hottest historical years (Runkle et al. 2022-TN7161).

There is no overall trend for precipitation in South Carolina since the beginning of the 20th century. Between 2000 and 2020, 15 years have been characterized by warm season drought conditions in South Carolina (Runkle et al. 2022-TN7161). The state has experienced several disaster events including severe storms, tornado outbreaks, hurricanes, and droughts that resulted in billion-dollar damage. An increase in the number of Category 4 and 5 hurricanes is projected by the end of this century (Runkle et al. 2022-TN7161). Sea levels have risen by 3.3 cm (1.3 in.) per decade at Charleston since 1921, which is double the global rise in sea level (1.8 cm [0.7 in.] per decade). Global sea level is forecasted to rise another 0.3 to 1.2 m (1 to 4 ft) by 2100. For these reasons, greater rises in sea level along the South Carolina coastline are possible (Runkle et al. 2022-TN7161).

The 2018 Fourth National Climate Assessment (GCRP 2018-TN5847) also noted increasing daily average temperature and precipitation in the U.S. Southeast. This report highlighted the greater risks of metropolitan cities to be affected by poor air quality, vector-borne diseases, extreme weather events, and damage to infrastructure due to climate change. Extreme rainfall events have increased in frequency and intensity in the Southeast and will continue to increase in the future. Natural resources, industry, the local economy, and the population of the region are at increasing risk to these extreme events (GCRP 2018-TN5847).

3.7.2 Air Quality Impacts

3.7.2.1 Affected Air Quality

Under the federal Clean Air Act (CAA) Amendments of 1990 (42 U.S.C. § 7401 *et seq.* Public Law 101-549, as amended; TN4539), the EPA established National Ambient Air Quality Standards (NAAQSs), which define the acceptable levels for six criteria pollutants: nitrogen oxides (NO_x), ozone (O₃), sulfur oxides, carbon monoxide, lead, particulate matter (PM) in the forms of coarse particles (PM₁₀) and fine particles (PM_{2.5}) (listed in Table 3-8). Compliance within a region is attained when pollutant concentration levels are lower than the established NAAQSs. EPA uses three designations to assess area:

- attainment, which means the area meets the standards;
- nonattainment, which means the area does not meet the standards; and
- unclassifiable, which means there are not enough data to classify the area under the new or revised standard.

Table 3-8 National Ambient Air Quality Standards for Criteria Pollutants (Source: 40 CFR Part 50-TN1089)

Pollutant	Averaging Time	NAAQS	
Carbon Monoxide (CO)	8 hours	9 ppm	
	1 hour	35 ppm	
Lead (Pb)	3 months	0.15 µg/m ³	
Nitrogen Dioxide (NO ₂)	1 hour	100 ppb	
	1 year	53 ppb	
Ozone (O ₃)	8 hours	0.070 ppm	
Particle Pollution (PM)	PM _{2.5}	1 year	12.0 µg/m ³
		24 hours	35 µg/m ³
	PM ₁₀	24 hours	150 µg/m ³
Sulfur Dioxide (SO ₂)	1 hour	75 ppb	

Currently, all of South Carolina, including Richland County, is in attainment for all criteria pollutants (40 CFR 81.341 [TN255]). Table 3-9 provides the annual total emissions of criteria pollutants in Richland County as estimated in the 2014 National Emission Inventory (EPA 2021-TN6996). The annual design values of ozone and nitrogen oxides at an air quality monitoring station in Columbia, South Carolina are provided in Table 3-10. These design values measured at the Sandhill Experimental Station in Columbia, South Carolina, are currently below the Federal standard limits for ozone and nitrogen dioxide.

Table 3-9 Annual Air Pollutant Emissions in Metric Tons for Richland County. (Source: EPA 2021-TN6996)

Pollutant	NH ₃	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC
Emissions (T/yr)	502	6,7524	13,069	6,101	2,758	10,111	34,234

Table 3-10 Annual Design Values for Ozone and Nitrogen Dioxide at Sandhill Experimental Station in Columbia, South Carolina. (Source: SCDHEC 2021-TN7033)

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
O ₃ (ppb)	75	71	73	73	69	64	62	65	64
NO ₂ (ppb)	40	40	40	40	38	37	35	38	38

Under the CAA, the EPA sets ambient air quality standards and limits on emissions from specific industrial sources. In South Carolina, the SCDHEC is authorized by the EPA to implement and enforce Federal air quality standards and ensure that facilities operate within their set emission limits. The SCDHEC regulates the operation and construction of new emission sources under the authority of CAA, South Carolina Pollution Control Act, and SC Regulation 61-62 Air Pollution Control Regulations and Standards (SCDHEC 2019-TN6997). The Federal standards at 40 CFR 60 and 40 CFR 63 are applicable to the CFFF (SCDHEC 2012-TN6778, SCDHEC 2019-TN6598, SCDHEC 2019-TN7177). SCDHEC ensures the WEC's compliance of these Federal regulations in addition to State regulations 61-62 (SCDHEC 2019-TN6997).

The SCDHEC Bureau of Air Quality updated the WEC's air operating permit for CFFF operations in June 2012, documenting that the CFFF is neither a "major" source nor a "synthetic minor" source of criteria pollutant emissions. The CFFF is classified as a minor-source operator by the State (WEC 2019-TN6510). The WEC's air operating permit addresses, in part, NAAQS criteria pollutants, toxic air pollutants, nitric acid, and opacity. The SCDHEC determines the WEC's operating permit limits based on the total heat or material input and opacity limits for the individual sources. The SCDHEC establishes monitoring, recordkeeping, and reporting requirements to maintain compliance, as part of the technical review. The 2012 permit expired in 2018 (SCDHEC 2012-TN6778) and the WEC submitted an application for renewal of the air operating permit and is awaiting approval from the SCDHEC (WEC 2019-TN6777). A draft 5-year air operating permit renewal underwent a 30-day public comment period ending on October 12, 2019 (SCDHEC 2019-TN6598, SCDHEC 2019-TN7177, SCDHEC 2019-TN7183).

3.7.2.2 Air Quality Impact of Proposed Action

Under the proposed action, there would be no significant changes in operations. The WEC is required to continue to comply with permit limits for criteria pollutants, toxic air pollutants, nitric acid, and opacity set by the SCDHEC. The CFFF is located within an attainment area for the

NAAQSs. The proposed action does not involve changes to equipment operations, workforce size, or truck shipments.

A construction permit application for the replacement of three existing boilers with two new natural gas-fired Cleaver Brooks boilers (each with 24.5 metric million British thermal units [MMBTU]/hr capacity) was submitted by the WEC on June 11, 2018 and approved by the SCDHEC BAQ (WEC 2019-TN6777). The WEC’s fabrication facility is classified as a minor source of air emissions under Title V of the Clean Air Act of 1970, as amended (42 U.S.C. 7651 et seq.) and is not subject to S.C. Regulation 61-62.5, Standard 7 - Prevention of Significant Deterioration (PSD) and S.C. Regulation 61.62.70 - Title V Operating permits. However, CFFF is required to quantify emissions and perform modeling in compliance with the South Carolina Standards No. 2 and No. 8. Table 3-11 shows estimates of total annual emissions of some of the major pollutants from the WEC facility as provided in the WEC’s air operating permit renewal application (WEC 2019-TN6777). Emission rates are calculated based on process throughputs because the permit does not require monitoring of any air pollutant. More details about the emission inventory and the estimation methods are provided in the air operating permit renewal application. The WEC reported emissions for criteria pollutants and toxic air pollutants and incorporated them into the draft air operating permit (SCDHEC 2019-TN7177, SCDHEC 2019-TN7183). The SCDHEC estimates are similar to those provided in Table 3-11 of this EIS and the WEC’s air operating permit renewal application (WEC 2019-TN6777). Additionally, the SCDHEC conducted source testing of emissions, including metals, hydrogen fluoride, nitric acid, hydrogen chloride, sulfuric acid, and nitrogen oxides, from the process scrubbers at the WEC during 2019 and the detailed emissions data are provided in the SCDHEC test reports (SCDHEC 2019-TN7163, SCDHEC 2019-TN7162). The measured emission rates from these two source tests were found to be lower than the modeled emission rates used by the SCDHEC for compliance evaluation.

Table 3-11 Annual Potential Emission Estimates for the WEC CFFF as Reported in Permit Renewal Application (Source: WEC 2019-TN6777)

Pollutant	PM ₁₀	SO ₂	CO	NO _x	VOC	CO ₂	HF	HNO ₃
Emissions (T/yr)	8.8	3	16	45	4.1	35087	0.3	2.6

Air dispersion modeling for the site was performed as part of these permit applications to demonstrate compliance with South Carolina Standard No. 2. Dispersion modeling showed that the modeled NO_x air concentration at the site boundary of 675 m (2,215 ft) even with the addition of background concentrations falls below the permissible limit of Standard No. 2, as indicated in Table 3-12 below. In addition, dispersion modeling of toxic air pollutants, including hydrogen fluoride, showed air concentrations below the permissible limits of Standard No. 8.

Table 3-12 Modeled NO_x Concentrations from the WEC CFFF as Provided in Permit Renewal Application (Source: WEC 2019-TN6777)

Pollutant	Averaging Period (µg/m ³)	Modeled Concentration (µg/m ³)	Background Concentration (µg/m ³)	Total Concentration (µg/m ³)	Allowable Concentration (µg/m ³)
NO _x	1-hour	86.8	69.6	156.4	188
	Annual	2.1	7.7	9.8	100

The stack emissions of nonradiological pollutants from the CFFF are insignificant as a contributor to local air pollution; the site contributors are two boilers, five calciners, one incinerator and five process scrubbers. The NO_x emissions only account for 0.34% of the total emissions in Richland County. The incremental impact of the stack emissions on the region is expected to be minimal. The SCDHEC provides potential-to-emit (PTE) limits in the draft air operating permit (SCDHEC 2019-TN7177, SCDHEC 2019-TN7183). The SCDHEC draft air permit requires the WEC to conduct source testing to verify that actual emission rates are below the PTE emissions. Additionally, the air dispersion modeling in the air operating permit renewal application confirmed that the modeled air concentrations from the proposed CFFF emissions are below the current air pollution standards in South Carolina. The SCDHEC is responsible for continually evaluating the WEC's compliance with the State and Federal air quality standards using engineering methods such as dispersion modeling and source emission testing.

The WEC's program includes 42 stacks as well as 4 onsite ambient environmental air stations monitored for the presence of radioactive material.

3.7.2.3 Greenhouse Gases

On September 22, 2009, the EPA issued a final rule requiring greenhouse gas (GHG) reporting for large GHG emission sources in the United States (40 CFR Part 98-TN2170). In general, the threshold for reporting is 25,000 tons (T) of carbon dioxide equivalent (CO₂ eq) emissions per year and/or an aggregate maximum heat input capacity greater than 30 MMBtu/hr. The WEC estimated GHG emissions of 35,507 CO₂eq in its air operating permit renewal application (WEC 2019-TN6777). However, in 2020 the CO₂eq emissions from the WEC boilers were calculated as 7,224 T/yr, based on the combustion of 112 million cubic feet (MCF) of natural gas and 4.13 million liters (1.09 million gallons) of diesel fuel used at the CFFF (WEC 2021-TN7048). The calculated 2020 emissions are much lower than the 25,000 T threshold, and for this reason the WEC currently is not required to report to EPA.

Under EPA's GHG Tailoring Rule the requirement to reduce GHG emissions only applies if the source exceeds limits for other criteria pollutants and is subject to PSD (EPA 2019-TN7051). The WEC is a minor source of criteria pollutants and therefore is not subject to PSD permitting (WEC 2019-TN6777). For these reasons, the requirement to reduce GHG by BACT for large emitting sources does not apply to the CFFF. The estimated GHG emissions at the WEC fabrication facility also fall below the 75,000 T/yr CO₂eq threshold in the GHG Tailoring Rule, which requires that only major sources of GHG implement the best available control technology (BACT) to reduce emissions.

Based on its review of the emission analyses conducted by the WEC and the SCDHEC, the NRC staff expects that the direct and indirect impacts on air quality from proposed continued operation of the CFFF for 40 additional years would be SMALL. The SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact (see Section 3.19 for additional information).

3.7.3 Mitigation Measures

The WEC monitors radiological gaseous emissions from 42 stacks. The stacks are outfitted with scrubbers, or high-efficiency particulate air (HEPA) filters, or both to minimize the discharge of gaseous effluents. Ambient air also is monitored at four onsite locations for the presence of radioactive material. The impacts on air quality can be further reduced by maintenance and best management practices relative to stacks and scrubbers (e.g., continuous monitoring and inspection of air flow, water flow, differential pressure and uranium buildup in scrubbers,

differential pressure monitoring and regular maintenance of HEPA filters, record keeping) through the proposed additional 40 years of operation. The WEC is also required to report any changes in the stack and scrubber configuration to the SCDHEC (SCDHEC 2019-TN7177, SCDHEC 2019-TN7183).

3.8 Noise

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts of noise caused by the proposed action.

3.8.1 Noise Guidelines

Exposure to loud noise damages nerve endings in the inner ear, causing permanent hearing loss. Occupational workers at manufacturing facilities, like the CFFF, are exposed to noise from various industrial machines and equipment. Members of the public may also be exposed to noise if they are located close to such facilities.

Noise to members of the public is regulated in the State of South Carolina by local or county government. There are no Federal regulations for public exposure to noise. Congress passed the Noise Control Act of 1972 (42 U.S.C. § 4901 *et seq.*; TN4294); however, in 1982 Federal noise control policy transferred the responsibility to State and local governments (EPA 2020-TN7070). Noise to workers is subject to threshold values from the National Institute for Occupational Safety and Health (NIOSH) under the Occupational Safety and Health Act of 1970 (Public Law 91-596; 29 U.S.C. § 651 *et seq.*; TN4453). The NIOSH's Recommended Exposure Limit for occupational noise exposure is 85 A-weighted decibels (a weighted measure used to approximate the noise response of the human ear), as an 8-hour time-weighted average using a 3-decibel exchange rate (CDC 2018-TN6998). The Occupational Safety and Health Administration (OSHA) permissible exposure limit states that a worker cannot be exposed to more than a 90-decibel (A-weighted) average for an 8-hour shift (29 CFR 1910.95 [TN654]).

Richland County, South Carolina, has promulgated noise standards in Section 18-3, "Noise," of its Code of Ordinances (Richland County 2019-TN6704). These standards deem it "... unlawful for any person to make, continue, or cause to be continued, any loud, excessive, unnecessary, or disturbing noise, or any noise which either annoys, disturbs, injures, or endangers the comfort, repose, health, peace or safety of others, within the limits of the unincorporated area of the county, except where the activity generating the noise is permitted by lawful authority (e.g., a permitted event)." However, the standard further states that these noise level limits do not apply to construction, industrial, or manufacturing noise.

The EPA recommends an equivalent continuous outdoor noise level (24 hour) of 70 decibels or less as adequate to protect against hearing loss over a lifetime and a day-night average sound level outdoors of 55 decibels or less to be adequate to protect against activity interference and annoyance (EPA 1974-TN3941; Table 1). The EPA identifies noise at/or greater than 55 A-weighted decibels, with a margin of safety determined to protect hearing, as causing outdoor-activity interference and annoyance. The U.S. Department of Housing and Urban Development's exterior noise standard states that noise levels are acceptable if the day-night average sound level outside a residence is less than 65 A-weighted decibels (24 CFR 51.101(a)(8) [TN1016]). As points of comparison, heavy highway traffic at 91 m (300 ft) has a noise level of 60 A-weighted decibels and a gas-powered lawn mower at 30 m (100 ft) has a noise level of 70 A-weighted decibels. Noise levels decrease with increasing distance from the source.

3.8.2 Existing Noise Levels at the CFFF Site and Impacts

Noise generated at the CFFF is associated with operations of a large manufacturing facility. Sources of noise at CFFF include various industrial machines and equipment such as materials handling equipment, paging and alarm systems, engines, and vehicular traffic. All noise-making activities would be performed in compliance with OSHA standards, best management practices, and other applicable regulatory requirements.

Under the proposed action, the WEC did not request changes to its license related to construction of new buildings or any changes to the CFFF operations. However, the East Lagoon has been decommissioned and Sanitary Lagoon is being removed under the CA, which would necessitate the use of large earth-moving equipment and heavy trucks. Noise levels to workers are anticipated to continue during the proposed 40 years of CFFF operations and are not anticipated to change significantly during the proposed action.

The primary source of noise at the site boundary is vehicular traffic from Bluff Road, which bounds the site to the north (WEC 2019-TN6510). The NRC staff is not aware of any noise surveys that have been conducted at the CFFF site. Transportation impacts, such as worker and shipment traffic, are discussed in Section 3.13 of this EIS. The WEC stated that noise from the CFFF is not detectable at the site boundary (WEC 2019-TN6510). The manufacturing building for CFFF is located approximately 760 m (2,500 ft) from Bluff Road (WEC 2019-TN6510). The nearest resident is approximately 1,000 m (3,281 ft) to the northwest from the center point of the facility (see Figure 3-21 in Section 3.9). Eight individuals live and one church is located within 1.6 km (1 mi) of the CFFF site (WEC 2019-TN6510). There are no other noise-sensitive receptors (e.g., schools, hospitals, etc.) nearby. The potential impacts of noise on ecological resources from continued operation of the CFFF are addressed in Section 3.5.1 of this EIS.

Given the distance of the CFFF from the site boundary, and compliance with applicable noise regulations, the NRC staff expects that direct and indirect impacts on human health due to noise as a result of the proposed continued operation of the CFFF for an additional 40 years would be SMALL. Based on these minor impacts, the SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact (see Section 3.19 for additional information).

3.8.3 Mitigation Measures

The proposed action is not expected to result in new noise effects. Current practices to mitigate manufacturing noise to occupational workers at similar facilities would include the use of engineering and administrative controls (OSHA 2020-TN6576). Examples of these controls would include providing distance between receptors and the noise activity, shielding, using personal protective equipment, and maintaining equipment and vehicles in proper working condition. The controls reduce the propagation of noise to onsite and offsite receptors. Additional mitigation measures are not identified.

3.9 Historic and Cultural Resources

This section describes the context of the continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts on historic and cultural resources from the proposed action.

Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to the district, site, building, structure, or object. The criteria for eligibility are listed in 36 CFR 60.4 (TN1682) and include (1) association with events that have made a significant contribution to our broad patterns of history; (2) association with the lives of persons significant in our past; (3) embodiment of distinctive characteristics of type, period, or methods of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (4) resources that have yielded or are likely to yield information important in prehistory or history (ACHP 2012-TN6999). The property must also have integrity, or the ability to convey its significance, to be listed or eligible for listing in the NRHP. The historic preservation review process, Section 106 of the National Historic Preservation Act (NHPA), is outlined in regulations at 36 CFR Part 800 (TN513). As allowed under 36 CFR 800.8, the NRC staff is conducting the Section 106 review process in coordination with the NEPA review for this proposed CFFF license renewal.

As discussed in Section 2.1.1 of this EIS, the CFFF site is located on an approximately 469 ha (1,151 ac) in Richland County, SC. Approximately 28 ha (68 ac) of the property area are used for facility operations and support activities (see Figure 3-21). In developing this EIS, the NRC staff evaluated potential impacts to historic properties and determined that the direct and indirect area of potential effects (APE) are contained within the CFFF's licensed boundary. The APE was informed by the scale and nature of the undertaking, the proposed continued operation of the CFFF for an additional 40 years. The activities under the WEC's special nuclear materials license are conducted entirely within CFFF's licensed boundary. The potential for offsite consequences, above regulatory thresholds, are unlikely. As discussed in Section 3.4 of this EIS, the NRC staff determined the potential for contaminants to move offsite is low because the operational activities at CFFF and remediation programs in place under the CA minimize the effects of potential releases on local surface water and groundwater resources, as well as local users of these resources. In addition, the WEC must comply with NRC regulations in 10 CFR Part 70, which provide reasonable assurance that the licensee has implemented engineered and administrative controls to prevent or mitigate accident sequences internal to the facility (e.g., explosions, spills, fires). These regulations also require the WEC to provide reasonable assurance that they have implemented engineered and administrative controls to prevent or mitigate credible external events (e.g., floods, earthquakes) that could result in facility-induced consequences to workers, the public, or the environment (see Section 3.15 of the EIS). Therefore, the NRC staff based its decision to contain the APE to the license area boundary in consideration of the scale and nature of the undertaking, and the low potential for contaminants to move offsite.

Additionally, as part of this environmental impact evaluation, the NRC staff considered both undisturbed areas within the license area boundary and those previously disturbed by the construction and operation of the CFFF site, in addition to the licensed activities anticipated to occur during the proposed license renewal term. There are areas within the CFFF site that have also been previously disturbed by activities other than the construction and operation of the CFFF. For example, forested areas are used for timber production and hay fields are harvested. There is also an electrical substation, owned by Dominion Energy, on approximately 2.8 ha (7 ac) of the CFFF site near Bluff Road. These activities are not licensed by the NRC and thus considered outside the scope of the undertaking, which is the NRC's decision whether to renew the NRC license for the CFFF to continue to operate for an additional 40 years)

The NRC staff consulted historic context information provided in the recently completed cultural resources survey of the CFFF site (Brockington 2022-TN7251). The NRC staff also consulted cultural resource reports and historic context information available at the South Carolina Department of Archaeology and Historic Preservation (SCDAH), the South Carolina Institute of Archaeology and Anthropology (SCIAA), and through the October 2019 draft EA public comment period and this EIS scoping process, and public comment period on the DEIS to compile a brief historic and cultural overview of the history of human land use in and around the CFFF site and its vicinity. Historic and cultural overviews provide historic context for understanding the potential significance of and period of significance associated with historic and cultural resources that may be present within the APE. The following high-level overview is derived from historic and cultural resource survey reports completed on portions of the CFFF site or nearby (Brockington 2022-TN7251, Reid 2004-TN6886; Jaeger 1993-TN6877; Legacy Research Associates 2005-TN6885).

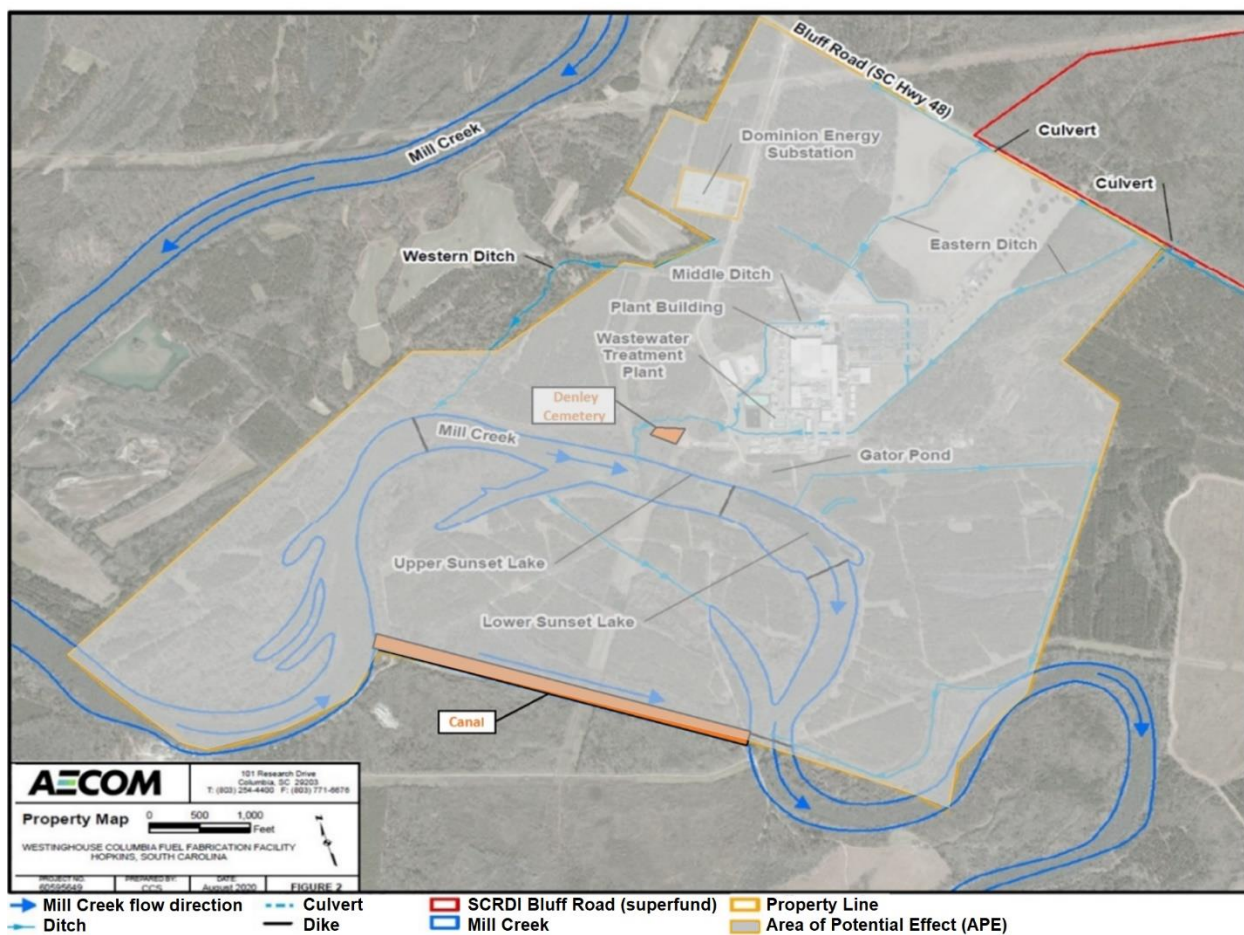


Figure 3-21 Area of Potential Effect CFFF Property Boundary. Denley Cemetery and Historic Canal are also depicted. (Modified from source: WEC 2020-TN6707)

There is archaeological evidence of American Indian precontact use in the South Carolina Midlands area as early as 10,000 to 15,000 years ago. The cultural chronology for American Indian precontact land use in the South Carolina Midlands area is divided into the following periods: Paleo-Indian (B.C. 10,000 to 8000); Archaic (B.C. 8000 to 500), Woodland (B.C. 500 to 1000) and Mississippian (A.D. 1000 to 1543) (Reid 2004-TN6886). The Archaic and

Woodland Periods are further subdivided into Early, Middle, and Late Periods. Each period is characterized by changing material culture including stone tool technologies and pottery types, which first emerge during the Late Archaic Period (B.C. 2000 to 500), as well as changing settlement and resource procurement patterns. During the Paleo-Indian Period, mobile groups relied on hunting, fishing, and some plant resources for subsistence (Legacy Research Associates 2005-TN6885). During the Early Archaic Period, subsistence focused on foraging, and settlement patterns consisted mostly of base camps situated along rivers and streams, and smaller upland foraging sites (Legacy Research Associates 2005-TN6885).

By the Late Archaic Period, ceramics were introduced, stone tool technology became more diverse, and settlement patterns became more sedentary (Legacy Research Associates 2005-TN6885). Significant cultural changes occurred during the Woodland Period including the advent of the bow and arrow, burial mound construction, and an increase in permanent settlements (Legacy Research Associates 2005-TN6885). The Mississippian Period is characterized by large ceremonial centers situated along major river drainages including the Congaree River (Legacy Research Associates 2005-TN6885 and Brockington 2022-TN7251). Green Hill Mound (site 38RD4), located within 8 km (5 mi) of the CFFF site boundary near the Congaree River, is an example of a Mississippian-era mortuary center (Mitchie 1980-TN7019; Stephenson 1972-TN7018), has historic and ancestral importance to the Pine Hill Indian Tribe (2021-TN7149), and is a highly significant archaeological resource (Catawba Indian Nation 2021-TN7147; CSCPA 2021-TN7176; Judge 2021-TN7148). Archaeological evidence indicates that these societies relied on agricultural practices as a key part of their subsistence strategy (Legacy Research Associates 2005-TN6885 and Brockington 2022-TN7251). Evidence of Mississippian Period resource extraction sites have also been identified by the presence of small scatters of Mississippian artifacts found throughout the regions (Brockington 2022-TN7251).

European exploration of South Carolina began in the early sixteenth century (Brockington 2022-TN7251). Hernando De Soto, the Spanish explorer, is one of the first Europeans known to come to the interior of South Carolina, having arrived in the mid-16th century and visited the Mississippian chieftain of Cofitachequi (Legacy Research Associates 2005-TN6885 and Brockington 2022-TN7251). Early European exploration resulted in the severe decline of the American Indian population in the region as a result of warfare, disease and slave raids (Brockington 2022-TN7251). The Congaree and Wateree people occupied what is now Richland County until the 1700s when they merged with the Catawba Indian Tribe (Jaeger 1993-TN6877). Trading posts were established, including Old Fort Congaree located on the West bank of the Congaree River that was established in 1718 (Legacy Research Associates 2005-TN6885).

By the mid-1700s the lands in and around the CFFF site consisted of small family farms and large plantations (Reid 2004-TN6886). According to the Jaeger Company (1993-TN6877), the emergence of these large plantations resulted in an economy that was dependent upon enslaved African American populations who accounted for 75 percent of the Richland County's population. Among these early plantation landowners was Thomas Howell. Archaeological site 38RD397, which is located adjacent to but outside the CFFF site license boundary, contains the structural remains of this plantation (Reid 2004-TN6886). Indigo, cotton, and tobacco were the primary crops grown in the region (Jaeger 1993-TN6877). Cotton became the primary crop as a result of Eli Whitney's invention of the cotton gin in the late 1700s (Jaeger 1993-TN6877) and by the mid-19th century was South Carolina's primary cash crop.

During the American Revolution, American forces were defeated in 1780 at Camden, which is located northwest of the CFFF site and the City of Columbia (Reid 2004-TN6886). The City of Columbia, established in the mid-1780s, replaced Charleston as the state capital and later became a hub of activity during the Civil War (Reid 2004-TN6886; Legacy Research Associates 2005-TN6885). Regionally, during the early 20th century, the number of farms and farm sizes decreased. Fort Jackson, which is located within 8 km (5 mi) of the CFFF site, opened in 1917 and the City of Columbia continued to grow.

The CFFF property is located on lands known as the Greenfield Plantation and was owned by Wright Denley during the 1800s (Brockington 2022-TN7251). The South Carolina Land Commission, established in 1869, purchased approximately 9,000 ac of land in Richland County for the purposes of redistributing the land to poor white men and to freedmen (Jaeger 1993-TN6877). The NRHP-listed Barber House is located within 8 km (5 mi) of the CFFF site. It was constructed in 1880 and is situated on land acquired by Samuel Barber, a formerly enslaved person in 1872 as part of the South Carolina Land Commission efforts.⁶ The Barber House has remained in the same family since 1872. The 1865 Freedman's bureau records identifies individuals working under a lease agreement of lands on the Denley Estate who used the lands for pasturage for livestock (Brockington 2022-TN7251). According to research conducted by Brockington Cultural Resources Consulting, (Brockington 2022-TN7251), a group of former enslaved people who formed the Zion Mill Creek Baptist Church in 1883 likely rented lands from Denley's estate and have connections to the Denley Cemetery (depicted in Figure 3-22). Additional connections to the Denley Cemetery found in the historical record include information contained in the US Census records from the early 1900s. These records reveal that the Greenfield Plantation was tenanted by African Americans in the early 1900s and that an African American couple (Chester Denley and his wife) resided in the area which had become known as Lykesland in School District #5 for Richland County (Brockington 2022-TN7251).



Figure 3-22 Denley Cemetery (Photo provided by the WEC)

⁶ <http://www.nationalregister.sc.gov/richland/S10817740093/index.htm>

By the 1930s the nearby Bluff Road was improved and the Greenfield Plantation and adjoining Plantation were combined into the Greenfield Farm which was later purchased by Marion Burnside who sold the land to the WEC in 1968 (Brockington 2022-TN7251). Construction of the CFFF in response to the 1967 passage of the South Carolina General Assembly “1967 S.C. Atomic Energy and Radiation and Control Act” established to encourage industrial development of nuclear energy based facilities (Brockington 2022-TN7251). The CFFF site opened in 1969.

3.9.1 Historic and Cultural Resources at the CFFF Site

The SCDAH has indicated that the CFFF site has a high probability of significant archaeological resources (SCDAH 2006-TN6700, SCAHC 2015-TN5608, SCDAH 2019-TN6701). Scoping comments received from external stakeholders (Catawba Indian Nation 2020-TN6534; Waccamaw Indian People 2020-TN6532; Pine Hill Indian Tribe 2020-TN6535; CSCPA 2020-TN6540; NPS 2020-TN6543; Friends of Congaree Swamp 2020-TN6703; Hayden 2020-TN6702; Judge 2020-TN6879, Judge 2020-TN6878) have also indicated that the area where the CFFF site is located and the nearby surrounding area, particularly along the nearby Congaree River and Congaree National Park, is important historically and archaeologically (NRC 2021-TN6934).

The NRC staff reviewed the recently completed cultural resources survey design (Brockington 2021-TN7189) draft and final cultural resources survey report completed for the CFFF site (Brockington 2021-TN7189 and Brockington 2022-TN7251), and consulted the following databases to identify cultural resource investigations that have occurred within the APE and to determine if any historic and cultural resources are located within the APE:

- non-public view of SCIAA’s ArchSite
- NRHP database
- SCDAH National Register of Historic Places.

According to SCIAA’s ArchSite, which was consulted in October 2020, prior to the recent completion of the cultural resources survey of the CFFF site in 2021, two cultural resource investigations have occurred at the CFFF site, resulting in the identification of one aboveground resource, site # 171-3577. In 1993, a historical and architectural survey was completed by the Jaeger Company of lower Richland County (Jaeger 1993-TN6877), which covered the CFFF site. Additionally, in 2004 an archaeological inventory was completed of a small portion (8 ac) of the CFFF site for the Hopkins Transmission Line and Substation (Reid 2004-TN6886). The Jaeger Company first identified site # 171-3577 in 1993, describing it as an “unknown canal” and recommended the site as being potentially eligible for NRHP listing and worthy of further research to understand its historic function and age (Jaeger 1993-TN6877). The 2004 archaeological field investigation consisted of a surface inventory and subsurface shovel testing, which did not locate any archaeological resources but did relocate site # 171-3577 (Reid 2004-TN6886). Site # 171-3577 is depicted as a linear canal feature on the USGS topographic map included in the report and is described as an excavated canal feature that links two portions of Mill Creek (Reid 2004-TN6886). Based on discussions the author had with the then South Carolina Electric and Gas (SCE&G) project manager of the WEC CFFF, Reid (2004-TN6886) learned that the canal was excavated by the property owners (Burnside family) in the 1960s to address flooding of the Mill Creek and to enhance hunting conditions. Based on this information, Reid (2004-TN6886), recommended that site # 171-3577 did not meet NRHP eligibility requirements, but may have research value to future researchers as an engineering feature. Site #171-3577 has not been formally evaluated for NRHP eligibility but is identified in ArchSite as being potentially eligible. While not listed in ArchSite, the Denley Cemetery was re-

discovered on the CFFF site in 2003 and fenced off by the WEC (2019-TN6510; SCDAH 2008-TN6641; WEC 2021-TN7170). The cemetery is located southeast of the main CFFF building, and its footprint is approximately 24 × 49 m (80 × 160 ft) (WEC 2019-TN6510). The cemetery operated from approximately 1890 to 1940, contains more than 100 graves of African Americans, and has historical ties to the Denley Plantation (WEC 2019-TN6510). Members of the Denley and Washington families of Lower Richland are buried there (SCDAH 2008-TN6641). The WEC continues to maintain the fenced area (WEC 2019-TN6510). Figure 3-21 (above) indicates the location of the canal and the Denley Cemetery.

ArchSite also indicates that there are 58 archaeological sites located within 8 km (5 mi) of the CFFF site boundary. Eight archaeological resources are located within 1.6 km (1 mi) of and adjacent to the north and west boundary of the CFFF site and these were recorded in 1990 by Mark Groover as part of his Master's thesis research (Reid 2004-TN6886). These resources include five artifact scatters predominantly associated with the 19th century (site numbers: 38RD391, 38RD394, 38RD395, 38RD396, and 38RD398), two multicomponent⁷ sites containing 19th century and Archaic/Woodland artifact scatters (site number 38RD392, and 38RD393), and the remains of the mid-18th century Thomas Howell Plantation (site number 38RD397). While none of these sites has been formally evaluated for NRHP eligibility, excavations completed at the Thomas Howell Plantation and published research (Groover and Brooks 2003-TN6642; Stine et al. 1996-TN6643) indicate that this site likely qualifies for NRHP eligibility and listing.

ArchSite indicates that there are 60 aboveground resources located within 8 km (5 mi) of the CFFF site boundary. Two aboveground resources are located within 1.6 km (1 mi) of the CFFF site boundary and were recorded by the Jaeger Company in 1993. One resource is a cemetery (site # 171-3586), which the Jaeger Company described as being associated with Black residents in the community (Jaeger 1993-TN6877). Because of limited access to this cemetery during the 1993 survey, field investigations were not completed at that time. The Jaeger Company identified site # 171-3586 as being worthy of further investigation and recommended that it be formally evaluated for NRHP eligibility in the future (SCIAA 2021-TN6916).⁸ The Chicora Foundation completed a comprehensive inventory and research of cemeteries in Richland County, and the Denley Cemetery was recorded and included in that inventory as "Denley's Graveyard" (Trinkley and Hacker 2013-TN7000). The second resource is an unidentified house (site # 463-3674) that is identified on ArchSite as being potentially eligible for inclusion in the NRHP. The Jaeger Company also recommended that site # 463-3674, which was also inaccessible at the time, was worthy of further investigation and that it too should be formally evaluated for NRHP eligibility in the future (Jaeger 1993-TN6877).

ArchSite also indicates that there are 5 NRHP-listed aboveground resources within 8 km (5 mi) of the CFFF site boundary; they include the Hopkins Graded School, Barber House, Hopkins Presbyterian Church, Hopkins Family Cemetery, and the Northwest Boundary Dike.⁹ None of these resources are located within 1.6 km (1 mi) of the CFFF site boundary.

⁷ Multicomponent archaeological sites contain both historic and precontact era artifacts and features.

⁸ ArchSite (SCIAA 2021-TN6916) identifies site # 171-3586 as not eligible for inclusion in the NRHP, while the Jaeger Company 1993 report does (Jaeger 1993-TN6877). The NRC staff reached out to SCDAH to clarify the status and received a reply by e-mail on October 12, 2020, stating that the site has not been formally evaluated for NRHP eligibility and to "rely on the language at the end of the survey report that says further research and evaluation of the site is needed since it was not evaluated in the field in 1993" (SCDAH 2020-TN6887).

⁹ NRHP documentation for these resources can be found on the SCDAH's SHPO NRHP database located at <http://www.nationalregister.sc.gov/richland/nrrichland.htm>.

In 2021, the WEC contracted with Brockington Cultural Resources Consulting to conduct a cultural resource survey of the CFFF site, which followed the survey research design/plan (Brockington 2021-TN7189) approved by the South Carolina Department of Archives and History (SCDAH). The WEC conducted an intensive cultural resources survey of the CFFF site between July and November of 2021 (Brockington 2022-TN7190). The draft cultural resources report provided an historical overview, presented the results of architectural and archaeological resource field investigations, as well as geophysical investigations of the Denley Cemetery (Brockington 2022-TN7190). It also provided recommendations for NRHP eligibility evaluations of all identified resources, and additional management recommendations (Brockington 2022-TN7190). The archaeological survey of the CFFF site relied on a model predicting archeological resource potential using LIDAR imagery, historical aerial imagery, and soils data (Brockington 2021-TN7189). Brockington Cultural Resources Consulting divided the CFFF site into four categories ranking the potential for archaeological resources and the accessibility for conducting a survey (Brockington 2022-TN7190). The categories include (1) “no potential,” which consists of the 68-acre developed area where most of the CFFF facilities are located; (2) “very low potential,” which includes wetlands and water (i.e., Mill Creek); (3) “low potential,” which includes flat areas away from the Congaree River flood plain; and (4) “high potential,” which includes areas next to the Congaree River flood plain and stream levees and point bars (Brockington 2022-TN7190).

Systematic surface and subsurface archaeological investigations (i.e., shovel tests) focused on the high and low potential areas resulting in the identification and documentation of five new archaeological sites. The five newly identified archaeological sites consist of two multi-component sites containing cultural material associated with both the precontact and 19th - 20th century time period (38RD1512 and 38RD1514), two precontact-era archaeological sites (38RD1513 and 38RD1515), and one 20th century historic era archaeological site (38RD1516). In addition, two precontact-era and one historic-era isolated finds were identified. The architectural resources inventory focused on documentation of structures that were at least 45 years old and had “a minimal level of structural integrity” (Brockington 2022-TN7190). The results of the architectural survey included documentation of three standing structures that are associated with the mid-20th century farm complex that were present at the CFFF site prior to its construction (Site #8120, a cattle facility; Site #8690, the Butler building, and Site #8691, a tractor shed), and the CFFF facility itself (Site #8689). In addition, documentation of a previously recorded canal (Site #171-3577) and the Denley Cemetery (Site # 8119/ 38RD1518)¹⁰ was updated. Documentation of the Denley Cemetery (Site # 8119/ 38RD1518), describes an “early 20th century African American community cemetery with burial dating from 1918 onward” that also very likely includes ancestors of American Indian ancestry including members of the Pine Hill Indian Tribe (Brockington 2022-TN7190). A GPR survey was completed of the Denley Cemetery that resulted in detailed mapping of 191 markers and an anomaly along the eastern fence (Brockington 2022-TN7190). Brockington Cultural Resources Consulting also recommended that all archaeological and aboveground resources were not NRHP-eligible and provided several management recommendations to protect archaeological resources (Brockington 2022-TN7190).

The draft cultural resources report was submitted to the SCDAH on February 1, 2022 (Brockington 2022-TN7190). Upon receipt of the draft cultural resources report on February 1,

¹⁰ Prior to the 2021 cultural resources field investigation, the documentation of the Denley Cemetery had not been formally recorded with the South Carolina State-wide historical survey, but it has been managed and protected by the WEC since its discovery in 2003. In 2014, the Chicora Foundation documented the Denley Cemetery and registered it as Cemetery FS-26 ([Brockington 2022-TN7251](#)).

2022, the SCDAH shared the draft cultural resources report with the Pine Hill Indian Tribe and Christopher Judge of the University of South Carolina Lancaster who reviewed the document and submitted comments to SCDAH (Pine Hill Indian Tribe 2022-TN7311 and USC 2022-TN7320). In its letter dated February 28, 2022, the Pine Hill Indian Tribe disagreed with Brockington and Associates finding that the CFFF area lacked cultural significance, and provided several references regarding the importance of the area relating to contact-era American Indian trade, its association with the nearby contact period town of Cofitachequi, Fort Congaree, and Green Hill Mound, as well as the history of the Denley Plantation, the Denley Cemetery and its potential association with American Indian ancestry (Pine Hill Indian Tribe 2022-TN7311). Mr. Judge provided technical comments to the SCDAH regarding the archaeological context and significance of the Green Hill Mound on February 27, 2022 (USC 2022-TN7320). The SCDAH provided its comments on the draft cultural resources report to Brockington and Associates on March 7, 2022 (SCDAH 2022-TN7321). The SCDAH also shared its comments as well as comments provided by the Pine Hill Indian Tribe and Christopher Judge with NRC staff, Brockington and Associates and the WEC on March 8, 2022 (SCDAH 2022-TN7312). In its March 7, 2022, letter to Brockington and Associates (SCDAH 2022-TN7321), the SCDAH requested that comments from the Pine Hill Indian Tribe and Christopher Judge be incorporated into the historical context section in the final report. In addition, the SCDAH requested that additional context about the industrial development of the CFFF be added to the final report to support the recommendation that the CFFF facility does not meet the criteria for NRHP eligibility listing. In addition, the SCDAH requested that the final report address how precontact components of archaeological sites 38RD1512-38RD1516 are related to other precontact sites in the lower Richland County, including the Green Hill Mound (38RD0004) (SCDAH 2022-TN7321), to assist the SCDAH in its review of Brockington's recommendations that these sites are NRHP ineligible. SCDAH concurred with Brockington and Associates' NRHP recommendations that four of the five aboveground sites (SHPO Site Nos 8120, 8690, 8691, and 3577) and the Denley Cemetery are not NRHP eligible. SCDAH also requested clarifications regarding recommendations associated with future potential ground-disturbing activities occurring inside the security fence and within the sandy levee ridges in the Congaree River flood plain and provided a few technical comments. The final cultural resource survey report was finalized, after incorporating comments provided by the SCDAH, Pine Hill Indian Tribe, and Christopher Judge that focused on the historical setting of the CFFF site and clarified the WEC's recommendations for management of cultural resources for future ground-disturbing activities. No changes in the final report were made on NRHP eligibility recommendations (Brockington 2022-TN7251).

The WEC's recommendations provided in the final cultural resources survey report include that the WEC maintain the Denley Cemetery in its current state and continue to protect it from desecration or damage in accordance with South Carolina burial law statutes, and that the eastern fence be moved at least 5 to 10 ft to the east to incorporate subsurface anomalies identified by the GPR survey that may be graves (Brockington 2022-TN7251). The WEC implemented these recommendations on March 1, 2022 (Brockington 2022-TN7251). The final report describes an area within the CAA that may not have been disturbed by original construction of the plant. The final report also notes the WEC's recommendation that a professional archaeologist review plans for proposed ground-disturbing activities more than 4 ft below the present ground surface in this portion of the CAA to determine the need for archaeological testing or monitoring to establish whether intact archaeological resources are present in the deeply buried, undisturbed soils prior to initiating activities (Brockington 2022-TN7251). Finally, Brockington Cultural Resources Consulting recommends that due to the high potential for deeply buried archaeological deposits to exist in the sandy levee ridges along the Congaree River, archaeological testing should be conducted prior to initiation of any land-

disturbing activities in these areas if they extend more than 3 ft below the ground surface (Brockington 2022-TN7251).

The final cultural resources survey report was submitted to the SCDAH on April 14, 2022 (Brockington 2022-TN7251). In a letter dated May 12, 2022, the SCDAH concurred that the CFFF was not NRHP eligible (SCDAH 2022-TN7357). The SCDAH requested that the cultural resources information including survey, maps and cultural resources protocols be gathered in a folder along with contact information for NRC, SHPO, and the WEC and be provided to the SCDAH office and any other consulting parties (SCDAH 2022-TN7357). The SCDAH also requested that an annual update be provided to all consulting parties regarding any updates on cultural resources work planned or undertaken at the site including status updates for the Denley Cemetery SCDAH 2022-TN7357). In an e-mail dated May 16, 2022, the SCDAH also concurred that the archaeological sites (38RD1512 – 38RD1516) are not NRHP eligible (SCDAH 2022-TN7368).

3.9.2 Historic and Cultural Resources Impacts

As discussed in Section 2.6 of this EIS, the NRC’s proposed action is to determine whether to renew the CFFF’s materials license for an additional 40 years. The NRC staff considered effects from ground-disturbing activities within the CFFF site anticipated to occur during the continued operation of the CFFF. Indirect effects considered in this EIS within the CFFF site and adjacent areas are atmospheric, auditory, and visual effects that could diminish the integrity of historic and cultural resources if the WEC license were renewed an additional 40 years.

In its LRA, the WEC has not requested changes to its license that would result in land disturbances. It is possible that over the course of the proposed 40-year renewal license term the WEC would need to conduct ground-disturbing activities. Many of these activities would require a license amendment,¹¹ in which case the NRC staff would evaluate the potential environmental impacts of that action at that time. For instance, in December 2018 the WEC described plans to remodel its administration building, which they anticipated would require a license amendment request (NRC 2018-TN6925). The WEC, however, has since stated it does not plan to request those changes at this time (NRC 2019-TN6474).

The WEC has installed new monitoring wells and borings (which involve ground-disturbing activities) in support of the remedial investigations being conducted as part of the implementation of a CA that was executed with the SCDHEC to address known onsite groundwater, surface water, and soil contamination from COPCs (SCDHEC/WEC 2019-TN6554). See Section 3.4 of this EIS for additional information about the CA. The installation of these monitoring wells and borings occurred under the current CFFF materials license, which expires in 2027. Installation of these wells involved minimal land disturbance as noted in the NRC staff’s July 2019 communication to the South Carolina SHPO.

In November 2020, the SCDHEC approved a Phase II RIWP (WEC 2020-TN6871) submitted by the WEC to completely characterize the “source, nature and extent of COPCs from historic operations” (WEC 2020-TN6844). The WEC has completed the Phase II investigations that

¹¹ In general, license applicants or licensees initiate the Federal action by submitting an application to the NRC for projects or activities requiring an NRC license or approval. In accordance with 10 CFR 70.72, “Facility Changes and Change Process,” licensees, including the WEC, are authorized to make changes to licensed operations without the prior approval of the NRC, when specific criteria are met. The criteria that must be met to make changes without prior approval are in described in 10 CFR 70.72(c).

involve collecting soil gas and sediment samples and installing monitoring wells to assess contamination levels of COPCs (WEC 2020-TN6844, WEC 2020-TN6871). Remediation of contaminated soils has also been conducted in certain areas of the CFFF site and future remediation could be completed as part of the WEC's continued implementation of the CA.

None of the cultural resources identified on the CFFF site (described in Section 3.9.1) have been determined to be eligible for listing in the NRHP (Brockington 2022-TN7251, SCDAH 2022-TN7321, SCDAH 2022-TN7357, and SCDAH 2022-TN7368). However, the Denley Cemetery is protected under State laws such as SC Code of Laws, Section 16-17-600, regarding burial sites and cemeteries. The Denley Cemetery is fenced and currently maintained by the WEC. The WEC has indicated they will continue its upkeep (WEC 2019-TN6510), and will be subject to SC Code of Laws, Section 16-17-600, regarding burial sites and cemeteries. Additionally, the WEC moved the fencing surrounding the Denley Cemetery 5-10 ft to the east on March 1, 2022, in accordance with the management recommendations made by Brockington and Associates (Brockington 2022-TN7251).

The NRC staff has not identified activities being conducted under the WEC's CA with the SCDHEC or ongoing licensed operational activities that would continue through the proposed license renewal term that have the potential to affect the Denley Cemetery (WEC 2020-TN6844, WEC 2020-TN6871). The WEC installed a permanent monitoring well (W-98), but it lies "near but outside the southern edge of the original Denley Cemetery," (WEC 2020-TN6871, WEC 2021-TN7170). According to the results of the GPR survey conducted by Brockington and Associates, this well has been separated from the cemetery by fencing and can be accessed without entering the "defined limits of the cemetery" (Brockington 2022-TN7251). A review of maps provided in the Phase II RIWP and the WEC's responses to the NRC staff's request for additional information dated November 3, 2020, determined ground-disturbing activities planned by the WEC under the CA, would avoid impacts on the historic canal (site # 173-3577) (WEC 2020-TN6844, WEC 2020-TN6871).

The CFFF has established procedures and provisions to avoid and minimize potential impacts on historic and cultural resources when conducting all ground-disturbing activities, including those that are part of the ongoing and future implementation of the CA. For example, well installations and future remediation activities would be considered future ground-disturbing activities that need to be assessed under the WEC's procedures (WEC 2021-TN7048). One WEC-developed procedure to manage the discovery of previously unrecorded cultural resources or human remains during the implementation of ground-disturbing activities was associated with the implementation of the RIWP (WEC 2020-TN6707). This procedure was provided in Appendix C of the Phase II RIWP and is entitled "Procedures Guiding the Discovery of Unanticipated Cultural Resources and Human Remains" (unanticipated discovery procedure or UDP) (WEC 2020-TN6871). The UDP was informed by SC Code of Laws, Section 16-17-600 (SC Code 16-17-TN6883). The UDP includes stop work procedures and notification to the South Carolina State Historic Preservation Office (SHPO) in the event of an unanticipated discovery of cultural resources or human remains (WEC 2020-TN6871). Additionally, the UDP requires that a qualified professional archaeologist investigate all finds to determine the potential significance of the find and to consult with the South Carolina SHPO on additional actions, which may include further archaeological investigations or consultation with Indian Tribes. If human remains are determined to be of possible Native American origin, the remains will be left in place and the South Carolina SHPO and appropriate Indian Tribes will be consulted to develop a plan that is consistent with SC Code of Laws, Section 16-17-600 (SC Code 16-17-TN6883) guidance (WEC 2020-TN6871). This procedure has been incorporated

into a new WEC procedure, RA-432, also titled “Procedures Guiding the Discovery of Unanticipated Cultural Resources and Human Remains”(WEC 2021-TN7060 and WEC 2022-TN7358).

RA-432 (WEC 2021-TN7060 and WEC 2022-TN7358), “Procedures Guiding the Discovery of Unanticipated Cultural Resources and Human Remains” was updated in 2022 to address management recommendations made by Brockington and Associates after the completion of the cultural resources survey (Brockington 2022-TN7251). The procedures will be used prior to and during all ground-disturbing activities occurring on the CFFF property, and during any unanticipated discovery encountered on the CFFF property (WEC 2022-TN7358). Updates to RA-432 were made in March of 2022 to incorporate the results of the 2021 cultural resources survey and management recommendations (WEC 2022-TN7358). Accordingly, RA-432 states that most of the CFFF site has been previously developed¹² by agricultural activities and CFFF construction activities and as a result, these areas have low probability of any cultural resources remaining (WEC 2022-TN7358).

RA-432 also states that two areas within the CFFF site will require additional investigation prior to the initiation of ground disturbance (WEC 2022-TN7358). These include the sandy levees within the Congaree Flood Plain where undisturbed soils may be present more than 3 ft below the present ground surface and in specified areas within the CAA fence. RA-432 states that these areas will require additional archaeological work prior to ground-disturbing activities (WEC 2022-TN7358). RA-432 states that prior to conducting any ground disturbance within specified areas within the CAA fence or more than 3 ft below the present ground surface within the Congaree River Flood Plain Sandy Levees, “Environmental Engineering must be contacted to determine if there is the possibility of archaeological deposits at that location...[and if so] GPR and/or monitoring by a licensed archaeologist may be required” (WEC 2022-TN7358).

RA-432 outlines additional steps to undertake if GPR detects an anomaly, if a cultural resource is discovered, and if human remains are discovered. In the case of an anomaly, RA-432 requires the anomaly to be evaluated by a qualified archaeologist who would consult with the South Carolina SHPO to ascertain whether the find is of archaeological significance, and if so, additional notifications and consultations would be made (WEC 2022-TN7358). If cultural resources or human remains are identified during the course of routine work, they would be treated as an unanticipated discovery and the corresponding protocol would be followed as detailed in the above description of the UDP.

Updates to RA-432 also addressed management recommendations made in the cultural resources survey report regarding the Denley Cemetery, including requirements for the WEC to protect the cemetery from desecration and offer descendants the opportunity to coordinate site visits in accordance with Section 27-43-310 of South Carolina State Law” (WEC 2022-TN7358). Accordingly, RA-432 states that the WEC will protect, maintain and upkeep the Denley Cemetery and that family members and descendants associated with the Denley Cemetery may coordinate visits with WEC security. RA-432 also states that the WEC will not allow digging/trenching/excavation to occur in the cemetery (WEC 2022-TN7358).

¹² New definitions for developed and disturbed were added to the updated RA-432. Developed area is defined as “an area that has had some alteration to the surface or subsurface soils.” Developed areas can be classified as disturbed or undisturbed (WEC 2022). These clarifications provide insight into areas at the CFFF site that have a higher potential to contain cultural resources (i.e., developed and undisturbed) and areas that have a low potential to contain cultural resources (i.e., developed and disturbed) (WEC 2022-TN7182).

In addition to the RA-432 (WEC 2022-TN7358), the WEC has several provisions in place that provide comprehensive sitewide procedural cultural resource protections during all ground-disturbing activities occurring on the CFFF site (WEC 2020-TN6844, WEC 2020-TN6872, WEC 2020-TN6873, WEC 2021-TN7048). These include RAF-104-5, "Environmental Protection Guidelines and Checklist" (WEC 2020-TN6844, WEC 2020-TN6872), TAF-500-11, "10 CFR 70.72 Engineering Pre-screening Checklist" (WEC 2020-TN6844, WEC 2020-TN6873), RA-136, "Soil Sampling and Disposal" (WEC 2021-TN7062), SYP-233, "Excavation" (WEC 2021-TN7064), and RA-432, "Procedures Guiding the Unanticipated Discovery of Cultural Resources and Human Remains" (WEC 2021-TN7060), and a cultural resources training module, TRN-170 (AECOM Undated-TN7063).

RAF-104-5 is a checklist that considers whether a proposed activity occurring on the CFFF site would affect various aspects of the environment including impacts on archaeological or historical sites located on the WEC property or "if provisions have been made for protection or mitigation in the event of an archaeological or historical discovery onsite" (WEC 2021-TN7048). TAF-500-11 considers whether a proposed CFFF activity "involves land/soil disturbance or removal" (WEC 2020-TN6844, WEC 2020-TN6873). If the answer is yes for either of these procedures, "controls would be established" (WEC 2020-TN6844). Controls include, but are not limited to, completion of ground-penetrating radar (GPR) analysis prior to conducting ground-disturbing activities on the CFFF site, following stop work protocols and notification to the Environmental, Health, and Safety environmental engineering, at the WEC, to conduct additional evaluations (WEC 2021-TN7048).

RA-136 (WEC 2021-TN7062) is specific to soil-sampling activities and directs personnel to stop work and evaluate if any unknown anomaly is identified. SYP-233 (WEC 2021-TN7064) is specific to safe excavation and hand digging on the CFFF site and requires that subsurface anomalies be identified by GPR or other applicable alternate method, prior to any excavation occurring in undisturbed areas to avoid impacting cultural resources and to follow stop work protocols if unknown anomalies are identified. RA-136 and SYP-233 refer to TRN-170, "Cultural Resources Training" for an overview of typical cultural resources that may be found on the CFFF site (AECOM Undated-TN7063).

TRN-170 is a cultural resources training module prepared by a qualified archaeologist (i.e., a professional that meets the Secretary of Interior's qualification standards at 36 CFR Part 61) and will be provided to all employees and contractors conducting or supervising ground-disturbing activities (WEC 2021-TN7048 and AECOM Undated-TN7063). The training provides an overview of historic and cultural resource types found in the region and describes the types of "artifacts, cultural features, and soil deposits" that are "likely to be associated with these sites" (WEC 2021-TN7048 and AECOM Undated-TN7063). The training module also describes the procedures to be followed if archaeological remains are exposed (WEC 2021-TN7048 and AECOM Undated-TN7063).

As discussed in Sections 3.2, 3.3, and 3.4 of this EIS, the NRC staff determined that there is a low potential for contaminants to move offsite because of the implementation of activities and programs to minimize the effects of releases on other users of the local surface water and groundwater resources (e.g., spill prevention controls, the environmental sampling and monitoring program). As part of its accident mitigation program, the WEC submitted its Integrated Safety Analysis (ISA) methodology with the LRA for NRC's review and approval. In the ISA, applicants and licensees identify and evaluate all credible events (accident sequences) internal to the facility (e.g., explosions, spills, fires) and credible external events that could result

in facility-induced consequences to workers, the public, or the environment that could exceed the performance requirements of 10 CFR Part 70 (TN4883). Engineered and administrative controls are identified to prevent or mitigate consequences. The WEC (2019-TN6510) evaluated several accidents that, although considered to have a low probability of occurrence, could result in the largest environmental consequences—criticality accident, a UN release, chemical releases from a UF₆ cylinder, and a major fire. These are discussed in Section 3.15 of this EIS. The WEC has identified controls to prevent or mitigate these consequences. Regarding potential visual impacts, the CFFF can be partially viewed at a distance from State Route 48 (Bluff Road), but otherwise is difficult to view from the forested landscape of the surrounding rural area (see Section 3.10 of this EIS). Therefore, indirect effects (atmospheric, auditory, and visual effects) to historic and cultural resources located in adjacent areas to the CFFF are not anticipated to be significant or adverse.

In summary, the WEC conducted a cultural resource survey of the CFFF site and there are no historic and cultural resources eligible for listing in the NRHP (Brockington 2022-TN7251, SCDAH 2022-TN7321, SCDAH 2022-TN7357, and SCDAH 2022-TN7368). The WEC has also developed and established sitewide cultural resources protection and management procedures and provisions with the goal of avoiding and minimizing impacts on historic and cultural resources in the conduct of all ground-disturbing activities, including procedures for unanticipated discoveries of cultural resources and human remains, and a training module for employees and contractors conducting ground-disturbing activities. Further, the WEC has updated its sitewide cultural resource protection and management procedures (WEC 2022-TN7358) to incorporate management recommendations made in the cultural resources survey report related to additional reviews and testing in areas where intact archaeological deposits could be buried (Brockington 2022-TN7251). The Denley Cemetery is fenced and currently maintained by the WEC (WEC 2022). The WEC has indicated they will continue its upkeep and make it accessible to descendants to visit (WEC 2019-TN6510 and WEC 2022) and must follow State laws such as SC Code of Laws, Section 16-17-600, regarding burial sites and cemeteries. In addition, in response to management recommendations made in the cultural resources survey report as a result of GPR surveys, the WEC moved the fence on the eastern (entrance) edge of the Denley Cemetery out 10 ft (Brockington 2022-TN7251 and WEC 2022-TN7358). Therefore, the NRC staff concludes that potential impacts on historic and cultural resources would be SMALL. Additionally, the NRC staff does not anticipate that historic properties would be affected and the staff will notify all consulting parties of NRC's finding, in accordance with 36 CFR 800.4(d)(1). The NRC staff sent a letter, dated May 26, 2022, to the South Carolina SHPO summarizing the consultation activity and concluding NHPA Section 106 consultation (NRC 2022-TN7460). See Appendix A for additional discussion of past and ongoing NHPA Section 106 consultation activities for the proposed action.

Overall, when combined with other past, present, and reasonably foreseeable future actions, the proposed action would have a SMALL incremental impact contribution but would not result in a collectively greater cumulative impact on historic and cultural resources. The implementation of the WEC's procedures will improve the management and protection of historic and cultural resources at the CFFF site. Specifically, incorporating the cultural resources management recommendations made in the cultural resources survey report into the WEC's procedures will facilitate the avoidance of potential impacts on historic and cultural resources, as well as minimize and mitigate effects (see Section 3.19 for additional information).

3.9.3 Mitigation Measures

The WEC has incorporated cultural resources management recommendations made in the cultural resources survey report into its procedures (and will follow its historic and cultural resource management and protection procedures (WEC 2022-TN7182, Brockington 2022-TN7251 and WEC 2022-TN7358).

3.10 Visual and Scenic Resources

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts on visual and scenic resources of the proposed action.

An aerial view of the CFFF is shown in Figure 3-23. The CFFF is an industrial complex located in a semi-rural area that is surrounded in part by forested lands (WEC 2019-TN6510). There are no nearby natural or man-made features that are considered distinct visual or scenic resources, such as views of mountains, surface water features, or monuments. The CFFF can be partially viewed at a distance from State Route (SR) 48 (Bluff Road) from the north from a clearing near the entrance, but otherwise is difficult to view from the forested landscape of the surrounding rural area. The CFFF is not visible from the Congaree National Park, located approximately 8 km (5 mi) to the southeast of the site, or the Congaree River Swamp within the park, which is a National Natural Landmark (NPS 2020-TN6973).



Figure 3-23 Aerial View of the CFFF Site and Facilities (WEC 2012-TN6697)

3.10.1 Visual and Scenic Resource Impacts

The WEC did not request changes to its NRC license related to construction of new facilities or operations, which would alter the existing visual character of the local landscape of the site (WEC 2019-TN6510). However, the Sanitary Lagoon is being removed under the CA. Any minor visual alterations would be difficult to detect from the existing available views of the CFFF site from public locations. Therefore, the NRC staff concludes that direct and indirect impacts on visual or scenic resources during continued operations of the CFFF for an additional 40 years would be SMALL. Because the proposed action will not alter the existing landscape, the SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact (see Section 3.19 for additional information).

3.10.2 Mitigation Measures

The proposed action is not expected to result in significant impacts on visual and scenic resource and additional mitigation measures are not identified.

3.11 Socioeconomics

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct and indirect impact on socioeconomic resources of the proposed action. The following subsections summarize the affected socioeconomic environment for five primary topic areas: (1) demography (i.e., population characteristics), (2) employment structure and personal income, (3) housing availability and affordability, (4) tax structure and distribution, and (5) community services. These subsections include discussions of spatial (e.g., regional, vicinity, and proposed CFFF project area) and temporal considerations, where appropriate.

The NRC staff analyzed regional socioeconomic data provided by the U.S. Census Bureau (USCB), including 5-year estimates that the USCB collects for commuting workers by county of origin and county of destination. The CFFF is located in Richland County and the NRC staff considered the linkage between the labor force commuting to and from Richland County as the principal influencing factor for determining the appropriate socioeconomic region. Figure 3-24 illustrates this linkage. Richland County, with the economic center of Columbia, the state capital, employs more than 80 percent of its resident workforce in the county. Figure 3-24 illustrates that while commuting workers from Fairfield, Kershaw, Calhoun, and Newberry counties represent only minimal proportions of the Richland County workforce, these workers represent 10–36 percent of the working residents in these counties. This forges a strong economic linkage between these counties. Because of these linkages, a 32 km (20 mi) radius is used for demographic analysis to encompass the likely extent of commuting CFFF workers and related plant economic activity.

In addition to the census data about commuting patterns, the WEC provided the current distribution of the CFFF workforce by county of residence (WEC 2020-TN6844), which is summarized in Table 3-13. The WEC data indicate that 88.9 percent of the CFFF workforce resides in five South Carolina counties: Richland, Lexington, Kershaw, Orangeburg, and Sumter.

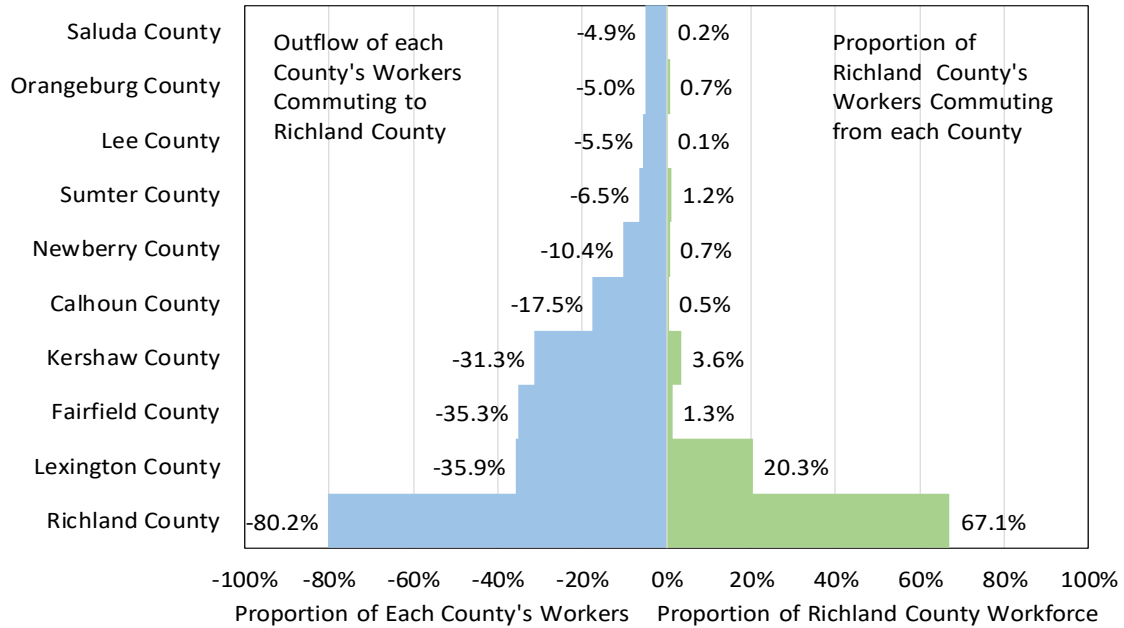


Figure 3-24 2015 County Workforce Commuting Flows (Source: USCB 2019-TN6977)

Table 3-13 CFFF Workforce by County of Residence (November 2020)

County of Residence	Workers	Percent
Richland	489	43.0%
Lexington	369	32.4%
Kershaw	92	8.1%
Orangeburg	39	3.4%
Sumter	23	2.0%
All Other South Carolina	84	7.4%
Outside South Carolina	42	3.7%
Total	1,138	100%

Source: WEC 2020-TN6844

3.11.1 Demography

3.11.1.1 Population Distribution in the Socioeconomic Region

The CFFF is located in unincorporated Richland County, near the community of Hopkins. Table 3-14 provides demographic information about the population (current and projected) in these counties, within the 32 km (20 mi) radius from the CFFF. Table 3-15 provides demographic characteristics of the socioeconomic region.

Table 3-14 County Population Estimates and Projections for the Socioeconomic Region

County	2000	2010	2020	Annual 00-20	2025	2035	Annual 20-35
Calhoun	15,192	15,094	14,290	-0.3%	13,655	12,345	-0.9%
Kershaw	52,851	61,706	66,685	1.3%	69,340	74,145	0.7%
Lexington	216,873	263,334	303,605	2.0%	324,860	365,575	1.4%
Richland	321,981	385,757	420,845	1.5%	436,420	463,530	0.7%
Orangeburg	91,524	92,320	85,250	-0.3%	80,950	71,710	-1.1%
Sumter	104,802	107,612	105,740	0.0%	103,570	97,690	-0.5%
Region	803,223	925,823	996,415	1.2%	1,028,795	1,084,995	0.6%
South Carolina	4,024,223	4,635,656	5,213,370	1.5%	5,542,140	6,223,085	1.3%

Source: South Carolina Department of Revenue and Fiscal Affairs (SCDRFA 2019-TN6698)

The five-county region has been growing at a slightly slower rate than South Carolina as a whole and is projected to grow at less than half of the annual rate of the State through 2035. Several rural counties are shrinking and are projected to continue shrinking in population. Growth is largely confined to Lexington County, making up suburban Columbia. The five-county region makes up nearly 20 percent of the South Carolina population. The five-county region has a substantially higher proportion of minority residents than South Carolina as a whole, and nearly half of the population comprises racial or ethnic minorities. African Americans and Hispanics/Latinos make up the largest individual minority groups.

Median family incomes vary widely by county, reflecting the combination of urban and rural counties in the region. The weighted average median family income for the five-county region is slightly higher than the State median income. Orangeburg County has the lowest median family income and the highest proportion of individuals living at or below the Federal poverty level. The socioeconomic region's proportion of individuals living in poverty closely matches the State proportion of about 16 percent.

3.11.2 Economic Characteristics

Economic characteristics include the local employment situation and the housing market conditions. These factors become important for context if the CFFF were to change employment levels significantly during the proposed license renewal period. Unemployment rates in the five-county region are presented in Table 3-16 and reflect trends that have been observed across the nation since the mid-2000s. Unemployment was relatively low prior to the Great Recession of 2008–2010, then doubled in most areas between 2008 and 2010. Prior to the COVID-19 public health emergency (PHE), unemployment levels had been reduced to levels lower than pre-recession levels of the mid-2000s. Estimated 2020 unemployment across all counties in the region shows a 1-year doubling due principally to the economic effects of the COVID-19 PHE. However, as seen in Table 3-16, current unemployment has not approached levels seen during the recession period in 2010.

Industry employment is summarized at the metropolitan area scale by the Bureau of Economic Analysis. As shown in Table 3-17, the 2015–2018 period exhibits a diverse and growing employment base in several major industries including construction, manufacturing, trade, healthcare, financial services, and other service sector industries. Total employment was growing steadily prior to the COVID-19 PHE.

Table 3-15 Selected 2018 Demographic Characteristics of the Socioeconomic Region

Demographic	Sumter County	Lexington County	Kershaw County	Orangeburg County	Richland County	Region	South Carolina
Population reporting race/ethnicity	106,995	286,316	64,361	88,454	408,263	954,389	4,955,925
White alone	48,574	215,302	44,372	29,404	174,911	512,563	3,156,973
African American alone	50,218	41,302	15,253	54,253	188,510	349,536	1,328,352
Native American alone	272	742	147	289	660	2,110	14,187
Asian alone	1,328	5,019	253	735	11,416	18,751	74,278
Pacific Islander alone	38	275	-	83	477	873	2,812
Other race alone	100	363	157	122	1,267	2,009	8,584
Multiracial alone	2,318	6,315	1,489	1,651	10,289	22,062	95,054
Hispanic or Latino of any race	4,147	16,998	2,690	1,917	20,733	46,485	275,685
Aggregate Minority	58,421	71,014	19,989	59,050	233,352	441,826	838,833
Aggregate Minority Percentage	54.6%	24.8%	31.1%	66.8%	57.2%	46.3%	16.9%
Population reporting Poverty Status	104,409	282,695	63,958	85,572	378,039	914,673	4,814,032
Individuals at or Below Federal Poverty Level	21,177	35,768	10,488	20,697	61,617	149,747	770,632
Poverty Level Percentage	20.3%	12.7%	16.4%	24.2%	16.3%	16.4%	16.0%
Families	3,849	17,371	75,479	20,033	27,915	144,647	1,249,795
Median Family Income (2018\$)	\$63,917	\$57,866	\$72,398	\$47,002	\$51,369	\$62,852	\$63,437

Sources: USCB 2019-TN6978, USCB 2019-TN6979, USCB 2019-TN6980

Table 3-16 County Unemployment Rates, 2007–2020

County	2007	2010	2015	2019	2020
Kershaw	5.4	11.5	6.0	3.5	5.6
Lexington	4.1	8.2	4.9	2.7	4.7
Orangeburg	8.1	15.9	10.9	5.3	10.1
Richland	5.2	9.4	5.7	3.2	6.8
Sumter	7.0	12.5	6.8	3.8	7.6
Region	5.4	10.1	6.0	3.3	6.4

Source: SCWorks 2020-TN6981

Table 3-17 Columbia, South Carolina, Metropolitan Area Employment by Industry, 2015–2018

Industry	2015	2016	2017	2018
Farm employment	3,920	3,893	3,942	3,701
Forestry, fishing, and related activities	2,491	2,537	2,524	2,595
Mining, quarrying, and oil and gas extraction	876	695	669	699
Utilities	(D)	(D)	4,323	3,883
Construction	22,168	23,915	27,450	25,673
Manufacturing	32,547	32,364	29,671	31,358
Wholesale trade	16,819	(D)	16,781	16,602
Retail trade	48,422	50,063	50,601	50,926
Transportation and warehousing	(D)	15,987	17,914	19,331
Information	(D)	(D)	(D)	6,959
Finance and insurance	27,704	28,421	28,958	29,238
Real estate and rental and leasing	(D)	(D)	21,493	22,070
Professional, scientific, and technical services	25,889	26,027	(D)	(D)
Management of companies and enterprises	(D)	(D)	(D)	(D)
Administrative and support and waste management and remediation services	(D)	(D)	38,188	38,551
Educational services	10,103	10,219	9,358	9,222
Health care and social assistance	43,810	45,092	45,804	46,474
Arts, entertainment, and recreation	(D)	(D)	(D)	(D)
Accommodation and food services	(D)	(D)	(D)	(D)
Other services (except government and government enterprises)	28,953	(D)	(D)	28,999
Federal civilian	10,235	10,276	10,366	10,413
Military	12,398	11,739	12,330	12,408
State government	34,970	35,370	35,309	34,826
Local government	37,903	38,011	38,262	38,537
Total employment (number of jobs)	489,418	498,376	505,636	512,470

(D): Disclosure withheld in source data for privacy reasons; totals include undisclosed employment.

Source: BEA 2020-TN6982

3.11.2.1 Housing

Housing statistics for the local five-county region are compiled in Table 3-18. Based on the Census American Community Survey (ACS) 2014-2018 5-year data on housing units by county, the local housing market, including single-family homes and rental properties, appear to have an adequate supply of available housing. Across the region, nearly 13 percent of the habitable housing stock is vacant of which over 7 percent are rental units. The market is tighter than the State average, based on vacancy rates, but would not be considered constrained currently. The weighted average median rent across the region is slightly less than the State average.

Table 3-18 2018 County Housing Statistics (USCB 2020-TN6983)

County	Housing Units	Owner-Occupied		Renter-Occupied		Vacant Units		Median Rent	Rental Vacancy Rate
		Number	Pct	Number	Pct	Number	Pct		
Kershaw	28,799	20,404	70.8%	4,429	15.4%	3,966	13.8%	\$745	5.5%
Lexington	122,711	82,289	67.1%	28,976	23.6%	11,446	9.3%	\$907	6.2%
Orangeburg	42,689	22,427	52.5%	10,539	24.7%	9,723	22.8%	\$679	9.9%
Richland	171,000	88,450	51.7%	61,859	36.2%	20,691	12.1%	\$952	7.8%
Sumter	47,837	26,608	55.6%	14,529	30.4%	6,700	14.0%	\$776	5.9%
Region	413,036	240,178	58.1%	120,332	29.1%	52,526	12.7%	\$854	7.3%
South Carolina	2,256,951	1,305,349	57.8%	589,362	26.1%	362,240	16.0%	\$868	9.4%

3.11.2.2 Local Finance

The WEC paid \$3.4 million in property taxes and other fees to Richland County and local jurisdictions and the state in calendar year 2019. It is assumed that this is an appropriate estimate for continued annual payments over the course of the proposed 40-year renewed license period (WEC 2020-TN6844). In 2018, the WEC paid \$2.8 million, and Richland County indicates that the WEC ranked 8th of the County's largest taxpayers (Richland County 2019-TN6930). The CFFF tax revenue is a minor fraction of the total annual Richland County property tax revenue of about \$700 million.

3.11.3 Community Infrastructure and Services

This section provides baseline information regarding local services and infrastructure in close proximity to the CFFF site or which provide services to the site.

3.11.3.1 Education

Several schools are located in the Hopkins area to the north of the CFFF site and are listed in Table 3-19.

3.11.3.2 Hospitals

There are no hospitals within the 8 km (5 mi) radius of the CFFF site. There are several hospitals in the greater Columbia metropolitan area: Providence Hospital, Palmetto Richland Hospital, and Lexington Medical Center.

Table 3-19 Local Area Public Schools Information 2019-2020 School Year

School	Grades	Enrollment	Student Teacher Ratio
Hopkins Elementary	PK-5	270	11.84
Hopkins Middle School	6-8	472	11.51
Lower Richland High School	9-12	1,137	12.65
Mill Creek Elementary School	PK-5	357	11.52

Sources: National Center for Educational Statistics (NCES 2020-TN6931)

3.11.3.3 Fire and Police

Richland County is served by four fire departments including the Columbia-Richland County Fire Department, two Federal fire departments, and a State fire department. Richland County Emergency Services provides emergency medical and disaster relief services. The Alvin S. Glenn (Richland County) Detention Center is located 8 km (5 mi) north of the CFFF site, just off Bluff Road (SC 48) (WEC 2019-TN6510)

3.11.3.4 Transportation and Traffic

According to the WEC (2019-TN6510), Columbia and the surrounding area contain a well-developed and maintained system of interstate, regional, and local highways that provide easy year-round access. Three interstate highways serve Columbia. The CFFF site can be accessed by state highway S-48 (Bluff Road). Although CSX Transportation, Incorporated (CSX), operates two rail lines close to the CFFF site, there are no rail lines or spurs on the WEC property.

Currently, there are approximately 1,138 employees at the CFFF, working in one of three shifts. The annual average daily workforce is 859 workers resulting in approximately 1,700 vehicles on the road (WEC 2019-TN6510, WEC 2020-TN6844). Additional information about the transportation and traffic can be found in Section 3.13 of this EIS.

3.11.4 Socioeconomic Impacts

Socioeconomic impacts would be expected if the proposed continued operation of the CFFF for an additional 40 years would alter baseline socioeconomic conditions in some noticeable way. The current operations of the CFFF already contribute to the baseline conditions encountered in the five-county socioeconomic region. The proposed continued operation of the CFFF for an additional 40 years is not expected to noticeably change the employment level or mission of the CFFF. The CFFF would continue to be a significant employer in the Columbia metropolitan area and would continue to generate tax revenue and personal income, which would benefit the local economy through a multiplier effect as plant employees spend their income and the plant makes local expenditures. Local traffic would continue and change to the baseline impacts on local roadways and other infrastructure would not be expected.

The NRC staff could not identify impacts on local property values connected to the known contamination in close proximity to the CFFF site. Property values are affected by many factors simultaneously and may have offsetting effects. Various studies have reviewed the recent evidence and found the body of studies to be inconclusive. For example, Bezdek and Wendling (2006-TN2748) found that various studies report no statistical effect of proximity to nuclear facilities, while also finding that other studies have found positive or negative effects.

Socioeconomic impacts, including impacts on local employment, income, and tax revenues are subject to uncertainty. During the 40-year analysis period, many factors can affect the local area surrounding the CFFF site as well as the greater Columbia metropolitan area. Growth or decline of new or existing industries can offset any effects resulting from the NRC's licensing decision regarding the CFFF.

Therefore, the staff concludes that the socioeconomic impacts of proposed continued operation of the CFFF over a 40-year license period would be SMALL. Because the NRC staff does not expect changes to baseline socioeconomic impacts, the SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact (see Section 3.19 for additional information).

3.11.5 Mitigation Measures

NRC staff does not expect the proposed action to impact the baseline socioeconomic conditions of the local five-county region. Additional mitigation measures are not identified beyond the remedial investigation the WEC is conducting under the CA with the SCDHEC.

3.12 Public and Occupational Health

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts on public and occupational health of the proposed action.

The proposed renewal of the CFFF license for an additional 40 years does not involve changes to current operations. The radiological and nonradiological exposures to members of the public and workers would continue, and the WEC would continue to be bound by its license and regulatory requirements. This section describes the sources of radiation and chemical exposure, baseline health conditions, public and occupational health protection standards, and the potential direct and indirect impact of renewing the license. Additionally, Section 3.8 of this EIS discusses impacts from noise, and Section 3.13 discusses transportation impacts, such as workers commuting and shipment of materials. Section 3.15 of this EIS discusses accidents.

3.12.1 Sources and Pathways of Radiation and Chemical Exposure

Radiation doses to the general public occur from radioactive materials found in the Earth's soils, rocks, and minerals. Radon is a radioactive gas that escapes into ambient air from the decay of uranium (and its progeny, radium) found in most soils and rocks. Naturally occurring low levels of uranium and radium are also found in drinking water and foods. Cosmic radiation from outer space is another natural source of exposure and ionizing radiation dose. In addition to natural sources of radiation, there are artificial or man-made sources that contribute to the dose the general public receives. Medical diagnostic procedures using radioisotopes and x-rays are a primary man-made radiation source.

Based on the most recent National Council of Radiation Protection and Measurements (NCRP) Report No. 160, *Ionizing Radiation Exposure of the Population of the United States* (NCRP 2009-TN420), for a U.S. resident, the effective dose per individual from ubiquitous background radiation is 311 mrem/yr (3.11 millisieverts [mSv]/yr). Because of the increase in medical imaging and nuclear medicine procedures, the annual average dose to the public from all sources (natural and human-made) is 620 mrem (6.2 mSv) (NCRP 2009-TN420). The sources of this exposure are naturally occurring radionuclides, anthropogenic radionuclides (human

produced), external radiation, and internal radiation (radionuclides in the body) (NCRP 2009-TN420). This value is important for comparison to the estimated dose to a member of the public and to the occupational worker from CFFF operations.

The NRC noted in its 1985 environmental review for the license renewal for the CFFF that background radiation, expressed in terms of average gross alpha contamination, in the vicinity of the CFFF was 3.9×10^{-6} pCi/L in ambient air, 2.2 pCi/L in the Congaree River, and 1.0 pCi/L in offsite well water and drinking water (NRC 1985-TN5602). The radiological monitoring data for onsite soil resulted in a 3-year average of 0.23 to 0.65 pCi/g of total uranium. The sample locations are the same location as the ambient air monitors (NRC 1985-TN5602).

Chapter 2 of this EIS describes facility operations at CFFF. The following chemicals are kept in bulk to support manufacturing operations: aqueous ammonia, argon, calcium hydroxide, calcium oxide, fuel oil, gasoline, hydrofluoric acid, hydrogen, nitric acid, oxygen, sodium hydroxide, sodium silicate, sulfuric acid, triuranium octoxide, uranium dioxide, uranium hexafluoride and UN (WEC 2019-TN6510). Other hazardous materials include degreasing solvents, and lubricating and cutting oils (WEC 2019-TN6510).

Across the street from the CFFF on the northside of Bluff Road, there is a Superfund site known as the South Carolina Recycling and Disposal, Inc. site. It is a 1.6 ha (4 ac) site that was used for storage, recycling, and disposal operations until 1982. The migration of contaminated groundwater (mainly VOCs) from this site was stabilized and the contamination does not currently threaten people living and working near the site (EPA 2020-TN6522).

Historical incidents of interest to public and occupational health at the CFFF began in 1971 when a former wastewater lagoon leaked and released up to 1.5 million gallons of wastewater into Upper Sunset Lake (SCDHEC 2020-TN6842). As documented in a presentation by the SCDHEC (2019-TN6843), occupational and public health incidents noted in the 1980s included a fish kill in Gator Pond. A monitoring well network was established, and it was determined that the wastewater lagoons were leaking nitrates and fluoride to the groundwater. In 1995, solvent chemical contamination was noted in the groundwater and more monitoring wells were installed. Groundwater treatment to reduce the solvents in groundwater occurred between 1996 and 2011. Wastewater line leaks occurred in 2008 and 2011, and leaks from the HFSS #2 inside the facility were reported in 2018. The soil underneath the HFSS #2 was removed, remediated, and filled back in with concrete. In 2019, inspections by the WEC found a hole in the roof of a sea-land container (also referred to as intermodal container) being used to store materials containing uranium (2019-TN6843). As of November 2020, 62 intermodal containers had been removed. As the intermodal containers were removed, the WEC sampled the soil and removed contaminated soil in accordance with its site remediation procedure. The WEC has remediated soils in which the uranium levels were detected above the WEC-established residential cleanup standard (WEC 2020-TN6844). A CA with the SCDHEC was executed on February 26, 2019, to establish communication protocols, and conduct investigations of past releases, response mechanisms for future releases, evaluation of cleanup alternatives, remedial design, and remedial action (SCDHEC/WEC 2019-TN6554) (see Section 1.5.2.2.1 for additional discussion). For more information regarding water sampling, see Sections 2.2.2, 3.3, and 3.4 of this EIS. Section 2.2.2.3 of this EIS describes the CA, and Section 2.2.2.3 describes monitoring for the CA.

The WEC also completed several environmental improvement programs in the 2019-2020 timeframe, including the addition of monitoring wells around the chemical manufacturing building, removal of obsolete air-handling equipment, completion of air emission testing to

validate minor-source status for the CFFF air permit, elimination of nickel-plating room operations to eliminate the only chemical source in the mechanical manufacturing area, and elimination of PCE. Elimination of PCE means that there is no significant source of VOCs at the site. In 2021, the WEC decommissioned the East Lagoon under the SCHDEC-approved closure plan, disposed of other contaminated materials, such as calcium fluoride and obsolete cylinders, and analyzed sludge in the Sanitary Lagoon to support closure activities (WEC 2021-TN7157). For more information about waste management, see Section 3.14 of this EIS.

The radiological materials potentially released from the CFFF into the environment would be transported through the environment in a variety of ways and would expose the public through both internal and external exposure pathways. For the liquid exposure pathway, dose to the public would be through potential ingestion of aquatic food and exposure from recreational activities such as boating; there are no surface water withdrawals registered within the Saluda River Basin downstream of the WEC NPDES discharge (WEC 2021-TN7048). For the gaseous releases, the exposure pathways would include direct radiation from deposited radioactivity on the ground, inhalation of radioactive material in the air, and ingestion of crops and animal products that come in contact with radioactive material in the air.

The CFFF is bounded by private property owners to the east, south, and west. Manufacturing facilities are located about 0.5 km (0.3 mi) from the site boundary, at its nearest point. Farms, single-family dwellings, and light commercial activities are located chiefly along nearby highways. Within a 1.6 km (1 mi) radius of the CFFF site, agricultural use makes up 44 percent of the area (WEC 2019-TN6510). The remaining 56 percent is classified as “other” (WEC 2019-TN6510). Five farms are located within 8 km (5 mi) of the CFFF. These provide quail, strawberries, fish for pond stocking, and full-service equestrian services (WEC 2019-TN6510). Within the county there are a variety of farms producing vegetables, fruits, and animal products including herbs, leafy greens, corn, tomatoes, pork, and chicken (WEC 2021-TN7048).

To evaluate the dose to a member of the public the maximally exposed individual (MEI) is considered to be a potential person living adjacent to the CFFF site boundary full time and growing food and raising animals for both milk and meat on their property. Potential MEIs were modeled as being located approximately 1,000 m (1094 yd) to 2,900 m (3,173 yd) away from the center of the CFFF in the cardinal directions N, NNW, ENE, ESE, and WSW based on satellite imagery (Figure 3-25). The person is also expected to participate in recreational activities on the Congaree River and consume fish harvested from the Congaree. To be conservative, the MEI is also modeled as getting drinking water from the Congaree River, but this is not probable for a resident.

The potential exists for accidents leading to a direct or indirect release of radioactive and chemical materials. The accidental release would likely be more concentrated over a shorter period of time. Concentrations and exposure rates help determine whether there will be acute effects or chronic effects. For radiation, acute dose usually refers to a large dose of radiation received in a short period of time, while chronic dose refers to the sum of small doses received repeatedly over a long period of time. See Section 3.15 of this EIS for information about radiological and nonradiological accidents.

Additionally, the NRC-approved Site Emergency and Physical Protection Plan minimizes the potential and severity of such accidents (WEC 2019-TN6510). The WEC coordinates with the DOE Savannah River Site in Aiken, South Carolina, and the U.S. Department of Homeland Security Federal Emergency Management in Atlanta, Georgia (WEC 2019-TN6510) with regard to emergency response coordination and facility security.



Figure 3-25 Map of Potential MEIs with an Approximation of the CFFF Site Boundary

3.12.2 Protection Standards, Programs, and Permits

The NRC has statutory responsibility, pursuant to the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2011 *et seq.*; TN663) to protect worker and public health and safety. The NRC’s regulations in 10 CFR Part 20 (TN283) specify annual worker dose limits, including 0.05 Sv (5 rem) total effective dose equivalent (TEDE) and dose limits to members of the public, including 1 mSv (100 mrem) TEDE with no more than 0.02 mSv (2 mrem) in any 1-hour period from any external sources. These public dose limits from NRC-licensed activities are a fraction of background radiation dose, which is 6.2 mSv (620 mrem) from natural and man-made sources (NCRP 2009-TN420).

The WEC is required to meet the dose limits for individual members of the public as stated in 10 CFR 20.1301 (TN283) (see Table 3-20) and demonstrate compliance with the dose limits at the site boundary as required in 10 CFR 20.1302 (TN283). In addition, the WEC uses guidance in Regulatory Guide 8.37, *ALARA Levels for Effluents from Materials Facilities* to demonstrate the offsite doses are as low as reasonably achievable (ALARA) (NRC 1993-TN5601). The WEC conducts a radiological effluent monitoring program to meet the regulatory requirements in 10 CFR 70.59 (TN4883), “Effluent monitoring reporting requirements.” Data from this monitoring program are used by the WEC to perform annual assessments of dose to members of the public from liquid and gaseous effluents to ensure that limits to the public provided in 10 CFR 20.1301 (TN283) are met and are ALARA (WEC 2014-TN6421).

Table 3-20 Dose Limits for Individual Members of the Public

Annual Dose Limit from Licensed Operations	
Individual member of the public	0.1 rem/yr (1 mSv/yr)
Dose in any unrestricted area from external sources	0.002 rem/hr (0.02 mSv/hr)
ALARA constraint per 10 CFR 20.1101 (d)	0.01 rem/yr (0.1 mSv/yr) from emissions of airborne radioactive material, excluding radon

Exposure to radiation presents an additional risk of cancer. The annual dose limit set by the International Atomic Energy Agency (IAEA), and the NRC, to protect members of the public from the harmful effects of radiation is 1 mSv (100 mrem). The additional risk of fatal cancer associated with a dose of 1 mSv (100 mrem), calculated using the scientific methods of the International Commission on Radiological Protection (ICRP 2007-TN422) and applying a linear-no-threshold dose response assumption, is on the order of 1 in 20,000. This small increase in lifetime risk can be compared to the baseline lifetime risks of 1 in 2–3 for anyone developing a cancer and 1 in 5 for anyone developing a fatal cancer (ACS 2020-TN6932).

The OSHA General Industry Standards (29 CFR Part 1910-TN654) establish practices, procedures, exposure limits, and equipment specifications to preserve worker health and safety. Relevant to protecting worker health at the CFFF, standards for occupational exposure to hazardous chemicals in laboratories are found at 29 CFR 1910.1450, and personal protective equipment standards are found at 29 CFR 1910, Subpart I (TN654). The WEC is also subject to South Carolina’s Occupational Safety and Health Administration regulations that covers OSHA General Industry Standards (DOL 2022-TN7185). The WEC is required to meet the occupational dose limits for workers as stated in 10 CFR 20.1201 (TN283) (see Table 3-21). Workers are monitored for radiation exposure to ensure the occupational doses limits are met and maintained ALARA. The WEC is also required to limit risk to workers from accident conditions in accordance with 10 CFR 70.61 (TN4883).

Table 3-21 Occupational Dose Limits for Adults Established by 10 CFR 20.1201(a) (TN283)

Tissue	Annual Dose Limit
Whole body or any individual organ or tissue other than the lens of the eye	More limiting of 5 rem/yr (0.05 Sv/yr) TEDE to whole body or 50 rem/yr (0.5 Sv/yr) sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye
Lens of the eye	15 rem/yr (0.15 Sv/yr) dose equivalent
Extremities, including skin	50 rem/yr (0.50 Sv/yr) shallow dose equivalent

Source: NRC 2019-TN6472

The SCDHEC and NRC have regulatory authority at the WEC site (SCDHEC 2020-TN6845). As noted previously, environmental investigations and monitoring have been conducted at the CFFF site since the 1980s. The SCDHEC and the WEC signed a CA in February 2019 to define the sources and extent of contaminants throughout the CFFF site (SCDHEC 2018-TN6713). For the CFFF’s air permit, the SCDHEC does not require the WEC to monitor for nonradiological pollutants because the CFFF is classified as a minor-source operator, but the WEC provides modeled emission rates that the SCDHEC uses to determine compliance (WEC 2019-TN6510). The WEC does monitor for nonradiological pollutants as part of the NPDES

permitting process. The WEC also performs radiological ecological monitoring on soil, vegetation, and fish samples annually and samples vegetation for fluoride levels (WEC 2019-TN6510). The WEC is currently preparing a Remedial Investigation Report as part of the CA with the SCDHEC, so monitoring requirements may change in the future based on the final Remedial Investigation Report. The CFFF Chemical Safety Program is designed to assure that all current and proposed chemical-use hazards are evaluated, and appropriate measures are taken to assure safe operations. For instance, use of anhydrous ammonia at the CFFF was eliminated in August 2011, and replaced by the use of aqueous ammonium hydroxide. This resulted in a reduction in chemical hazard risk (WEC 2019-TN6510). The WEC has programs in place to manage industrial hazards, hazardous materials, and radioactive materials. Industrial hazards for the CFFF are those considered typical for similar industrial facilities and include exposure to chemicals and accidents ranging from minor cuts to harm from industrial machinery (NRC 2007-TN5598).

The WEC holds an International Organization for Standardization (ISO) 9001 Certification of Approval. While the approval isn't required by NRC or OSHA regulations, the ISO process implements a quality assurance program by which safety requirements are met, hazards are identified, and risks are reduced. The facility also has a Clinical Laboratory Improvement Amendments Certification, Environmental Laboratory Certification, NPDES Permit, Air Quality Operating Permit, Infectious Waste Generator Registration, Radioactive Materials License, Radioactive Waste Transport Permit, and Registration for radiation-producing machines and other sources of ionizing radiation from the SCDHEC (WEC 2019-TN6510). These permits, certifications and licenses assist in maintaining public and occupational health. A list of permits held by the WEC for CFFF can be found in Section 1.3.4 of this EIS.

3.12.3 Public Health Impacts

Potential public health impacts could result from release of radiological materials and nonradiological hazardous materials that are transported from the site through the air, surface water, or groundwater.

The WEC conducts a radiological effluent monitoring program to meet the regulatory requirements in 10 CFR 70.59, "Effluent monitoring reporting requirements" (TN4883). Data from this monitoring program are used by the WEC to perform annual assessments of dose to members of public from liquid and gaseous effluents to ensure that public dose limits provided in 10 CFR 20.1301 (see Table 3-20 [TN283]) are met and are ALARA (WEC 2014-TN6421). Doses at the CFFF site have been below 1 mrem/yr (WEC 2021-TN6904, WEC 2020-TN6912, WEC 2020-TN7016, WEC 2019-TN6950, WEC 2019-TN6550, WEC 2018-TN7049, WEC 2021-TN7109). Offsite effluent releases are monitored at release points and reported to the NRC on a semiannual basis. In addition, doses to the public are estimated on an annual basis. The sources of radiation from the CFFF include both uranium and Tc-99 from operation activities (see Chapter 2 of this EIS for detailed information about the operational processes and points of release). The annual average discharge rate for uranium in gaseous effluents can be found in Section 2.2 of this EIS and the measured discharge to the Congaree River for uranium and Tc-99 can be found in Chapter 2, Table 2-2 of this EIS. For estimating a dose to the MEI, the gaseous release of uranium is assumed to be 470 μ Ci/yr (WEC 2019-TN6510) and the discharge of uranium and Tc-99 is assumed to be 13.4 mCi and 10.4 mCi, respectively (WEC 2019-TN6510).

Radiation doses to the public and nonhuman biota were evaluated using the computer program NRCDOSE3 (NRC 2021-TN7050) including XOQDOQ, GASPAR II, and LADTAP II. Potential

doses to an MEI included exposure to gaseous effluents as well as liquid effluents releases to the Congaree River but did not include exposure to contaminants in the groundwater, because there is a low potential for contaminants to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources (e.g., the environmental sampling and monitoring program) (see Section 3.4 of this EIS for additional information). XOQDOQ was used to determine the gaseous dispersion of radiation (see Section 3.7 of this EIS). GASPARG was used to evaluate the doses to the potential MEI by evaluating dose to a potential resident living adjacent to the site boundary, including doses from external exposure to radiation on the ground and in the air as well as internal exposure to radionuclides inhaled or ingested through vegetables, meat, and milk that is grown/raised/or produced at the residence. LADTAP was used to evaluate the dose to an MEI assuming that the MEI gets drinking water and fish for consumption from the Congaree River downstream from the effluent discharge point and participates in recreational activities including boating and shoreline exposure.

The highest radiation dose to a potential MEI from uranium released through gaseous effluents in a year was found to be approximately 0.2 mrem/yr. Doses to the potential MEI from yearly liquid effluent releases of uranium and Tc-99 was found to be approximately 0.0001 mrem/yr. These doses are comparable to those calculated by the licensee in semiannual reports to the NRC (WEC 2020-TN6912, WEC 2020-TN7016, WEC 2019-TN6950, WEC 2019-TN6550, WEC 2018-TN7049). This is below the WEC's ALARA goal of a 1 mrem/yr dose to members of the public from gaseous and liquid effluents (WEC 2019-TN6510). If compared to the dose limit in 10 CFR 20.1301, this is less than 1 percent of the 100 mrem/yr (1 mSv/yr) limit. That dose also represents less than 10 percent of the 10 mrem/yr ALARA requirement from air emissions in 10 CFR 20.1101. Compared to the ubiquitous background dose given in NCRP Report 160 of 311 mrem/yr (NCRP 2009-TN420), the 0.2 mrem/yr is only a small fraction of that amount. These doses to a potential MEI living at the site boundary are compliant with the regulatory limits set in 10 CFR Part 20 (TN283).

Liquid effluent from the CFFF includes sanitary waste and process liquid waste containing ammonia and fluorides. To comply with its NPDES permit requirements and 10 CFR Part 20 (TN283) regulatory limits, the WEC currently treats the sanitary waste and process liquid waste onsite prior to its being discharged into the Congaree River. According to the WEC, the average combined liquid effluent flows were 100,000 gpd over a 10-year period (WEC 2019-TN6510).

The CFFF is classified as a minor-source operator and operates under an air permit from the SCDHEC (WEC 2019-TN6510). The WEC submitted an air permit renewal application to the SCDHEC and the final approval is pending. The WEC is required to comply with the emission limitations in Section II of the permit (WEC 2019-TN6510). There are 42 exhaust stacks that discharge gaseous emissions, such as uranium compounds, ammonia, and fluorides (WEC 2019-TN6510). Gaseous effluents are treated through HEPA filters and scrubbers prior to discharge to comply with regulatory limits in 10 CFR Part 20 (TN283) (WEC 2019-TN6510). The facility also uses an incinerator, gas-fired boilers, gas-fired calciners, and oil-fired diesel generators, which all release gaseous effluents (WEC 2019-TN6510).

The impacts of the proposed action could result in potential direct and indirect exposure to members of the public from releases of radiological and nonradiological hazardous materials. Based on this review, the continued requirements to meet NRC dose limits to the public, compliance with the NPDES permit and the SCDHEC's air permit, the facility's environmental sampling and monitoring, and regulatory oversight by the SCDHEC and the NRC, the NRC staff

considers direct and indirect impacts on members of the public from renewing the CFFF license for an additional 40 years to be SMALL. Based on the potential for cumulative impacts on public and occupational health from nearby actions and facilities, the SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact (see Section 3.19 for additional information).

3.12.4 Occupational Health Impacts

During normal facility operations, occupational workers would be expected to be exposed to radiological and nonradiological hazardous materials that must be within regulatory limits. The WEC has a Chemical Safety Program and other occupational programs in place to minimize worker health impacts, including accidents, such as electrical shock and asphyxiation, while workers are engaged in activities such as facility maintenance and testing. Health impacts on the CFFF workers would also be through exposure or improper handling of nonradiological materials including zirconium alloys, acetone, ammonia, nitric acid, and hydrofluoric acid (WEC 2019-TN6510).

The WEC is required to meet the occupational dose limits for workers as stated in 10 CFR 20.1201 (TN283). Workers are monitored for radiation exposure to ensure the occupational doses limits are met and maintained ALARA. The WEC is also required to limit risk to workers from accident conditions in accordance with 10 CFR 70.61 (TN4883) and monitor workers for radiation exposure (WEC 2019-TN6510).

According to the March 2019 ER, no serious injuries or deaths have occurred at the CFFF site since operations began in 1969 (WEC 2019-TN6510). In 2019, the WEC reported to the NRC an event requiring three employees to be hospitalized as a result of maintenance work on hydrofluoric acid process equipment. The employees stayed at the hospital overnight and were released with no work restrictions. The incident was entered into the WEC's CAP (NRC 2020-TN6847). For 2017 and 2018, the CFFF total recordable incident rates were 0.83 and 2.10, respectively. The rate is defined as the number of OSHA-recordable injuries and illness versus the total number of man-hours worked. As noted by the U.S. Bureau of Labor Statistics, the 2020 average incident rate of nonfatal occupational injuries and illnesses for chemical manufacturing facilities such as the CFFF is 1.8 (BLS 2021-TN7158).

The continued operation of the CFFF would result in the potential direct and indirect exposure from release of radiological and nonradiological hazardous materials resulting in potential occupational health impacts on workers. According to the WEC, from 2005 to 2011, the average annual total effective dose to a radiation worker ranged between 197 mrem (1.97 mSv) (0.197 rem) and 327 mrem (3.27 mSv) (0.327 rem) (WEC 2014-TN6421). In its revised ER (WEC 2019-TN6510), the WEC noted that the average annual total effective dose for a radiation worker from 2014 through 2018 was lower and ranged from 98 to 143 mrem (0.98 mSv to 1.43 mSv) (0.098 to 0.143 rem). These doses are less than 10 percent of the 5.0 rem (50 mSv) annual occupational dose limits in 10 CFR 20.1201 (WEC 2019-TN6510). The average worker dose (TEDE) at a fuel cycle facility (fuel fabrication, processing, uranium enrichment, and UF₆ production facilities) in 2017 was 90 mrem (0.9 mSv) (0.09 rem) (WEC 2019-TN6550). In 2017, there were 339 workers at the CFFF with measurable committed effective dose equivalent (CEDE); the collective CEDE at the CFFF was 40.153 person-rem, the highest CEDE of the fuel fabrication facilities in 2017 (WEC 2019-TN6550).

The impacts of the proposed action would result in the potential direct and indirect exposure of occupational workers to the release of radiological and nonradiological hazardous materials.

Worker radiological dose exposures would be expected to remain below 10 CFR Part 20 (TN283) regulatory limits, and the WEC is expected to continue to comply with OSHA regulations; therefore, the NRC staff considers direct and indirect impacts on occupational workers from the proposed renewal of the CFFF materials license for an additional 40 years to be SMALL. Based on the potential for cumulative impacts on public and occupational health from nearby actions and facilities, the SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact (see Section 3.19 for additional information).

3.12.5 Mitigation Measures

The proposed action is not anticipated to result in significant public and occupational human health effects. Current processes, programs, and regulations are in place to reduce impacts to public and occupational human health effects. No additional mitigation measures beyond those implemented under the CA (SCDHEC/WEC 2019-TN6554) or the three new license conditions are necessary. The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either the SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2, and 2.4.2 of this EIS.

3.13 Transportation

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts on transportation from the proposed action.

The CFFF site is located in Richland County, South Carolina, and can be accessed by South Carolina highway S 48 (or Bluff Road). The major transportation corridors in the Columbia, South Carolina, area include Interstate highways I-20 (east-west), I-26 (northwest to southeast), and I-77 (north to south). Interstate 20 is approximately 22.4 km (14 mi) north of the CFFF site. Interstate 26 is slightly more than 12.8 km (8 mi) west of the CFFF site. Interstate 77 is approximately 9.6 km (6 mi) to the northwest. Other roads include US-21 (11.2 km [7 mi] west of the CFFF site), US-76/378 (about 9 km [5 mi] north of the CFFF site), and S 37 (about 2.4 km [1.5 mi] to the southeast of the CFFF) (see Figure 2-1).

CSX Railroad runs two train lines within 8 km (5 mi) of the CFFF site, but there are no rail lines or spurs on the site itself. The closest airport is the Columbia Metropolitan Airport, located 26 km (16 mi) away, northwest of the site. The Congaree River, which flows approximately 6.4 km (4 mi) southwest of the CFFF site, supports commercial barge traffic.

The South Carolina Department of Transportation (SCDOT) provides annual average daily traffic (AADT) counts by highway and highway segment. There are two traffic counting stations on S 48 on either side of the CFFF site entrance. The AADT counts in 2018 and 2019 for

station #244, which is north of the CFFF site entrance and headed toward the City of Columbia, were 6,700 and 7,500, respectively (SCDOT 2019-TN6573, SCDOT 2020-TN6570). The AADT counts in 2018 and 2019 for station #241, which is south of the CFFF site entrance and heading toward Gadsden, were 4,200 and 4,900, respectively (SCDOT 2019-TN6573, SCDOT 2020-TN6570).

The South Carolina Department of Public Safety (SCDPS) provides data about traffic accidents, injuries, and fatalities. In Richland County, 5,669 people were injured in traffic accidents and 52 traffic fatalities occurred in 2017, and 5,124 people were injured and 50 traffic fatalities occurred in 2018. Table 3-22 summarizes the traffic accident, injury, and fatality rates for Richland County for 2017 and 2018 (SCDPS 2018-TN6575, SCDPS 2019-TN6574).

Table 3-22 Richland County Traffic Accidents, Injuries, and Fatalities and Rates

Year	Vehicle Miles Traveled	Accidents	Accident Rate (per mile)	Injuries	Injury Rate (per mile)	Fatalities	Fatality Rate (per mile)
2017	4,120,696,522	13191	3.201E-06	5669	1.376E-06	52	1.262E-08
2018	4,300,003,041	13519	3.144E-06	5124	1.192E-06	50	1.163E-08

Source: SCDPS 2018-TN6575, SCDPS 2019-TN6574

The annual average daily workforce is 859 workers. Assuming one worker per vehicle (maximum traffic estimate), then the total number of worker vehicles on local roads would be 1,718 per day (i.e., = 2 x 859) (WEC 2019-TN6510).

The CFFF has approximately 1,342 shipments of chemicals, radioactive material, and waste annually, which equates to approximately seven vehicles per day (WEC 2019-TN6510). Therefore, vehicles either carrying workers or shipments represent 23 to 35 percent of the AADT count for the two Bluff Road stations in 2019.

Completed fuel assemblies are shipped to customers in NRC-certified fissile material packages such as the Traveller (NRC 2019-TN6511). Figure 3-26 shows 10 Traveller unirradiated fuel transportation packages being transported on a truck. Low-level radioactive waste (LLRW) is shipped to NRC-licensed or NRC Agreement State-licensed LLRW disposal sites. The WEC must follow NRC, DOT, and SCDOT requirements for shipment of radioactive materials.



Figure 3-26 Ten Traveller Unirradiated Fuel Transportation Packages Being Transported on a Truck (Source: Photo provided by the WEC)

3.13.1 Transportation Impacts

The proposed action does not involve any increase in workforce size or a significant increase in material or waste shipments. All material shipments will be conducted in accordance with applicable regulations from NRC, DOT, and the State of South Carolina. Operational activities will remain at current staffing levels. Therefore, the NRC staff does not expect any significant transportation impacts as a result of the proposed continued operation of the CFFF for an additional 40 years. Accordingly, the NRC staff considers direct and indirect transportation impacts to be SMALL. Based on these minor impacts, the SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact (see Section 3.19 for additional information).

3.13.2 Mitigation Measures

Transportation activities are a vital aspect of manufacturing that cannot be avoided, but negative impacts can be minimized by following established regulations. All shipments of nuclear materials, chemicals, and wastes would be carried out in conformance with NRC, DOT, and South Carolina requirements, including using truck placarding to identify contents and manifests. Trucks used for transport would be of the design and size deemed appropriate by the applicable regulations, and subject to the necessary inspections and maintenance to ensure safe transport. The proposed action is not expected to result in significant transportation impacts and additional mitigation measures are not identified.

3.14 Waste Generation and Management

This section describes the context of the proposed continued operation of the CFFF for an additional 40 years, and the potential direct or indirect impacts resulting from waste generation and management related to the proposed action. More specifically, this section describes the types of waste generated by the WEC at the CFFF and the disposition of the waste.

Section 2.1.2 of this EIS describes the facility operations that generates solid, gaseous and liquid wastes; Section 2.2.1 discusses the gaseous and liquid effluents; and Section 2.2.2 discusses monitoring and mitigation of the effluents. The WEC manages these wastes using a combination of onsite processing, onsite storage, offsite disposal, incineration, and recycling. The WEC would continue to generate several types of wastes—gaseous, liquid, and solid—during the proposed continued operation of the CFFF for an additional 40 years.

3.14.1 Waste Generation and Management and Impacts

3.14.1.1 Gaseous Wastes

The gaseous effluents currently generated by the CFFF operations would continue under the proposed LRA. Sections 2.2.1.1 and 3.7.2 of this EIS discuss gaseous effluents that are monitored (uranium compounds, ammonia, and fluorides) and modeled (nonradiological gaseous pollutants; e.g., particulate matter, sulfur dioxide (SO₂), nitrogen oxide (NO_x), carbon monoxide, volatile organic compounds (VOCs), toxic air pollutants). There are 42 exhaust stacks at the CFFF. Gaseous effluents from the CFFF are normally treated by HEPA filters, scrubbers, or both prior to discharge in accordance with 40 CFR Part 50 (TN1089) and 40 CFR Part 61 (TN3289), and 10 CFR Part 20 (TN283; WEC 2019-TN6510). Additionally, the SCDHEC requires a demonstration that a facility, such as the CFFF, will not cause an exceedance of the NAAQSs (40 CFR Part 50, “National Primary and Secondary Ambient Air Quality Standards”). The CFFF is a minor-source operator and operates under an air permit

with the SCDHEC (1900-0050-R1; WEC 2019-TN6510), which is currently in timely renewal. The WEC's air permit renewal application with the SCDHEC will include a new emissions calculation and the elimination of plating activities that occurred prior to 2020 (WEC 2020-TN6844). The CFFF has been below all regulatory limits for gaseous radiological effluents and nonradiological effluents, as further discussed in Sections 2.2.1.1 and 3.7.2 (WEC 2019-TN6510).

3.14.1.2 *Liquid Wastes*

There are two types of liquid effluent streams from the CFFF operations: process liquid wastes and sanitary waste sewage. Section 2.2.1.2 and 3.3.2 of this EIS describe these effluents in more detail and the associated monitoring programs. All liquid discharges must be in compliance with the facility's NPDES permit (SC0001848; SCDHEC 2017-TN5607). Liquid discharges of radiological constituents (whether gross measurements or isotopic specific) must be in compliance with the radiological dose limits to the public and protection of the environment, in accordance with the facility's license under 10 CFR Part 20 (TN283) and Part 70 (TN4883; WEC 2019-TN6510). The NPDES permit that authorizes discharge to the Congaree River also requires groundwater monitoring, and the WEC provides groundwater monitoring results to the SCDHEC annually (SCDHEC 2020-TN6984). The WEC is currently working with the SCDHEC on a renewal of the NPDES permit (WEC 2020-TN6844). In addition, stormwater runoff from the site is permitted in accordance with the SCDHEC's general NPDES permit for Storm Waste Discharges Associated with Industrial Activities (General Permit Number SCR000000; WEC 2019-TN6510). Changes in operations and discharges are discussed in Section 2.2.1.2, and operational changes based on closure of the East and Sanitary Lagoons are expected to continue under the proposed license renewal period.

3.14.1.3 *Solid Wastes*

The CFFF generates multiple types of solid waste: combustible, hazardous, mixed, nonhazardous, industrial, and radioactive wastes. The associated processes would continue under the proposed license renewal term.

Combustible wastes are generated through the manufacturing process. Combustible wastes containing uranium are either incinerated and leached to recover the uranium or shipped offsite to other licensed facilities for recovery. Noncombustible wastes and selected combustible wastes are packaged in compatible containers, compacted when appropriate, measured to verify the uranium content, and placed in storage to await shipment for further treatment, recovery, or disposal (WEC 2019-TN6510). In the past, the WEC stored drums of combustible waste, containing uranium waiting for uranium recovery via onsite incineration, in intermodal containers (sea-land containers) in an outdoor storage area. This practice of storing the waste in intermodal containers led to leakage and subsurface contamination. The CFFF has emptied all the intermodal containers in the Southern Storage Area that contained accountable uranium and uranium contaminated materials (see Section 2.1.3.1; WEC 2020-TN6844). The WEC has revised procedures to prohibit the future storage of uranium-containing materials in intermodal containers (WEC 2019-TN6552).

The CFFF is a large-quantity generator of hazardous wastes that include degreasing solvents, lubricating and cutting oils, and zirconium-laden wastes. The WEC also produces hazardous waste in the fabrication of TPBARs at CFFF, which is discussed in detail at Section 2.1.2 of this EIS. TPBAR assembly generates acetone-contaminated rags and zirconium alloy metal shavings that are consolidated in the same drums and stored in the same location as the

wastes from the manufacturing of the fuel at CFFF (WEC 2021-TN7126; WEC 2022-TN7182). These hazardous wastes are regulated under 40 CFR Part 261 (TN5092), "Identification and Listing of Hazardous Waste;" 40 CFR Part 262 (TN5492), "Standards Applicable to Generators of Hazardous Waste;" and South Carolina Hazardous Waste Regulations R61-79.261 (SC Reg 61-79-TN6888). Cumulative impacts associated with manufacturing TPBARs at CFFF are evaluated in Section 3.19 of this EIS

Hazardous wastes are stored at an onsite storage pad until being shipped for disposal offsite through permitted contractors. The rate of hazardous waste generated was approximately 92,360 kg (204,000 lb) annually from 2013 to 2018, except in 2017. In 2017, the WEC generated 105,607 kg (232,824 lb) of hazardous waste (WEC 2019-TN6510) based on an increase volume of waste from the plating process. The WEC stated that it believes the amount of hazardous wastes at the CFFF will be similar over the proposed license renewal term to the averages from 2013 to 2018, excluding 2017 (NRC 2019-TN6474). The WEC provides Hazardous Waste Generation Reports quarterly to the SCDHEC (NRC 2018-TN6416).

The CFFF operations produce a variety of LLRW, including used packaging, clothing, paper, and tools. After sorting, the LLRW is transferred to an onsite waste processing station, where radiation surveys are conducted. The waste may then be decontaminated for free release or reuse or shipped offsite for disposal at the Waste Control Specialists facility in Andrews, Texas. The LLRW is shipped offsite for disposal in 55-gallon drums or sea-land containers. The WEC stated that the amount shipped offsite between 2010 and 2018 has ranged from 12,000 ft³ to 38,000 ft³ (340 m³ to 1,100 m³) respectively, with an annual average of 24,000 ft³ (680 m³) (WEC 2019-TN6510).

The CFFF operations generate a limited amount of mixed waste. Mixed waste contains both hazardous and radioactive components and is regulated by the Resource Conservation and Recovery Act of 1976 (42 U.S.C. § 6901 *et seq.*; TN1281) and the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2011 *et seq.*; TN663). Mixed waste from the CFFF operations consists of materials that cannot be free-released, and include batteries (dry cell, lead acid, lithium), polychlorinated biphenyl-containing light ballasts, contaminated lamps, and lead shielding (WEC 2019-TN6510). The WEC expects to generate 5 to 10 drums of mixed waste per year (NRC 2019-TN6474). Mixed waste is disposed of offsite through permitted contractors.

Nonhazardous waste from the CFFF operations consists of items from routine office and industrial activities. The nonhazardous waste includes batteries, computers, oil filters, rags, and trash from office areas and lunchrooms. Nonhazardous waste generation rates have increased from 4,218 kg/yr (9,300 lb/yr) in 2013 to 178,446 kg/yr (393,000 lb/yr) in 2017, as a result of changing recycling markets. Industrial trash waste from office areas and lunchrooms has decreased from 292 MT in 2013 to 201 MT in 2017. These wastes are stored on the onsite storage pad and disposed of offsite at a State-permitted landfill (WEC 2019-TN6510). In 2012, the WEC implemented a recycling program for wood, corrugated cardboard, and rigid plastics. The WEC also implemented a food composting program to reduce food waste from the site (NRC 2018-TN6549).

Calcium fluoride, a nonhazardous industrial waste, is removed from West Lagoons I and II approximately every 2 years and from the North and South Lagoons less frequently. Calcium fluoride is either recycled or disposed of offsite. Every 2 years the calcium fluoride is recovered by dewatering the lagoons, dredging, and then storing it nearby to dry the material. The average amount of calcium fluoride, based on data from 2014 to 2018, is 4,152 tons (T) (WEC 2019-TN6510). Calcium fluoride was also recovered during the closure activities for the East

Lagoon (WEC 2021-TN7157, and WEC 2021-TN7133). Under 10 CFR 20.2002, “Method for Obtaining Approval of Proposed Disposal Procedures” (10 CFR 20.2002-TN283), the WEC determined through analytical methods a criterion of 30 pCi/g of uranium in the determination of the disposition of the calcium fluoride (WEC 2019-TN7137). Currently, calcium fluoride with a mean concentration of less than 30 pCi/g of uranium (free-release criterion) is sent to an offsite concrete plant through a permitted recycling activity (WEC 2019-TN6510; NRC 2020-TN6935). If the calcium fluoride does not meet the criterion, (the mean concentration of uranium exceeds 30 pCi/g), then the WEC must either request a license exemption or ship it offsite for disposal as low level radioactive waste (LLRW) (WEC 2019-TN6510).

On December 9, 2020, the NRC approved the WEC’s alternate disposal request under 10 CFR 20.2002, granted the WEC related exemptions (85 FR 81525-TN7164) under 10 CFR 70.11 and 10 CFR 30.11, and issued a conforming license amendment to allow the WEC to transfer specific waste containing byproduct and special nuclear material to US Ecology, Inc. (USEI), a Subtitle C RCRA disposal facility, near Grand View, Idaho. The USEI disposal facility is permitted by the State of Idaho to receive low-level radioactive waste and is not licensed by the NRC. While Idaho is not an NRC Agreement State, Idaho regulations and the Grand View facility permit make USEI’s acceptance of NRC-licensed material for disposal contingent upon NRC approval of the exemptions that the WEC has requested. The WEC’s specific waste material to be transferred to USEI included solid calcium fluoride sludge previously dredged from various onsite lagoons on the site and placed in a storage pile (all of this material is known to contain <0.5 weight percent U-235). On March 12, 2021 (86 FR 16239-TN7168), October 12, 2021 (86 FR 57705-TN7167) and March 24, 2022 ((87 FR 16772 – TN7217), the NRC staff granted similar exemptions to the WEC and USEI. Notification of the NRC staff’s EA supporting these four approvals were provided in the *Federal Register*: December 2020 (85 FR 79228-TN7166), March 2020 (86 FR 13915-TN7165), October 2021 (86 FR 56729-TN7169), and March 2022 (87 FR 13766-TN7196).

3.14.1.4 Impacts

The proposed action, if approved, would allow the CFFF to operate for another 40 years. The WEC did not propose changes to its licensed operations. As described in Section 3.14.1.3, solid waste is both non-hazardous and hazardous. The annual generation and management of solid waste over the 40 years is expected to remain at current levels.

The CFFF has seen an increase in its solid and hazardous waste streams over the last 3 to 4 years. The NRC staff expects that during the proposed license renewal term the WEC would continue to re-evaluate and assess its processes and waste streams, and thus the volume and types of waste changes could also change. The NRC staff also anticipates that the remediation activities at the CFFF in response to the CA with the SCDHEC will generate additional waste beyond the solid and hazardous waste streams from the operation of CFFF (SCDHEC/WEC 2019-TN6554).

The WEC committed to follow all applicable State and Federal regulations, as indicated in the WEC LRA and March 2019 ER. The NRC staff expects that disposal capacity at offsite facilities will remain available for the anticipated volumes of nonhazardous and hazardous solid waste over the proposed license renewal period. There are no existing and reasonably foreseeable projects, activities, or actions in the vicinity waste disposal that would negatively affect the disposal capacity for the CFFF wastes. LLRW and mixed waste are shipped in DOT-approved packages, and shipments are made in compliance with applicable State and Federal regulations

(WEC 2019-TN6510). The NRC staff recognizes the uncertainty regarding the long-term availability of commercial offsite storage of LLRW. While this uncertainty exists, the NRC staff finds it is reasonable to assume that sufficient LLRW capacity would be available during the proposed renewal term when needed. Historically, the demand for LLRW disposal capacity has been met by private industry, and the NRC staff anticipates that this trend would continue in the future (NRC 2014-TN4117).

Decommissioning of the CFFF site will generate significant volumes of LLRW. The NRC staff expects that the WEC will work with private industry to prepare plans for the needed disposal capacity for decommissioning. Limitations in capacity at the four licensed LLRW facilities within the United States may pose challenges for the WEC.

The NRC staff expects that waste generation and management over the proposed license renewal period for the CFFF would be similar to current generation rates and management practices. Therefore, the NRC staff does not expect any significant waste generation and waste management impacts as a result of the proposed continued operations of the CFFF for an additional 40 years, and any impacts on waste generation and management would be SMALL. Based on these minor impacts and because the NRC staff does not expect changes to waste management impacts, the SMALL incremental impact contribution from the proposed action would not result in a collectively significant impact (see Section 3.19 for additional information). Because there is uncertainty regarding the long-term availability of commercial offsite storage of LLRW in the U.S. during decommissioning of the CFFF, the NRC staff found that impacts as a result of decommissioning on waste management would be SMALL to MODERATE.

3.14.2 Mitigation Measures

Waste minimization actions can include reuse and recycling of nonradioactive materials, e.g., reuse of pallets and recycling of low-density plastic films as well as recovery of materials for reuse. The CFFF processes radioactive materials to recover uranium onsite or the materials are shipped to offsite licensed facilities (WEC 2019-TN6510). Uranium is recovered from combustible materials produced at CFFF through incineration, then chemical leaching the ash and clinker residue to form UN for recycle/reuse at the CFFF (WEC 2019-TN6510; WEC 2021-TN7048). The WEC eliminated the use of PCE in the solvent extraction process in 2020, and

Radiological Risk Regulations

As noted in NUREG-1520 (NRC 2010-TN5597), the specific regulations related to radiological risk are as follows:

10 CFR 20.1101 states that licensees shall apply procedures and engineering controls to achieve exposures to workers and the public that are ALARA.

10 CFR 20.1406 states that licensees shall design and develop procedures for operation that will minimize contamination of the facility and the environment, facilitate eventual decommissioning, and minimize the generation of radioactive waste.

10 CFR 70.22(i)(1) requires either an evaluation that the maximum dose to a member of the public resulting from a release of materials would not exceed 1 rem or 2 milligrams soluble uranium intake or the submission of an emergency plan for responding to the radiological hazards of a postulated accident.

10 CFR Part 70, Subpart H, contains requirements for performing ISAs, designating IROFS, and having management measures in place, both to ensure that IROFS are readily available and reliable in the context of the performance requirements and to provide facility change management and configuration control.

that change will continue to reduce the hazardous material in the liquid effluent streams and elimination of PCE degradation products in the solid mixed wastes (WEC 2020-TN6928). Noncombustible materials may be decontaminated for reuse, recycle, or release from the plant. The WEC plans to continue waste minimization as a mitigation measure.

3.15 Accidents

The term “accident,” as used in this section, refers to any abnormal event that results in a radiological and/or nonradiological release of materials into the environment. The focus of this review is on events that could lead to releases substantially in excess of permissible limits for normal operations. Normal release limits are specified in 10 CFR Part 20 (TN283), and regulations that apply to the control and management of radiological and nonradiological risks from accidents are also in 10 CFR Part 70 (TN4883).

Subpart H of 10 CFR Part 70 (TN4883) requires certain fuel cycle facilities licensed under Part 70 to perform an Integrated Safety Analysis (ISA). Subpart H of 10 CFR Part 70 applies to the WEC’s CFFF. An ISA is defined in 10 CFR 70.4 as “... a systematic analysis to identify facility and external hazards and their potential for initiating accident sequences, the potential accident sequences, their likelihood and consequences, and the items relied on for safety.” The ISA describes the licensee or applicant’s compliance with the 10 CFR 70.61 performance requirements, which require that controls be implemented to make credible high-consequence events highly unlikely or the consequences less severe than those in 10 CFR 70.61(b)(1)–(4) and to make credible intermediate-consequence events unlikely or the consequences less severe than those in 10 CFR 70.61(c)(1)–(4). In addition, the risk of nuclear criticality accidents must be limited by assuring that all nuclear processes are subcritical and in compliance with 10 CFR 70.61(d). The engineered or administrative controls and measures necessary to meet these performance requirements are known as items relied on for safety (IROFS). The WEC performed an ISA and submitted a summary to the NRC (WEC 2019-TN7137). As part of the LRA, the WEC submitted its ISA methodology for NRC’s review and approval. In addition, the WEC submits an updated ISA Summary to the NRC annually.

The purpose of the NRC staff’s review of the ISA summary is to establish reasonable assurance that the licensee has conducted an adequate ISA that meets 10 CFR 70.62(c)(1) and (2) requirements; for each applicable process, used methods and qualified staff adequate to achieve the requirements of 10 CFR 70.62; identified and evaluated all credible events (accident sequences) internal to the facility (e.g., explosions, spills, fires) and credible external events that could result in facility induced consequences to workers, the public, or the environment, that could exceed the performance requirements of 10 CFR Part 70 (TN4883); and evaluated the designated engineered and administrative controls and IROFS for preventing or mitigating the applicable accident sequences, and applied management measures to provide reasonable assurance that the performance requirements of 10 CFR 70.61 are met. Neither the ISA nor the summary are incorporated into the license (NRC 2010-TN5597).

In Chapter 4 of its LRA (WEC 2019-TN6423), the WEC discussed its ISA methodology, including consideration of the effects on workers and members of the public from chemical hazards, fire hazards, criticality accidents, and radiological hazards. Table 3-23 describes the criteria the WEC identified for determining the severity of accident consequences to comply with the performance requirements in 10 CFR 70.61 (WEC 2019-TN6571). The NRC staff’s safety review evaluates whether the ISA methodology provides reasonable assurance that the potential failures, hazards, accident sequences, and scenarios have been evaluated. The NRC staff, as part of its safety review of the LRA, determines whether the IROFS will be available and reliable to reduce the likelihood of occurrence and consequences of the credible accident

sequences to acceptable levels in accordance with the performance requirements of 10 CFR 70.61. Additionally, as part of the safety review, the NRC staff determines if the WEC has committed to an acceptable radiation protection program that meets requirements set forth in 10 CFR Part 19 (TN5491), Part 20 (TN283), and Part 70 (TN4883). Both chemical and radioactive materials are present in the fuel fabrication operations at the CFFF.

In its March 2019 ER, the WEC (2019-TN6510) identified the bounding maximum consequence basis accidents for the CFFF:

- liquid system criticality
- dry system criticality
- soluble uranium release
- insoluble uranium release
- aqueous ammonia release
- hydrofluoric acid release
- nitric acid release
- chlorine release
- hydrogen explosion
- fuel oil fire
- natural phenomena hazards

Table 3-24 identifies a spectrum of potential accidents in different areas of the CFFF (e.g., tank farm, chemical and manufacturing areas) and the chemical and radiological materials (e.g., uranium, fluoride, nitrate, hydrogen fluoride) that could be released (WEC 2019-TN6510).

Table 3-23 Accident Sequence Consequences

Level	Worker	Public	Environment
High	Radiological dose greater than or equal to 1 Sv (100 rem) total effective dose equivalent	Radiological dose greater than or equal to 0.25 Sv (25 rem) total effective dose equivalent	None.
	400 mg soluble uranium intake or greater	30 mg soluble uranium intake or greater	
	Chemical exposure greater than or equal to ERPG-3	Chemical exposure greater than or equal to ERPG-2	
Intermediate	A nuclear criticality accident Radiological dose greater than or equal to 0.25 Sv (25 rem) but less than 1 Sv (100 rem) total effective dose equivalent	Radiological dose greater than or equal to 0.05 Sv (5 rem) but less than 0.25 Sv (25 rem) total effective dose equivalent	A 24-hour averaged radioactive release outside the restricted area greater than 5,000 times Table 2 Appendix B of 10 CFR Part 20
	150 mg soluble uranium intake or greater	Chemical exposure greater than or equal to ERPG-1 but less than ERPG-2	
	Chemical exposure greater than or equal to ERPG-2 but less than ERPG-3		
Low	Accidents with radiological and/or chemical exposures to workers less than those above	Accidents with radiological and/or chemical exposures to the public less than those above	Radioactive releases to the environment producing effects less than those specified above

ERPG: Emergency Response Planning Guidelines
Source: WEC 2019-TN6423

Table 3-24 Potential Accidents and Releases of Concern

Facility Area and Material Involved	Potential Accidents	Severity^(a)	Releases of Concern
Tank farm <ul style="list-style-type: none"> • Ammonium hydroxide • Sodium hydroxide • Nitric acid 	Pipeline or tank leak; rupture, spills, fire	1, 2	Ammonia Nitrate Caustic and acid solutions
Lagoons <ul style="list-style-type: none"> • Ammonium nitrate • Calcium fluoride • Uranium 	Leak, massive dike/liner failure, flooding	1, 2	Ammonia Nitrate Fluoride Uranium
Outside-storage/inside-vaporization area <ul style="list-style-type: none"> • Uranium hexafluoride (solid, liquid, vapor) • Uranyl nitrate 	Ruptured cylinder, vapor release Ruptured tank	1, 2, 3	Uranium Hydrogen fluoride Uranium Nitrate
Chemical and manufacturing areas <ul style="list-style-type: none"> • Uranium • Uranium dioxide • Ammonium diuranate • Hydrogen fluoride • Hydrogen 	Pipeline or container rupture, spills, explosions, fires, filter failure criticality Explosion	1, 2, 3	Uranium Ammonia Fluoride
Transportation	Container rupture, spills	1, 2	Uranium Miscellaneous chemicals

(a) Accident severity category:

Category 1 accidents – those most likely to occur during normal plant operations and have the least environmental impacts of the three categories.

Category 2 accidents – those that would occur infrequently during the plant's operating life, could release concentrations of radiological and nonradiological pollutants to the onsite (and possibly offsite) environment that would exceed normal effluent releases and could cause significant impacts, if not controlled or mitigated.

Category 3 accidents – those not expected to occur during the life of the plant but could result in significant releases of radioactive or toxic pollutants to the onsite and offsite environment.

Source: WEC 2019-TN6510, NRC 1985-TN5602

In its March 2019 ER, the WEC assessed accidents that, although considered to have a low probability of occurrence, could result in largest environmental consequences: release of UN, release of uranium hexafluoride (UF₆), and a criticality accident (WEC 2019-TN6510). These are summarized below.

The WEC evaluated the potential radiological impacts of a spill of UN (liquid) from a ruptured UN outside-storage tank. The WEC assumed that part of the material would be precipitated out or adsorbed by the soil (75%), and approximately 25% of the uranium would be solubilized and transported to the storm drain and Sunset Lake. The WEC estimated the release to Sunset Lake would be 3 curies (Ci) of material and the estimated concentration of radioactivity in Sunset Lake would be approximately 1.85 E-05 uCi/ml (WEC 2019-TN6510). The WEC explained that an individual would have to drink approximately 5 liters of lake water to get an uptake of 30 mg of U. Sunset Lake, however, is not a source of potable water and is located within the CFFF site. The WEC also concluded that it is not possible for a worker or member of the public to receive a 25 rem dose as a result of a spill of UN liquid from a ruptured UN outside storage tank.

Further, the WEC estimated the concentration of radioactivity that could be released to site groundwater. The estimates exceeded 5,000 times the effluent concentration value in Table 2 of Appendix B of 10 CFR Part 20 in water for U-234, U-235, and U-238 (WEC 2019-TN6510). Therefore, under the criteria identified in Table 3 of Appendix B of 10 CFR Part 20 (WEC 2019-TN6510), the WEC considered this accident an intermediate consequence. Therefore, the WEC identified the following IROFS: dike to capture releases from ruptured UN tank and a shutoff valve to prevent flow into Sunset Lake (WEC 2019-TN6510).

A criticality accident is considered a high consequence event and the WEC has identified IROFS to ensure that a criticality accident is highly unlikely. In the March 2019 ER (WEC 2019-TN6510), however, the WEC evaluated the offsite consequences of an inadvertent criticality event. The WEC assumed the accident would occur in the UN nitrate tanks outside the south wall of the plant and estimated the dose at the nearest site boundary and four other onsite locations (WEC 2019-TN6510). The estimated doses at the four onsite locations were less than 13 rem, while the estimated dose at the nearest site boundary was less than 7 rem (WEC 2019-TN6510).

The WEC also considered the consequences of a fire in the Conversion Enclosure Containment ventilation system that could release 20 kg of U to the environment that could be inhaled by a receptor downwind of the fire. The estimated dose at the site boundary would be less than 3 rem (WEC 2019-TN6510). The WEC considered this accident an intermediate consequence event to the public.

The WEC also assessed the chemical consequences of a large release of UF₆ in the outdoor area where UF₆ cylinders are stored. The accident the WEC considered involved a fire from a truck crashing into the UF₆ cylinders outdoor storage area and rupture of two of the UF₆ cylinders (WEC 2019-TN6510). UF₆ is solid at ambient temperature, however, sublimation and reaction with water vapor would form uranyl fluoride (UO₂F₂) and hydrogen fluoride (HF). The UO₂F₂ and HF could move downwind. The WEC's estimated average concentration of U and HF as the plume through the nearest residence under adverse meteorological conditions would be approximately 60 mg/m³ and 20 mg/m³, respectively. The WEC compared the HF concentration to concentrations at 25 mg/m³ for several minutes, which would cause respiratory discomfort, while brief exposure to 40 mg/m³ would be dangerous to life (WEC 2019-TN6510). The intake of U of an adult at the nearest residence standing in the plume for an hour would be approximately 50 mg (WEC 2019-TN6510), which exceeds the 30 mg U threshold for a high consequence event to the public but below the fatal intake of 160 mg (WEC 2019-TN6510).

As previously discussed, compliance with the NRC regulations ensures that high and intermediate consequences for credible accidents would be unlikely and highly unlikely. Identification of IROFS and the implementation of emergency procedures would reduce the consequences and the likelihood of accidents. Therefore, impacts from accidents would be SMALL.

3.15.1 Mitigation Measures

The CFFF maintains a comprehensive Emergency Management Program with facilities, equipment, and processes for protecting workers, the public and the environment (WEC 2019-TN6571). This program assures the control of licensed material, capability to evacuate personnel, and availability of emergency measures and facilities. The program is documented in an approved Site Emergency Plan that addresses the following topics:

- Facility Description
- Engineered Safeguards for Abnormal Operations
- Types of Accidents and Classifications

- Response Management System
- Mitigation of Consequences and Assessment of Releases
- Emergency Response Facilities and Equipment
- Maintaining Emergency Preparedness Capability
- Records and Reports
- Safe Shutdown, Recovery, and Plant Restoration
- Hazardous Chemicals.

The CFFF also has detailed Emergency Procedures that contain instructions for emergency response and emergency personnel activities based on practices required by the Site Emergency Plan (WEC 2019-TN6571). These procedures clearly define the duties, responsibilities, action levels, and actions to be taken by each functional individual or group in response to emergency situations. The procedures address the following areas:

- Emergency Response Organization
- Emergency Response Team
- Equipment and Supplies
- Evacuation, Accountability, and General Response
- Classification
- Communication
- Notification
- Biological Threat
- Bomb Threat (Package or Object)
- Bomb Threat (Telephone or Correspondence)
- Civil Disturbance
- Criticality
- Explosion
- Fire
- Hazardous Material Release
- Hazardous Weather
- Loss of Utilities
- Oil Spill
- Radioactive Powder or Liquid Release
- Transportation Accident
- UF₆ Release
- Local Law Enforcement Agency Incident Response Plan

Notification Guidelines for NRC and Other Agencies.

3.16 Environmental Justice

Environmental justice (EJ) refers to the Federal policy established in 1994 by Executive Order (EO) 12898 (59 FR 7629-TN1450) that directs Federal agencies to identify and address disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority or low-income populations. The NRC, as an independent agency, was requested, rather than directed, to comply with Executive Order 12898. As reflected in the NRC's "Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions" (69 FR 52040-TN1009), the NRC is committed to the goals of EO 12898 and strives to meet those goals through its well-established NEPA review process.

A minority or low-income community may be considered as either a population of individuals living in geographic proximity to one another or a dispersed/transient population of individuals (e.g., migrant workers) where either type of group experiences common conditions of environmental exposure (NUREG–1748; NRC 2003-TN1983). In this section, the staff analyzed environmental justice with respect to the following minority groups: American Indian (not of Hispanic or Latino origin) or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, African American, some other race, and Hispanic or Latino ethnicity (of any race) (NRC 2003-TN1983). Low-income is defined as being below the poverty level as defined by the USCB (NRC 2003-TN1983). The NRC staff’s recommended area for evaluating census data is the census block group, which is delineated by the USCB and is the smallest area unit for which race and poverty data are available (NRC 2003-TN1983). The NRC staff used the geographic information system ESRI ArcGIS® and the USCB website to identify block groups within 32 km (20 mi) of the CFFF site. This radius was selected to be inclusive of locations where people could live and work in the vicinity of the proposed project and bounds public uses of the different environmental resources (e.g., recreation, hunting, fishing, agricultural activities; and use of groundwater and surface waters by the surrounding communities). The NRC staff included a block group if any part of the block group was within 32 km (20 mi) of the proposed CFFF project area; 367 block groups were identified as being within, or partially within, the 32 km (20 mi) radius. The NRC guidance indicates that a potentially affected EJ population exists if at least one of these conditions exists: either the minority or low-income population of the block group is more than 50 percent of the entire block group population, or the minority or low-income population percentage of the block group is significantly, or meaningfully, greater (typically by at least 20 percentage points) than the minority or low-income population percentage in the geographic areas chosen for comparative analysis, county or state (NRC 2003-TN1983).

3.16.1 Minority and Low-Income Populations

Using the USCB annual surveys conducted from 2014 to 2018 that represent characteristics during this period (American Community Survey 5-year estimates), the NRC staff calculated (1) the percentage of each block group’s population represented by each minority group for each of the 367 block groups within the 32 km (20 mi) radius, (2) the percentage that each minority group represented of the entire population of South Carolina, and (3) the percentage that each minority group represented for each of the six counties that has land within the 32 km (20 mi) radius of the CFFF site. If the percentage meets one of the above-stated conditions, then that block group was identified as being a potentially affected EJ population.

Of the 367 block groups located completely or partly within 32 km (20 mi) of the CFFF site, 189 block groups meet at least one of the two NRC guidance conditions previously described in this section. Table 3-25 summarizes the block group analysis. Figure 3-27 illustrates the geographic locations of the affected EJ populations.

Table 3-25 EJ Populations Census Block Group Summary

Classification	Block Groups
Not an EJ Block Group	178
Low-Income Population	11
Minority Population	147
Both Minority and Low-Income Populations	31
Total Block Groups	367

Source: Derived using Census ACS 2014-2018 5-Year Data.

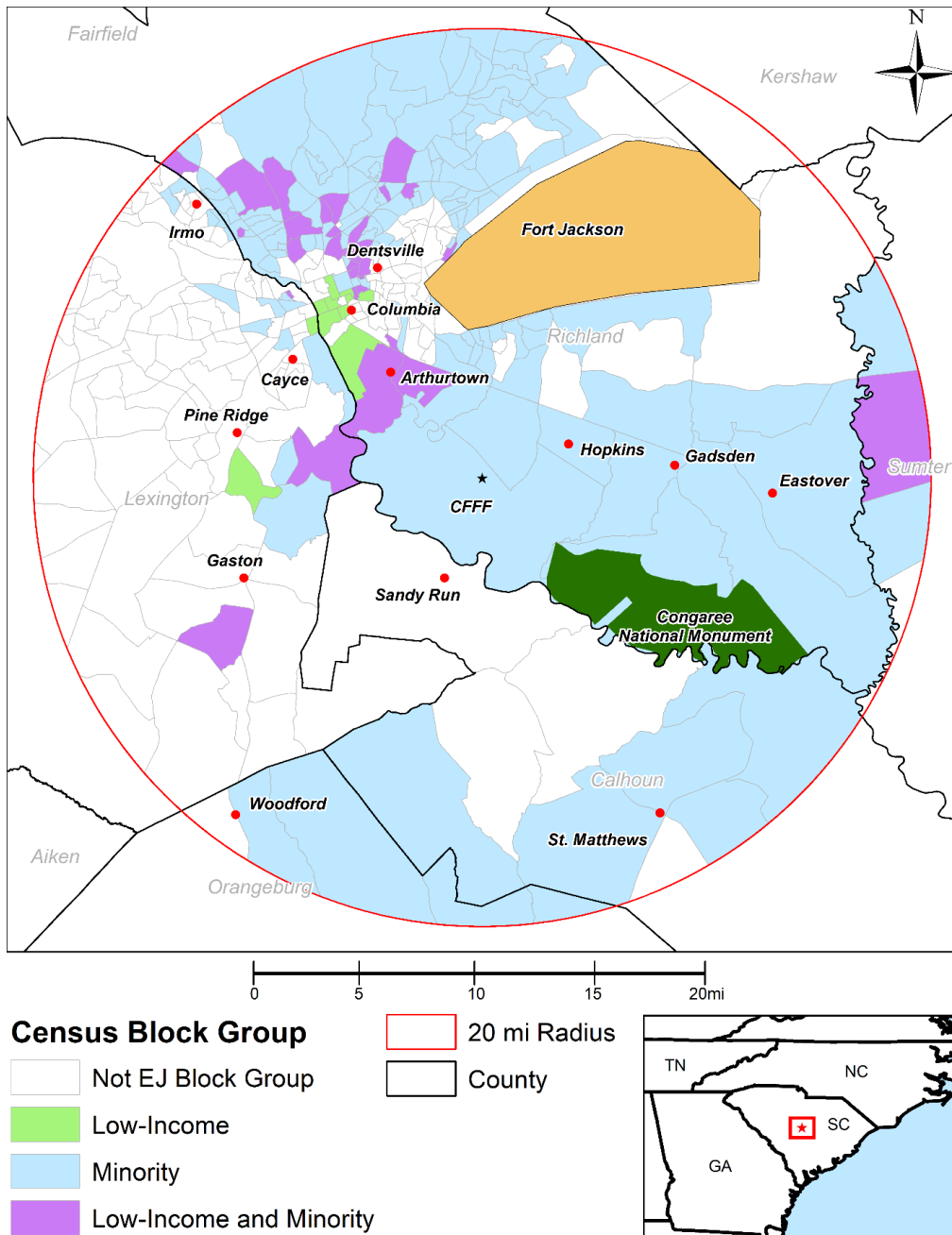


Figure 3-27 Block Groups with Potentially Affected Minority and Low -Income Populations within 32.2 km (20 mi) of the CFFF Site

Of the 367 block groups located completely or partly within 32 km (20 mi) of the CFFF site, 31 of the 42 block groups with low-income families also meet the criteria for minority populations.

The comparison of State-level threshold values for minority and low-income populations is found in Table 3-25. For South Carolina, if a census block group meets or exceeds 16.9 percent for the aggregation of all minority segments or 16.0 for the low-income population, the block group is an EJ population.

3.16.2 Community Engagement

The WEC explained that community engagement in the vicinity of CFFF site, related to the CFFF activities, is occurring through several channels. These include the Lower Richland Citizen Advisory Council (LRCAC), the Community Engagement Board (CEB), the National Association for the Advancement of Colored People (NAACP), the CFFF Community Website, and the CFFF Community Monthly Newsletter¹³ (WEC 2020-TN6844). These channels and resources provide several methods by which the CFFF operations information can be shared with minority and low-income communities. The WEC stated that they also provide opportunities for the communities to inquire and have questions about plant impacts answered in a transparent environment.

3.16.3 Environmental Justice Impacts

For the NRC staff to determine whether there are EJ impacts from the proposed action, the staff identifies whether there are minority or low-income populations in somewhat close proximity to the project in a meaningfully greater proportion (typically by at least 20 percentage points) to those populations in the wider comparison area (e.g., the State). The staff evaluates impacts of the proposed action, including cumulative and indirect impacts, to determine if high and adverse health or environmental effects from the proposed action exist. Then the staff determines whether there is an EJ impact based on whether there is a linkage connecting the disproportionately high and adverse health or environmental effect to the minority or low-income populations identified.

The CFFF site is located in and surrounded by census block groups that have minority populations exceeding the conditions described in Section 3.16.1. Therefore, the NRC staff closely evaluated the identified health and environmental impacts to determine if pathways could be established linking project impacts with the locally affected populations. All the health and environmental impacts identified were SMALL except for groundwater resources and waste generation during decommissioning, for which impacts were found to range from SMALL to MODERATE. The NRC staff, however, determined that there is a low potential for contaminants to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources (see Section 3.4 of this EIS). Further, the staff could not establish pathways linking these impacts to the local population. Thus, no disproportionately high and adverse health or environmental effects could be identified from this proposed action.

The NRC's impact analysis has not established any pathways by which previous or future environmental impacts would disproportionately affect EJ populations. Therefore, when the proposed action is combined with other past, present, and reasonably foreseeable future actions in the vicinity of the CFFF site, no disproportionately high and adverse cumulative health or environmental effects are expected (see Section 3.19 for additional information).

3.16.4 Mitigation Measures

The proposed action will not result in disproportionately high and adverse health or environmental impacts consistent with the current use of the property. As discussed in sections 3.2, 3.3, and 3.4 of this EIS, impacts to soil, surface water, and groundwater will be

¹³ <https://www.westinghousenuclear.com/about/independent-pages/columbia-community>

mitigated by the results of the WEC's remedial investigations under the CA with the SCDHEC and the three new proposed license conditions agreed to by the WEC.

The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either the SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2, and 2.4.2 of this EIS.

Additionally, the WEC plans to continue to share information with the community through several community engagement activities.

3.17 Impacts for Alternatives

3.17.1 No-Action Alternative

As discussed in Section 2.4.1 of this EIS, under the no-action alternative, the NRC would not renew the SNM-1107 materials license for the CFFF. The WEC can continue to operate the CFFF under its current license until the license's expiration date on September 30, 2027.

The NRC staff previously evaluated the environmental impacts of the WEC continuing to operate the CFFF until September 2027 when it approved the WEC's license renewal in 2007 (NRC 2007-TN6528). The NRC staff concluded in the 2007 license renewal EA that the continued operation of the CFFF site would not result in a significant impact on the environment (NRC 2007-TN5598). Notwithstanding the previous finding, the NRC staff considered the potential environmental impacts of the no-action alternative in light of the information that led to the NRC's decision to prepare an EIS.

Known onsite contamination is currently being addressed by the WEC under a CA with the SCDHEC (SCDHEC/WEC 2019-TN6554). The data gathered through and the analysis conducted as part of the WEC's remedial investigations were used to develop the CSM, which the WEC will use as a decision-making tool. The WEC's environmental monitoring and sampling program has changed since the last license renewal in 2007 and includes new monitoring wells and additional surface water, groundwater, sediment, and soil sample locations. The WEC would also use the data analysis results for comparison with previous results to detect potential leaks consistent with the WEC's "Environmental Data Management Procedure", RA-434. Procedure RA-433, "Environmental Remediation," would also be used for remediation decision-making. The WEC will also use the CSM to inform the environmental monitoring and sampling program and remediation strategy. See Section 1.5.2.2.1 of this EIS for additional information about the CA and CSM. As more information and data are gathered through implementation of the CA, these procedures will support further changes to the WEC's environmental monitoring and sampling program.

The nature and type of potential environmental impacts of the no-action alternative would be similar to those from the proposed action (i.e., the 40-year license renewal process). The no-action alternative's temporal scope affects when the impacts would occur (i.e., impacts would only occur through September 2027, the license expiration date). Additionally, the uncertainties associated with the outcome of the remedial investigations being conducted as part of the implementation of the CA are relevant to reasonably foreseeable impacts. The three new proposed license conditions (S-16, S-17, and S-18 discussed in Section 2.2.2.1.2 of this EIS) would not be part of the no-action alternative and, therefore, potential impacts on environmental resources like water resources would not be bounded by these new proposed license conditions. The WEC could also choose to incorporate the new license conditions and commitments into its current materials license.

Upon license expiration, if a request to renew the license is not submitted, the WEC would be required to start the decommissioning process, including site reclamation and remediation. The WEC would be required to prepare a decommissioning plan as delineated in 10 CFR 70.38(d) (g) and (i) (TN4884) for NRC review and approval. The NRC staff would undertake a separate environmental review under NEPA (TN661). Because fuel fabrication operations would cease upon license expiration, unless the WEC seeks and obtains a renewed license, impacts from decommissioning are reasonably foreseeable.

The following sections discuss the potential impacts of the no-action alternative.

3.17.1.1 Land Use

The use of the land at the CFFF site and surrounding area is not expected to change from its current uses during the no-action alternative timeframe. Any future construction or change in fuel fabrication operations requiring a license amendment would require a safety review, NEPA environmental review, and Section 106 review, as appropriate. The WEC would continue installing groundwater monitoring wells and collecting soil samples at the CFFF as part of the implementation of the SCDHEC-approved Phase II RIWP, but the installation of the wells would involve minimal land disturbance. The data collected would continue to be used in developing and enhancing the CSM, which the WEC would use as a decision-making tool in determining the extent of contamination, migration pathways, and remediation activities. Therefore, the NRC staff does not expect a significant impact on land use from the no-action alternative.

Impacts on land use associated with the no-action alternative would occur at the time of decommissioning and reclamation of the CFFF site. Impacts on land use associated with decommissioning would be the same for the no-action or relicensing alternatives; only the timeline for when the impacts would occur would change. Potential additional land disturbance could occur due to the need to construct temporary staging and decommissioning laydown areas. However, after decommissioning, reclamation of the site, and license termination, the land would be available for other uses.

Therefore, the NRC staff expects land use impacts associated with the no-action alternative to be SMALL.

3.17.1.2 Geology, Seismology, and Soils

There would be no significant disturbance of the soils and subsurface sediments at the CFFF site associated with the no-action alternative, and no offsite geological resources would be required. The WEC will continue installing groundwater monitoring wells and collecting of soil

samples at the CFFF as part of the implementation of the SCDHEC-approved Phase II RIWP, but the installation of wells would involve minimal land disturbance. The CFFF operations and investigations to date indicate that some soils near the plant buildings have been contaminated, but soils away from the operational areas have been only minimally affected to date. Continued operation of the CFFF until 2027 has the potential to involve future releases of radiological or nonradiological contaminants but they are expected to affect only soils near the plant buildings. Disturbance of soils and subsurface materials will occur during decommissioning, but these impacts are expected to be similar for each of the alternatives considered here and would be evaluated during a separate NEPA review by the NRC at the time of decommissioning. The WEC is expected to continue to conduct the remedial investigations under the CA and the results would continue to be used in developing and enhancing the CSM, which the WEC will use as a decision-making tool in determining the extent of contamination, migration pathways, and remediation activities. Soil disturbances would be limited to areas previously disturbed during the construction and operations stages of the CFFF. Remediation and removal of soils would be anticipated based on past need for remediation and existing conditions at the CFFF. Decommissioning activities would be conducted in accordance with 10 CFR Part 70 (TN4883) and Part 20 (TN283) requirements. The NRC staff anticipates impacts on geological and soil resources resulting from the no-action alternative would be SMALL.

3.17.1.3 Surface Water Resources

The NRC staff evaluated the effects of the no-action alternative on the availability of the potentially affected water resources to support other uses and users. The staff determined that surface water withdrawals and consumptive use of water for continued CFFF operations through the end of the current materials license term would have negligible effects on other uses and users of the Congaree River. The NRC staff also determined that discharges to the Congaree River would have minor effects on water quality that would not affect other users or uses of the river because discharge rates and pollutant releases will continue to be regulated and monitored under the NPDES permit and are not expected to change significantly. The staff also determined that continued operations may noticeably affect the water quality of the onsite water bodies, but continued activities under the CA with the SCDHEC and continued environmental monitoring requirements under the NPDES permit and the current NRC license would minimize the likelihood of contamination moving offsite and would minimize the effects of releases on other users of the local surface water resources. Impacts on surface water associated with decommissioning of the CFFF would be the same for the no-action or relicensing alternatives; only the timeline for when the impacts would occur would change. The WEC is expected to continue to conduct the remedial investigations under the CA and the results would continue to be used in developing and enhancing the CSM, which the WEC will use as a decision-making tool in determining the extent of contamination, migration pathways, and remediation activities. Therefore, the NRC staff concludes that the surface water impacts resulting from the no-action alternative would be SMALL.

3.17.1.4 Groundwater Resources

The CFFF fuel fabrication operations do not currently withdraw groundwater for any plant operational needs, nor are there any plans to use groundwater for plant operations in the future. Therefore, the NRC staff concludes that there are no potential impacts on groundwater resources from the withdrawal or consumptive use of groundwater for the continued operation of the CFFF through the end of the current materials license. Impacts on groundwater resources associated with decommissioning would be the same for the no-action or relicensing alternatives; only the timeline for when the impacts would occur would change. In evaluating

the potential impacts on groundwater quality from the no-action alternative, the NRC staff considered the likelihood of future inadvertent releases of contaminants to the subsurface, the transport and fate of existing and potential future contaminants in the groundwater, and the potential effects of contaminated groundwater on other users of the groundwater resources. The impacts, therefore, would be similar to the proposed action, although any new license conditions agreed to by the WEC would not be considered within the scope of the no-action alternative. The WEC is expected to continue to conduct the remedial investigations under the CA and the results would continue to be used in developing and enhancing the CSM, which the WEC will use as a decision-making tool in determining the extent of contamination, migration pathways, and remediation activities. However, the uncertainties discussed in Section 3.4 of this EIS would also apply under the no-action alternative. The NRC staff concludes that the groundwater impacts resulting from the no-action alternative would be SMALL to MODERATE.

3.17.1.5 Ecological Resources

Impacts on terrestrial resources associated with the no-action alternative could result in some disturbances to wildlife in the area because of noise, but wildlife are already habituated to noise from the CFFF site. Increased activity and noise from decommissioning may result in temporary species avoidance of the area, but this is not expected to be an adverse impact and decommissioning will have to eventually occur regardless of the alternative. Therefore, the NRC staff concludes that the terrestrial resources impacts resulting from the no-action alternative would be SMALL.

Impacts on aquatic resources associated with the no-action alternative could occur from runoff of contaminated stormwater during decommissioning or from changes to treated wastewater discharges directly into the Congaree River, but this would be monitored and managed by the WEC in accordance with the NPDES permit and potential remediation work plans per the CA with the SCDHEC (SCDHEC/WEC 2019-TN6554). Impacts on aquatic resources associated with decommissioning would be the same for the no-action or relicensing alternatives; only the timeline for when the impacts would occur would change. Therefore, the NRC staff concludes that the aquatic resources impacts resulting from the no-action alternative would be SMALL.

3.17.1.6 Climatology, Meteorology, and Air Quality

Impacts on the local climatology and air quality would be associated with the no-action alternative during current fuel fabrication operations through the end of the current materials license and decommissioning activities. Impacts through the end of the current license term would be monitored under the current State-issued air permit and are not expected to result in adverse effects. Impacts on climatology and air quality associated with decommissioning would be the same for the no-action or relicensing alternatives; only the timeline for when the impacts would occur would change. Use of construction equipment during decommissioning activities could temporarily increase the fugitive dust in the local air quality. However, after a short period of time following decommissioning, the local air quality would be cleaner and equivalent to the regional background because the main source of emissions, use of construction equipment, would end. The release of pollutants from the existing CFFF stacks would cease and thus there would be no long-term impact on the climate and air quality. Therefore, the NRC staff concludes that the climatology and air quality impacts resulting from the no-action alternative would be SMALL.

3.17.1.7 Noise

Impacts from noise associated with the no-action alternative would occur during continued operation through the end of the current license and at the time of decommissioning and reclamation of the CFFF site. Impacts from noise associated with decommissioning would be the same for the no-action or relicensing alternatives; only the timeline changes. Under the no-action alternative, occupational workers would be exposed to noise from the use of large earth-moving equipment, heavy trucks, and other equipment expected to be used in conjunction with decommissioning activities. The Sanitary Lagoon is also being removed under the CA, which would necessitate the use of large earth-moving equipment and heavy trucks. The WEC would still be required to maintain compliance with local or county regulations governing noise. Members of the public would also be exposed to noise, although this exposure would be expected to be temporary and short term. Therefore, the NRC staff concludes that noise impacts associated with the no-action alternative would be SMALL.

3.17.1.8 Historic and Cultural Resources

The WEC's contractor conducted a cultural resource survey of the CFFF site in September 2021 in accordance with the survey design/plan reviewed and approved by the South Carolina SHPO. The cultural resource survey included additional GPR assessment of the Denley Cemetery (Brockington 2022-TN7251) and no sites eligible for listing in the NRHP were identified. The South Carolina SHPO reviewed and concurred with the findings in the cultural resource survey report (SCDAH 2022-TN7368). The WEC has updated (its cultural resource management procedures to incorporate management recommendations from the cultural resource survey report. Additional information about the cultural resource survey report can be found in Section 3.9 of this EIS.

Impacts from decommissioning would be assessed during a separate NEPA environmental review and Section 106 review. While the Denley Cemetery was not found to be eligible for listing in the NRHP, cemeteries are protected from desecration under South Carolina law. The Denley Cemetery is fenced and currently maintained by the WEC. The WEC has indicated they will continue its upkeep (WEC 2019-TN6510). Updates to the WEC procedure RA-432 "Procedures Guiding the Discovery of Unanticipated Cultural Resources and Human Remains" were made in March 2022 to incorporate the results of the 2021 cultural resources survey and management recommendations (WEC 2022-TN7358). RA-432 states that the WEC will protect, maintain and upkeep the Denley Cemetery and that family members and descendants associated with the Denley Cemetery may coordinate visits with the WEC security. RA-432 also states that the WEC will not allow digging/trenching/excavation to occur in the cemetery (WEC 2022-TN7358). In response to the cultural resource survey management recommendations, the WEC moved the fence on the eastern (entrance) edge of the Denley Cemetery out 10 ft (Brockington 2022-TN7251 and WEC 2022-TN7358). In the event of an unanticipated discovery, potential impacts would be avoided or minimized through the implementation of the WEC's cultural and historic resources procedures and associated training of personnel. These procedures describe stop work instructions and notifications to South Carolina SHPO and Indian Tribes, as appropriate, if cultural resources or human remains are inadvertently encountered during ground-disturbing activities (WEC 2020-TN6707 and WEC 2021-TN7060). Sitewide protection procedures also describe the use of GPR and GPR analysis prior to conducting ground-disturbing activities in previously undisturbed areas to identify and evaluate anomalies (WEC 2021-TN7048 and WEC 2021-TN7064). Therefore, potential impacts from the no-action alternative would be SMALL.

3.17.1.9 Visual and Scenic Resources

Impacts on visual and scenic resources associated with the no-action alternative would occur during and through the end of the current license term and at the time of decommissioning and reclamation of the CFFF site. Impacts on visual and scenic resources associated with decommissioning would be the same for the no-action or relicensing alternatives; only the timeline for when the impacts would occur would change. Temporary visual impacts could occur due to the need to construct temporary staging and decommissioning laydown areas. However, after decommissioning and reclamation of the site, and license termination, the visible landscape would be further changed to one without structures and would be available for other uses. Therefore, the NRC staff concludes that visual and scenic impacts associated with the no-action alternative would be SMALL.

3.17.1.10 Socioeconomics

Socioeconomic impacts associated with the no-action alternative would occur during and through the end of the current license term and at the time of decommissioning and reclamation CFFF of the site. Impacts through the end of the current license term would be similar to the impacts from the proposed action and thus are not expected to noticeably change the employment level or mission of the CFFF. Impacts on socioeconomics associated with decommissioning would be the same for the no-action or relicensing alternatives; only the timeline for when the impacts would occur would change. Potential impacts of decommissioning activities would include those of any large-scale construction site because the operations workforce would be replaced by a construction workforce employed to dismantle facilities and reclaim the site. Decommissioning activities likely would employ a workforce smaller than the current CFFF operations workforce. Thus, impacts would result from a change in the annual socioeconomic impacts expected from continued fuel fabrication operations to impacts associated with decommissioning. However, decommissioning activities would be temporary and eventually the employment and other economic activity associated with the CFFF site would end, assuming no new use of the site is identified, resulting in a noticeable adverse impact on the local economy. Therefore, the NRC staff concludes that socioeconomic impacts associated with the no-action alternative would be MODERATE.

3.17.1.11 Public and Occupational Health

Impacts on public and occupational health associated with the no-action alternative would occur during the current license term of the CFFF through the end of the current license and at the time of decommissioning and reclamation of the CFFF site. Impacts from continued fuel fabrication operations through the current license term on public and occupational health would be similar to the impacts from the proposed action. Impacts on public and occupational health associated with decommissioning would be the same for the no-action or relicensing alternatives; only the timeline for when the impacts would occur would change. Potential occupational health impacts due to facility decommissioning activities would include those of any large-scale construction site, while exposure to radiological and hazardous materials would decrease. Members of the public would be exposed to less radiological and hazardous material during decommissioning and after decommissioning activities are complete, because the facility would release less radioactive gaseous, liquid, and solid material, and new releases of hazardous materials would stop. Therefore, the NRC staff concludes that public and occupational health impacts associated with the no-action alternative would be SMALL.

3.17.1.12 Transportation

Impacts from transportation associated with the no-action alternative would occur during and through the end of the current license term and at the time of decommissioning. Impacts from the current license term on transportation would be similar to the impacts from the proposed action. In the short-term, decommissioning activities could result in increased vehicle movements due to demolition activities. However, decommissioning activities would be temporary, and all material shipments will be conducted in accordance with applicable NRC, DOT, and State of South Carolina regulations. Impacts from transportation associated with decommissioning would be the same for the no-action or relicensing alternatives; only the timeline for when the impacts would occur would change. Therefore, the NRC staff does not expect any significant transportation impacts as a result of the no-action alternative and impacts would be SMALL.

3.17.1.13 Waste Generation and Management

Impacts from waste management associated with the no-action alternative would occur during and through the end of the current license term and at the time of decommissioning. The NRC staff expects that waste generation rates and management practices through the WEC's license expiration for the CFFF would be similar to current generation rates and management practices. Thus, impacts through the current license term would be similar to the impacts from the proposed action. Upon license expiration, waste generation from the fabrication of low-enriched uranium fuel assemblies would cease, and the majority of the waste that would be generated from the CFFF would be from decommissioning, leading to a significant short-term increase in volumes of LLRW compared to current operations. Impacts from gaseous and liquid effluents would be eliminated by the cessation of fabrication efforts. Impacts from solid waste associated with decommissioning would be the same for the no-action or relicensing alternatives; only the timeline changes in that the incremental increase in solid waste generated (hazardous, mixed, nonhazardous, industrial, and radioactive wastes) associated with the no-action alternative, 20-year license renewal alternative, and the proposed action are minor impacts based on available disposal options for the various solid waste categories. The NRC staff expects that the WEC will work with private industry to prepare plans for the needed disposal capacity for decommissioning. Therefore, the NRC staff concludes that waste generation and management impacts associated with the no-action alternative would be SMALL to MODERATE due to the short-term impacts from decommissioning activities.

3.17.1.14 Accidents

Under the no-action alternative, impacts from continued operation until the current license expiration would be similar to the impacts from the proposed action. Fuel fabrication operations at the CFFF would cease upon license expiration (i.e., in September 2027) and most of the accidents listed in Section 3.15, Table 3-24, of this EIS would no longer be possible. For example, when CFFF operations cease, there would no longer be the ability for a criticality accident. Therefore, the NRC staff concludes that impacts from accidents from the no-action alternative would be SMALL.

3.17.1.15 Environmental Justice

The CFFF site is located in and surrounded by census block groups that have minority and low-income populations exceeding the conditions described in Section 3.16 of this EIS. Therefore, the NRC staff closely evaluated the identified health and environmental impacts to determine if

pathways could be established linking project impacts with the locally affected populations. All the health and environmental impacts identified for the no-action alternative would be similar to the potential impacts from the proposed action and, thus, would be SMALL except for groundwater resources and waste generation from decommissioning, for which impacts were found to range from SMALL to MODERATE. For the no-action alternative, socioeconomic impacts would differ from the proposed action and would be MODERATE. Although MODERATE socioeconomic impacts would be expected under the no-action alternative, noticeable impacts would be felt by the existing workforce and businesses in the wider economic region. Only minimal socioeconomic effects on the immediate vicinity of the site would be expected because few workers or businesses are located in the vicinity, therefore socioeconomic impact pathways to minority or low-income populations were not identified. Even though groundwater resource impacts were found to range from SMALL to MODERATE, the NRC staff determined that there is a low potential for contaminants to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources (see Section 3.4 of this EIS). Further, the staff could not establish pathways linking these impacts to the local population. Thus, no disproportionately high and adverse health or environmental effects could be identified from the no-action alternative.

3.17.2 License Renewal for 20 Years

As discussed in Section 2.4.2, the NRC staff also considered as an alternative the approval of the WEC's license renewal request for a shorter term, i.e., 20 years. In SRM-SECY-06-0186 (NRC 2006-TN6558, NRC 2006-TN6985), the Commission approved staff's recommendation to implement maximum license terms for up to 40 years for new fuel cycle licenses and license renewals that are required to submit ISA summaries in accordance with 10 CFR Part 70 (TN4883), Subpart H. Additionally, the Commission approved implementing license terms for less than 40 years on a case-by-case basis when there are concerns about safety risk to the facility or when a licensee introduces a new process or technology.

The WEC's remedial investigations under a CA with the SCDHEC, and the development and use of a CSM as a decision-making tool, help the WEC understand the site's hydrogeology and the physical, chemical, and biological processes that govern the transport, fate, risk, and level of impact of contamination to ecological and/or human receptors. The historical facility events, the CA, and the CSM are discussed in sections 2.1.3, 2.2.2.3, and throughout Section 1.5.2.2.1, respectively.

The nature and type of potential environmental impacts from a renewed materials license for an additional 20 years would be similar to those from the proposed action (i.e., proposed 40 years of continued fuel fabrication operations). The new proposed license conditions S-16 and S-17, and S-18, to which the WEC has agreed as part of the proposed 40-year license renewal, would also apply under the 20-year license renewal (WEC 2021-TN7106). License condition S-16 would require the WEC to enter exceedances of Federal and State standards for drinking water into the CAP (WEC 2021-TN7106). License condition S-17 would require the submission of the environmental monitoring and sampling program to the NRC for review and approval after SCDEHEC approves the Remedial Investigation Report, or within five years of the license renewal (whichever comes first) (WEC 2021-TN7106). License condition S-18 would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval within 90 days of submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106).

Upon license expiration after the 20-year term, the WEC would either need to submit a new application for another license renewal term or would be required to start the decommissioning process. If decommissioning is selected, the WEC would be required to prepare a decommissioning plan, including site reclamation and remediation, as delineated in 10 CFR 70.38(d), (g) and (i) (TN4884) for NRC review and approval. The NRC staff would undertake a separate environmental review under NEPA as part of its review of a decommissioning plan (TN661). Additionally, the WEC would be required to maintain the necessary funding to assure they can successfully complete decommissioning and meet NRC's regulatory requirements.

3.17.2.1 Land Use

The use of the land at the CFFF site and surrounding area is not expected to change from its current uses during the 20-year license renewal alternative timeframe. Any future construction or change in fuel fabrication operations requiring a license amendment would require a safety, NEPA environmental review, and NHPA Section 106 review, as appropriate. The WEC would continue installing groundwater monitoring wells and collecting soil samples at the CFFF as part of the implementation of the SCDHEC-approved Phase II RIWP, but the installation would involve minimal land disturbance. The data collected would continue to be used in developing and enhancing the CSM, which the WEC would use as a decision-making tool in determining the extent of contamination, migration pathways, and remediation activities. Impacts on land use under a 20-year license renewal alternative would be similar to those under the proposed action. There would not be a significant new impact on land use during continued fuel fabrication operations for a 20-year term at CFFF, and while the timing of decommissioning would differ, the impacts from decommissioning would be similar to those under the proposed action. Therefore, the NRC staff concludes that land use impacts associated with the 20-year license renewal alternative would be SMALL.

3.17.2.2 Geology, Seismology, and Soils

Impacts on geological and soil resources for a 20-year license renewal alternative would be similar to those analyzed for the WEC's proposed 40-year license renewal. There would be no significant disturbance of the soils and subsurface sediments at the CFFF site with continued operation of the facility, and no offsite geological resources would be required. Known contamination has affected soils near the plant buildings but soils away from the operational areas have been only minimally affected to date. The potential future releases of contaminants are expected to affect only soils near the plant buildings for both the 20-year and 40-year license renewal terms. Therefore, the NRC staff concludes that impacts on geological and soil resources for the 20-year license renewal alternative would be SMALL.

3.17.2.3 Surface Water Resources

Impacts on surface water resources for a 20-year license renewal alternative would be similar to those analyzed for the proposed 40-year license renewal. Surface water withdrawals and consumptive use of water for CFFF operations would have negligible effects on other uses and users of the Congaree River, and discharges to the Congaree River would have minor effects on water quality that would not affect other users or uses of the river because discharge rates and pollutant releases will continue to be regulated and monitored under the NPDES permit and are not expected to change significantly. Continued operations may noticeably affect the water quality of the onsite water bodies, but reasonably foreseeable regulatory requirements would minimize the likelihood of contamination moving offsite to the degree that water quality would be noticeably altered and affect other users of the local surface water resources. Therefore, the

NRC staff concludes that the surface water impacts of continued operation of CFFF under the 20-year license renewal alternative would be SMALL.

3.17.2.4 Groundwater Resources

The CFFF operations would not withdraw groundwater for any plant operational needs under the 20-year license renewal alternative. Therefore, there would be no potential impacts on groundwater resources from the withdrawal or consumptive use of groundwater for this alternative.

In evaluating the potential impacts on groundwater quality from continued operation of the CFFF for a 20-year license renewal period, the NRC staff considered the same factors used when evaluating impacts for the proposed action: the likelihood of future inadvertent releases of contaminants to the subsurface, the transport and fate of existing and potential future contaminants in the groundwater, and the potential effects of contaminated groundwater on other users of the groundwater resources. The impacts, therefore, would be similar to the proposed action. The new proposed license conditions: S-16, S-17, and S-18, to which the WEC has agreed as part of the proposed 40-year license renewal, would also apply under the 20-year license renewal (WEC 2021-TN7106). The WEC would be expected to continue the ongoing remedial investigations under the CA with the SCDHEC. Therefore, the NRC staff concludes that the groundwater impacts from continued operation of CFFF under the 20-year license renewal alternative would be SMALL to MODERATE.

3.17.2.5 Ecological Resources

Impacts on both terrestrial and aquatic resources for a 20-year license renewal alternative would be similar to those analyzed for the proposed 40-year license renewal. Impacts on terrestrial resources associated with a 20-year license renewal could cause some impacts on wildlife but no new large buildings or land disturbances are planned, the impacts of the additional groundwater monitoring wells are minor and temporary, and wildlife is habituated to the CFFF operational noises. For aquatic species, contamination of surface waters is within health limits and further remedial investigation and potential mitigation of onsite uranium contamination is being addressed via the CA between the WEC and the SCDHEC (SCDHEC/WEC 2019-TN6554). Therefore, the NRC staff concludes that terrestrial and aquatic impacts associated with the 20-year license renewal alternative would be SMALL.

3.17.2.6 Climatology, Meteorology, and Air Quality

Impacts on climate and air quality would be similar under a 20-year license renewal alternative to those analyzed for the WEC's proposed 40-year license renewal, assuming that the nonradiological emissions remain the same for the entire renewal period and the CFFF would continue to comply with the SCDHEC regulatory requirements (i.e., air permit). For the proposed 40-year license renewal, the NRC staff found that the emissions would slightly contaminate (SMALL impact) the local air for a longer period than a 20-year license renewal period. Therefore, the NRC staff concludes that impacts on climatology and air quality associated with the 20-year license renewal alternative would be SMALL.

3.17.2.7 Noise

Impacts from noise would be similar under a 20-year license renewal alternative to those analyzed for the proposed 40-year license renewal. Under the 20-year license renewal

alternative, the WEC does not plan any new construction or any changes to the CFFF operations. There would not be a significant new impact from noise during continued operations at the CFFF site because the licensee would still have to maintain compliance with local or county regulations governing noise. Additionally, the site boundary is far enough away from the facility to protect members of the public from noise. Therefore, the NRC staff concludes that impacts from noise associated with the 20-year license renewal alternative would be SMALL.

3.17.2.8 *Historic and Cultural Resources*

Impacts on historic and cultural resources would be similar under a 20-year license renewal alternative to those analyzed for the proposed 40-year license renewal.

The WEC's contractor conducted a cultural resource survey of the CFFF site in September 2021 in accordance with the survey design/plan reviewed and approved by the South Carolina SHPO. The cultural resource survey included additional GPR assessment of the Denley Cemetery (Brockington 2022-TN7251) and no sites eligible for listing in the NRHP were identified. The South Carolina SHPO reviewed and concurred with the findings in the cultural resource survey report (SCDAH 2022-TN7368). The WEC has updated its cultural resource management procedures to incorporate management recommendations from the cultural resource survey report. Additional information about the cultural resource survey report can be found in Section 3.9 of this EIS.

The NRC staff anticipates that any potential impacts related to unanticipated discoveries would be avoided and minimized through the implementation of the WEC's sitewide historic and cultural resource procedures described in Section 3.9 of this EIS. These procedures include stop work instructions and notifications of the South Carolina SHPO and Indian Tribes, as appropriate, in the event cultural resources or human remains are encountered during ground-disturbing activities (WEC 2020-TN6707 and WEC 2021-TN7060). Sitewide protection procedures also include the use of GPR and GPR analysis prior to conducting ground-disturbing activities in previously undisturbed areas to identify and evaluate anomalies (by a professional archaeologist), stop work procedures and notification protocols (WEC 2021-TN7048 and WEC 2021-TN7064). The WEC has a cultural resource identification training in place for employees and contractors involved in ground-disturbing activities on the CFFF site (WEC 2021-TN7048 and WEC 2021-TN7060). Additionally, while the Denley Cemetery was not found to be eligible for listing in the NRHP, cemeteries are protected from desecration under South Carolina law. The Denley Cemetery is fenced and currently maintained by the WEC. The WEC has indicated they will continue its upkeep (WEC 2019-TN6510). Updates to the WEC procedure RA-432 "Procedures Guiding the Discovery of Unanticipated Cultural Resources and Human Remains" were made in March 2022 to incorporate the results of the 2021 cultural resources survey and management recommendations (WEC 2022-TN7358). RA-432 states that the WEC will protect, maintain and upkeep the Denley Cemetery, and that family members and descendants associated with the Denley Cemetery may coordinate visits with the WEC security. RA-432 also states that the WEC will not allow digging/trenching/excavation to occur in the cemetery (WEC 2022-TN7358). In response to the cultural resource survey management recommendations, the WEC moved the fence on the eastern (entrance) edge of the Denley Cemetery out 10 ft (Brockington 2022-TN7251 and WEC 2022-TN7358). Therefore, potential impacts on historic and cultural resources from the 20-year license renewal are expected to be SMALL.

3.17.2.9 Visual and Scenic Resources

Impacts on visual and scenic resources would be similar under a 20-year license renewal alternative to those analyzed for the proposed 40-year license renewal. There would not be a significant new impact on visual and scenic resources during continued operations at the CFFF site. Therefore, the NRC staff concludes that impacts on visual and scenic resources associated with the 20-year license renewal alternative would be SMALL.

3.17.2.10 Socioeconomics

Socioeconomic impacts would be similar under a 20-year license renewal alternative to those analyzed for the proposed 40-year license renewal. The CFFF operations activities and workforce would have the same annual impacts as those analyzed for the proposed action but would be for a term of 20 years. Therefore, the NRC staff concludes that impacts on socioeconomics associated with the 20-year license renewal alternative would be SMALL.

3.17.2.11 Public and Occupational Health

Impacts on public and occupational health would be similar under a 20-year license renewal alternative to those analyzed for the proposed 40-year license renewal. There would not be a significant impact on public and occupational health during continued operations at CFFF because the WEC would have to maintain compliance with State and Federal regulations governing public and occupational health. Therefore, the NRC staff concludes that impacts on public and occupational health associated with the 20-year license renewal alternative would be SMALL.

3.17.2.12 Transportation

The 20-year license renewal alternative would not involve any increase in workforce size or a significant increase in material or waste shipments. Similar to the analysis for the 40-year license renewal, all material shipments will be conducted in accordance with applicable regulations from NRC, DOT, and the State of South Carolina. Operational activities are expected to remain at current staffing levels. Therefore, the NRC staff does not expect any significant transportation impacts as a result of the 20-year license renewal alternative, and impacts from transportation associated with the 20-year license renewal alternative are expected to be SMALL.

3.17.2.13 Waste Generation and Management

Under the 20-year license renewal alternative, the NRC staff expects that waste generation rates and management practices would be similar to current CFFF generation rates and management practices. Thus, impacts from continued operation for an additional 20 years would be similar to the impacts from the proposed action. Waste generation and waste management impacts during decommissioning would also be similar to those during the proposed 40-year license renewal, with short-term SMALL to MODERATE impacts from the increase in LLRW volumes from decommissioning. The shorter license term, however, would reduce waste generation from fuel fabrication processes. Therefore, the NRC staff concludes that impacts from waste generation and management associated with the 20-year license renewal alternative would be SMALL.

3.17.2.14 Accidents

The accidents associated with the 20-year license renewal alternative would be similar to the accidents analyzed for the proposed 40-year license renewal. Therefore, for the same reasons as the 40-year proposed action analysis in the EIS, the NRC staff concludes that impacts from accidents associated with the 20-year license renewal alternative would be SMALL.

3.17.2.15 Environmental Justice

The CFFF site is located in and surrounded by census block groups that have minority populations exceeding the conditions described in Section 3.16 of this EIS. Therefore, the NRC staff closely evaluated the identified health and environmental impacts to determine if pathways could be established linking project impacts with the locally affected populations. All the health and environmental impacts identified for the 20-year license renewal alternative would be similar to the potential impacts from the proposed action and, thus, would be SMALL except for groundwater resources and waste management for decommissioning, for which impacts were found to range from SMALL to MODERATE. While the NRC staff found that potential impacts on groundwater resources can range from SMALL to MODERATE, the NRC staff determined that there is low potential for known onsite contamination to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources (see Section 3.4 of this EIS). Further, as discussed in Section 3.16.3, the NRC staff could not establish pathways linking these impacts on the local population. Thus, EJ impacts for the 20-year license renewal alternative are bounded by the proposed action and no disproportionately high and adverse health or environmental effects could be identified for this alternative.

3.18 Costs and Benefit of the Proposed Actions and Alternatives

This section summarizes the costs and benefits for each the proposed action, the no-action alternative, and the 20-year license renewal alternative. In accordance with 10 CFR 51.91(d) (TN250), the NRC staff presents the consideration of the costs and benefits in the EIS. The costs and benefits are not limited to a simple financial accounting of project costs for each alternative. Costs and benefits also are discussed for qualitative subjects (i.e., environmental degradation or enhancement). The cost-benefit analysis is not simply a mathematical formula from which to justify economic parameters; other applicable qualitative factors are discussed and weighed in the decision (NRC 2003-TN1983).

3.18.1 Methods

The economic cost-benefit analysis relies upon the concept of financial discounting and discounted cash flow analysis over the life cycle of the proposed action and is used to estimate the present value of quantifiable benefits and costs. Financial discounting quantifies the concept of the time value of money, which suggests that money in-hand is more valuable than the promise of the same money in the future. The discount rate indicates the opportunity cost of having money in the future versus having that same money in the present. It is the return one would expect to receive if they simply invested in a financial instrument as opposed to investing in the action being analyzed (the proposed continued CFFF operations for an additional 40 years).

The NRC guidance suggests the use of Office of Management and Budget (OMB) guidance (OMB 2020-TN7075) for cost-benefit analysis and the selection of a discount rate. Based on

the OMB guidance, discount rates of 0, 3, and 7 percent were used in this analysis. The alternative discount rates represent different assumptions about society's expected rate of return expectations over 40 years.

For each 40-year stream of costs and benefits the net present value (NPV) of the stream was calculated using the following formula:

$$NPV = \sum_{t=0}^n \frac{F_t}{(1+r)^t}$$

where

- F_t = net financial flow at time t (year),
- r = discount rate (opportunity cost of capital), and
- n = number of time periods in the stream (years).

The methods used are simplistic and not intended to represent investment-grade analysis. Rather, they offer a consistent framework to illustrate the relative value of financial flows related to continued CFFF operations under the proposed action. For example, all of the costs analyzed were assumed to be fixed values in each year of operation. In reality, costs in all categories will vary somewhat year-by-year, but how future costs will vary is not known.

3.18.2 Costs and Benefits of the WEC's Proposed Continued CFFF Operations

In previous sections of this EIS, the NRC staff analyze the potential impacts of the proposed continued operations of the CFFF for an additional 40 years, which includes both negative and positive environmental impacts. Negative environmental impacts are classified as environmental costs. In contrast, positive environmental impacts are classified as environmental benefits. EIS Table 3-26 and Table 3-27 define examples of environmental costs and environmental benefits of CFFF operations, respectively. In accordance with 10 CFR 2.390 (TN6204), some economic values have been redacted using (*) notation. These values are presented in Appendix C of this EIS, designated as proprietary and not described in this chapter. As such, Appendix C is not included in the publicly available version of this EIS.

Table 3-26 Environmental Costs of the WEC's Proposed Continued CFFF Operations

Resource	Description	Impact Assessment
Land Use	Land use within the CFFF site and surrounding area is not expected to change from its current uses.	SMALL
Transportation	No appreciable changes in workforce size or product shipments are expected.	SMALL
Geology and Soils	No significant disturbance of the soils and subsurface sediments from the proposed action are anticipated. Installation of groundwater monitoring wells and collection of soil samples would be temporary activities and involve minimal land disturbance. Remediation efforts are expected to disturb surface soils only near the plant buildings.	SMALL
Surface Water	The renewal of the CFFF materials license for 40 years does not involve changes to the current operating practices, including expected water usage or discharge amounts. Discharges to the Congaree River would continue to be	SMALL

Resource	Description	Impact Assessment
	conducted in accordance with the NPDES permit and NRC effluent requirements. Discharges would have minor effects on water quality and would not affect other users or uses of the river.	
Groundwater	No groundwater would be used for the CFFF operations. Onsite contamination is being addressed with implementation of the RIWP as part of the CA with the SCDHEC. Continued operations could result in inadvertent releases of contaminants that may noticeably affect water quality of the onsite groundwater and exceed water quality standards. Although there is a low potential for contaminants to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources, significant uncertainties remain about the ultimate fate and transport of groundwater contamination at the site and the ultimate outcome of remediation efforts under the CA.	SMALL to MODERATE
Terrestrial and Aquatic and Species	No significant impacts to terrestrial or aquatic species are expected. The proposed continued operation of the CFFF would result in minor and temporary impacts on terrestrial species from elevated noise during daily operations and some minor land disturbances associated with the installation of groundwater monitoring wells. Contamination levels in surface waters are within health standards.	SMALL
Air Quality	No changes in CFFF operations, equipment, workforce size, or truck shipments are expected.	SMALL
Noise	Given the distance of the CFFF from the site boundary, noise from continued operations of the CFFF would not be detectable at the site boundary.	SMALL
Historic and Cultural Resources	There will be no effect to historic properties from continued operation as there are none located within the APE. In addition, the WEC has procedures in place to protect areas with potential to contain buried archaeological resources and human remains (WEC 2022-TN7358).	SMALL
Visual and Scenic Resources	Construction of new facilities or changes to operations, which would alter the existing visual character of the local landscape of the site are not anticipated.	SMALL
Socioeconomics	The CFFF workforce results in impacts on local and regional community services and infrastructure; however, these impacts are understood and factored into current resource baselines, and no new impacts are expected from continued operations of the CFFF.	SMALL
Public and Occupational Health	Based on the continued requirement to meet NRC dose limits to the public and the workers, and nonradiological pollutant limits, oversight by the NRC and the SCDHEC, the NRC staff considers impacts to the public and occupational workers from proposed continued operations to be SMALL.	SMALL
Waste Management	The WEC does not plan any changes in the CFFF operations. Impacts from decommissioning could be expected given the uncertainties about the availability of low-level radioactive waste disposal capacity at permitted facilities.	SMALL – operations; SMALL to MODERATE-decommissioning
Environmental Justice	The NRC staff could not establish pathways linking these impacts to the locally affected population.	No disproportionately high and adverse

Resource	Description	Impact Assessment
		health or environmental effects on low-income or minority populations

Table 3-27 Environmental Benefits of CFFF Operations

Resource	Description	Impact Assessment
Socioeconomics	Positive impacts of plant employment, income, fees and tax revenue are noticeable, but already accounted for in the economic baseline of the local economy and would not change under the proposed action.	SMALL

3.18.2.1 Economic and Other Costs and Benefits of the CFFF Operations

Estimated costs for the CFFF site include the following activities: operating and maintaining the CFFF, and receipt of material and shipments of unirradiated nuclear fuel.

Economic costs include typical capital and operations expenditures regulatory compliance expenditures, environmental mitigation expenditures (which are amortized over the license renewal period), Richland County tax payments, and decommissioning fund payments (Table 3-28). Capital costs include annual costs expected for capital improvements to the CFFF plant, equipment, and site for such things as replacement facilities, major repairs, process improvements, etc. Operations costs include the annual cost expected for running the CFFF plant and maintaining the site. These costs include labor, utilities, regular maintenance, and management costs. Regulatory fees are the costs of regulatory oversight by NRC and local South Carolina regulators governing the various activities and processes of the CFFF site. Mitigation costs are the costs of pursuing various required mitigation activities on a project-by-project basis. These projects can be accomplished within a single year or may be larger and more complex, requiring multiple years to complete. The WEC provided examples of these costs, which the NRC staff used to estimate an amortized annual cost, assuming similar projects would be required periodically throughout the proposed 40-year period. Property tax payments include property taxes paid to Richland County, South Carolina. These amounts vary from year to year. Decommissioning fund payments are required by NRC regulations at 10 CFR 30.35, 10 CFR 40.36, and 10 CFR 70.25. The WEC forward funds the cost of decommissioning the CFFF site.

Table 3-28 Estimated Annual Economic Costs for Continued CFFF Operations

Economic Cost	Annual Value (\$Million) ¹
Typical capital expenditures	(*)
Typical operations expenditures	(*)
Regulatory and compliance expenditures	3.1
Environmental mitigation activity expenditures ²	(*)
Richland County tax payments	3.4
Decommissioning fund payments	0.9

Economic Cost	Annual Value (\$Million)¹
Total annual CFFF costs	(*)

Notes: (1) 2020 constant dollars; (2) mitigation project-based costs amortized over the license period.
 * noted as proprietary and redacted values
 Source: WEC 2020-TN6844.

Details concerning the calculation of the cost estimates including the discounting are presented in Appendix C of this EIS.

The chief economic benefit attributable to the CFFF is the value of the manufactured nuclear fuel. The WEC estimates that over the proposed 40-year license renewal period, the annual value in 2020 constant dollars of the manufactured fuel at CFFF would be (*) (WEC 2020-TN6844).

3.18.3 Costs and Benefits of the No-Action Alternative

Under the no-action alternative, after 2027, nuclear fuel fabrication attributable to the operation of the CFFF would need to be produced in another facility, assuming consistent demand for fuel over time. Decommissioning the CFFF site would eventually result in the elimination of any current environmental impacts attributable to on-going operations. It is not known how the site might be repurposed after decommissioning. It is possible that another industrial use may be pursued which could take advantage of current site infrastructure and minimize new environmental impacts. Decommissioning activities would be considered under a separate NEPA process prior to commencement of the activities.

3.18.3.1 Economic and Other Costs of the No-Action Alternative

The WEC indicates that economic costs after the current license expires would be for decommissioning the facility and site, as documented in the CFFF's most recent decommissioning cost estimate (submitted to NRC in July 2019; WEC 2019-TN6926). The WEC submitted its 2019 DFP and updated it to reflect recent environmental investigations. The NRC staff considered the current state of site contamination and expected remediation that the WEC would implement when reviewing the DFP for approval. The NRC staff approved the revised plan in August 2020 and amended the license accordingly (NRC 2020-TN7002). The benefits related to support of commercial nuclear power generation and providing clean energy would no longer be realized at this location, as the facility would no longer be producing nuclear fuel (WEC 2020-TN6844).

3.18.3.2 Economic and Other Benefits of the CFFF Operations of the No-Action Alternative

Some socioeconomic benefits related to local employment and community service initiatives would likely continue through the decommissioning phase, but these would be greatly diminished as the workforce would be significantly decreased once the facility stops manufacturing fuel (WEC 2020-TN6844). The NRC staff estimates that if the site were repurposed to another industrial use, that many existing economic impacts would continue. Employment levels and tax revenues would depend on the characteristics of the repurposed use and localized arrangements with any site developer but would continue.

3.18.4 Costs and Benefits of the 20-Year License Renewal Alternative

Under the 20-year license renewal alternative the CFFF would continue to operate for another 20 years. The adverse environmental impacts (costs) summarized in Table 3-26 also would occur under this alternative, but the duration of the impacts in most cases would last for 20 years instead of 40 years. Similarly, the beneficial impacts reported in Table 3-27 also would occur under the 20-year alternative but would be of shorter duration.

3.18.4.1 Economic and Other Costs of the 20-Year License Renewal Alternative

The annual financial costs listed in Table 3-28 would not change under this alternative. Detailed analysis of the financial costs and benefits of this alternative are provided in Appendix C of this EIS.

3.18.4.2 Economic and Other Benefits of the 20-Year License Renewal Alternative

The chief economic benefit attributable to the CFFF is the value of the manufactured nuclear fuel. Using the information supplied by the WEC (2020-TN6844), the NRC staff estimates that over a 20-year license renewal period considered in this alternative, the annual value in 2020 constant dollars of the manufactured fuel at CFFF would be (*).

3.18.5 Comparison of the Proposed CFFF Continued Operations (40 years) to the No-Action and 20-Year Renewal Alternatives

All the environmental impacts under each alternative would be SMALL, with the exception of groundwater resources and waste generation indicating a SMALL to MODERATE impact, based on the NRC staff analysis in this EIS. In qualitative terms, there would be no difference in impacts experienced between the alternatives except under the no-action alternative for the socioeconomic impact of lost CFFF jobs and property tax revenue after 2027, assuming no local production plant can replace the displaced workforce of the CFFF. This impact still would be SMALL in the context of the wider economy. The beneficial impacts of the proposed action would be the same under the 20-year alternative but would persist 20 fewer years and would result in the need to decommission and transition the use of the CFFF site 20 years sooner than would be expected under the proposed action.

3.18.5.1 Comparison of the Economic and Other Costs and Benefits

The NRC staff assumes that under the no-action alternative, need for nuclear fuel in the U.S. would not diminish. The CFFF facility likely would need to be replaced in some other part of the country and a separate NEPA process would cover the action to construct and operate any proposed new facility. Therefore, economic benefits of fuel production would not be lost to the country. Similarly, the economic costs of constructing a new facility elsewhere would be incurred. However, it is not unreasonable to estimate that the economic costs of building a replacement facility elsewhere would greatly surpass the costs of continuing to operate the existing CFFF, as the construction costs already have been incurred. Under the 20-year alternative, the need to replace the CFFF facility or renew its license for another term would occur 20 years sooner than under the proposed action.

3.18.5.2 Balancing of Costs and Benefits

The NRC staff has assessed the environmental and economic costs and benefits of continued operation of the CFFF over a renewed 40-year license period and weighed those against the

cost and benefits of the no-action and 20-year license renewal alternatives. This analysis required the balancing of qualitative and quantitative cost and benefit information. Detailed analysis is provided in the non-public Appendix C of this EIS.

The proposed action poses the least disruptive alternative from the cost-benefit perspective. The economic benefits derived from the value of the nuclear fuel produced outweigh the quantifiable economic costs. In addition, no resource area assessed any negative environmental impact greater than SMALL, with the exception of groundwater resources indicating a SMALL to MODERATE impact and waste generation and management indicating a SMALL to MODERATE impact during decommissioning. Also, there are SMALL offsetting positive socioeconomic impacts on local employment and tax revenues from continued CFFF operations.

The no-action alternative would result in the decommissioning of the CFFF site after the current license expires in 2027. Decommissioning would involve activities such as building demolition and remediation of land disturbance. These and related activities would be performed over some period of time (years) depending on many factors including a separate NEPA process that would look more in depth at the potential environmental impacts of decommissioning.

Once decommissioned, the CFFF site likely would become available for new industrial use and could be redeveloped for that purpose. A new manufacturing facility could be constructed to take advantage of the existing infrastructure in place at the CFFF site. The relative timing of such development, were it to be proposed, is not known for this EIS. The NRC staff assumes that the process of site decommissioning and site re-development could last for many years and would result in a new manufacturing facility, which could operate for many additional years on the CFFF site.

Decommissioning and re-development of the CFFF site would impose environmental costs that would exceed the environmental costs resulting from license extension. Substantially more ground disturbance would be expected for demolition and facility construction activities, as these activities are not anticipated under license extension, until after the end of the license extension. Impacts to other resources such as groundwater, surface water, historic and cultural resources, ecological resources, and others would depend on the nature of the re-development and future use.

In present-value terms, the quantifiable economic costs also would be higher under the no-action alternative. The capital costs of decommissioning and later re-development would be substantial in comparison to the continued operations costs of the CFFF under license extension. In addition, replacement costs for the CFFF likely would be incurred in some other location in the country, further escalating the economic cost of this alternative relative to license renewal.

Socioeconomic benefits including high-wage employment and generation of property tax revenue would continue under either alternative, but there likely would be some disruption in employment and tax revenues in the transitions from operations to decommissioning and from decommissioning to expected new plant construction and operation.

The 20-year license renewal would result in 20 additional years of CFFF operations. This alternative ranks between the proposed alternative and the no-action alternative when balancing benefits and costs. The duration of the existing adverse environmental impacts of CFFF operations would be shortened to 20 years. Offsetting beneficial economic impacts on tax revenues and local employment also would be of shorter duration under this alternative. Similar to the proposed action, the economic benefits outweigh the economic costs under the 20-year

alternative, but the duration of positive economic returns to operations would be shortened by 20 years.

After assessing and weighing these factors, the NRC staff concludes that benefits of the proposed action outweigh the economic and environmental costs. Further, the staff concludes that the no-action alternative would result in environmental and economic costs to society that would exceed these costs for the proposed action. While the 20-year alternative also would result in a positive economic benefit-cost ratio similar to the proposed action, the duration of beneficial impacts and positive economic returns to CFFF operations would be shorter by half. Therefore, the staff concludes that pursuing the proposed action would be superior to the no-action alternative or the 20-year alternative from a benefit versus cost perspective. In accordance with 10 CFR 51.91(d), these conclusions are included for the information of the public, recognizing that ultimately NRC's decision will be driven by public health and safety considerations.

3.19 Cumulative Impacts

The NRC regulations in Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions" of Title 10 of the Code of Federal Regulations (10 CFR Part 51) Section 51.90 require that the final EIS be prepared in accordance with the requirements in 10 CFR 51.71(d), which states that the EIS will consider and weigh "the environmental effects, including any cumulative effects, of the proposed action." Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. A proposed project could contribute to incremental impact when its impact on the environment is added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

The NRC staff has developed this EIS using the requirements described in the 10 CFR Part 51 (TN250) regulations. This EIS considers cumulative impacts in the relevant environmental resource analyses. This section of the EIS is intended to describe the relevant past, present, and reasonably foreseeable future projects potentially impacting and impacted by the proposed action, leaving the resource-specific impacts to be analyzed and described in the respective resource sections of Chapter 3. Climate change, including the increased frequency of hurricanes, intensification of drought and extreme rainfall events, warming winter temperatures, and changing fire patterns, may have an impact on the WEC's CFFF and the region. Beyond the direct impacts of these changes on the CFFF, the 2018 Fourth National Climate Assessment (GCRP 2018-TN5847) highlights the effects of these changes, which can result in impacts on the functioning of natural systems, including ecosystems and ecological diversity; physical systems such as bridges, roads, and water treatment facilities; and social systems, including increases in exposure-linked health impacts and economic vulnerabilities. These changes are likely to affect terrestrial and aquatic resources, socioeconomics, and EJ communities, among others.

Relevant past, present, and reasonably foreseeable future actions potentially impacting and impacted by the proposed action are described below in Table 3-29.

The significance of cumulative resource impacts is summarized below in Table 3-29. Resource areas requiring additional cumulative impacts analysis are described in Sections 3.19.2 through 3.19.2.6.

Table 3-29 Existing and Reasonably Foreseeable Projects, Activities, and Actions

Project Name	Summary of Project/Activity/Action	Location	Status
Energy Projects			
South Carolina Electric and Gas Substation	Electrical Substation	CFFF Site	Operational (WEC 2019-TN6510)
Dominion Natural Gas Pipeline	Gas Pipeline	Within 1 mi (1.6 km)	Under development (FERC 2016-TN6939)
Timber and Hay Field Production	Timber and hay production	CFFF Site	Ongoing (WEC 2019-TN6510)
Transportation Projects			
Bluff Road Expansion	Road expansion projects to encourage development in an existing industrial park	Within 15 mi (24 km)	Approved (Richland County 2021-TN7036) Phase 1 Completed, Phase 2 On Hold (Parrish & Partners 2021-TN7035)
Federal, State, County, and Local Projects			
Hopkins Elementary School	School	Within 5 mi (8 km)	Operational (WEC 2019-TN6510)
Lower Richland High School	School	Slightly more than 5 mi (8 km)	Operational (WEC 2019-TN6510)
Mill Creek Elementary School	School	Slightly more than 5 mi (8 km)	Operational (WEC 2019-TN6510)
Sandhills School	School	Slightly more than 5 mi (8 km)	Operational (WEC 2019-TN6510)
Nine churches	Churches	Within 5 mi (8 km)	Operational (WEC 2019-TN6510)
Alvin S. Glenn (Richland County) Detention Center	Detention Center	Within 5 mi (8 km)	Operational (WEC 2019-TN6510)
Fort Jackson	U.S. Army Base	7 mi north (11 km)	Operational (WEC 2019-TN6510)
McEntire Base	Joint National Guard Base	6 mi northeast (9.7 km)	Operational (WEC 2019-TN6510)
Parks and Agricultural Facilities			

Project Name	Summary of Project/Activity/Action	Location	Status
Congaree River and National Park	National Park, Nationwide Rivers Inventory, International Biosphere, Globally Important Bird Area, National Natural Landmark	Within 5 mi (8 km)	Operational (NPS 2019-TN6974)
Mill Creek Mitigation Bank Project	Stream and Wetland Mitigation Bank	Within 5 mi (8 km)	Operational (Richland County 2018-TN7144)
Various Farms	Quail, strawberries, fish for pond stocking, and equestrian	Within 5 mi (8 km)	Operational (WEC 2019-TN6546)
Businesses, Homes, and Other Projects			
Private property	Private property	Adjacent to the east, south, and west	Ongoing (WEC 2019-TN6510)
Fiberglass Manufacturing Facility	Fiberglass manufacturing	Within 15 mi (24 km)	Operational (Wilkinson 2018-TN7022)
South Carolina Recycling and Disposal, Inc. (Superfund Site)	Storage, recycling, and disposal	Within 1 mi (1.6 km)	Closed Superfund site (EPA 2020-TN6522)
Carolinas-Virginia Tube Reactor	Decommissioned nuclear facility	Within 50 mi (80 km)	Decommissioned (IAEA 2021-TN7034)
DAK Americas	Man-made production fibers	Within 5 mi (8 km)	Operational (WEC 2019-TN6546)
Nephron Pharmaceuticals	Eye drop medications, respiratory medicine, vaccines, and injectable drugs	Within 5 mi (8 km)	Operational (WEC 2019-TN6546)
Knight's Redi-Mix	Concrete batching plant for commercial use	Within 5 mi (8 km)	Operational (WEC 2019-TN6546)
Wallace Concrete Products	Manhole production	Within 5 mi (8 km)	Operational (WEC 2019-TN6546)
Schneider Electric	Industrial motor control production	Within 5 mi (8 km)	Operational (WEC 2019-TN6546)
Devro Inc.	Collagen casings for food	Within 5 mi (8 km)	Operational (WEC 2019-TN6546)
Amazon	Consumer products distribution	Within 5 mi (8 km)	Operational (WEC 2019-TN6546)
Future urbanization	Construction of housing units and associated commercial buildings; roads, bridges, and rail;	Throughout region	Construction would occur in the future, as described in State and

Project Name	Summary of Project/Activity/Action	Location	Status
	construction of water and/or wastewater treatment and distribution facilities and associated pipelines, as described in local land use planning documents.		local land use planning documents
Tritium-Producing Burnable Absorber Rod (TPBAR) manufacturing	Manufacturing of stainless-steel rods filled with lithium and zirconium alloy used to absorb tritium from nuclear reactor cores.	CFFF Site	Operational (WEC 2021-TN7126)

Table 3-30 Cumulative Resource Impacts Associated with the CFFF

Resource	Cumulative Impact Assessment
Land Use	SMALL
Transportation	SMALL
Geology and Soils	SMALL
Surface Water	SMALL to MODERATE
Groundwater	SMALL to MODERATE
Terrestrial and Aquatic and Species	SMALL
Air Quality	SMALL
Noise	SMALL
Historic and Cultural Resources	SMALL
Visual and Scenic Resources	SMALL
Socioeconomics	SMALL
Public and Occupational Health	SMALL
Waste Generation and Management	SMALL – operations; SMALL to MODERATE - decommissioning
Environmental Justice	No disproportionately high and adverse health or environmental effects on low-income or minority populations

3.19.1 Cumulative Activities

3.19.1.1 TPBAR Fabrication

As discussed in Section 2.1.2 of this EIS, the DOE/National Nuclear Security Administration (DOE/NNSA) contracts with Westinghouse Government Services LLC (WGS) to fabricate TPBARs at the CFFF. TPBAR fabrication is a separate activity from the proposed action and is therefore analyzed as a cumulative impact. A TPBAR is made of a stainless-steel rod filled with lithium and zirconium alloy. TPBARs are inserted, along with fuel rods, into the core of a nuclear power reactor that is producing electricity (WEC 2021-TN7126).

While TPBARs are manufactured at the CFFF, they do not contain radioactive material nor produce radioactive material during fabrication. After fabrication, TPBARs are sent to the Watts

Bar Nuclear Plant operated by the Tennessee Valley Authority where they are irradiated, followed by shipment to the Savannah River Site in NRC-approved transportation packages per 10 CFR Part 71 for subsequent extraction of the tritium (WEC 2021-TN7126). Shipment of irradiated TPBARs must comply with applicable NRC and U.S. Department of Transportation (DOT) regulations for the transportation of radioactive materials in 10 CFR 71 and 73 and 49 CFR 107, 171–180, and 390–397, as appropriate to the mode of transport.

The TPBAR manufacturing area is located in the mechanical area of the plant, and the waste produced in the production of TPBARs is common to other mechanical area production activity generating waste at CFFF. TPBAR production includes generation of a small amount of nonradioactive, hazardous waste, including acetone-contaminated rags and zirconium alloy metal shavings. The TPBAR area generates less than one drum of acetone-contaminated rags and less than one gallon of zirconium shavings annually. Such wastes would be stored onsite and disposed of in accordance with applicable State and Federal hazardous waste regulations, consistent with those described in Section 3.14 of this EIS. There are no liquid or gaseous effluents generated from the TPBAR manufacturing (WEC 2022-TN7182). Occupational health impacts from TPBAR production are managed by the WEC's Chemical Safety Program, which is designed to evaluate current and proposed chemical-use hazards to maintain safe operations. The WEC is also required to comply with occupational health and safety regulations to preserve worker health and safety.

3.19.1.2 Ongoing Activities at the CFFF Site

Since the 2007 license renewal (NRC 2007-TN5598), multiple leaks or spills have resulted in the contamination of the subsurface at the CFFF site (WEC 2019-TN6546) and in the groundwater and surface water. The remedial investigation activities the WEC is conducting under the CA with the SCDHEC (SCDHEC/WEC 2019-TN6554) will provide relevant information about contamination migration and exposure pathways for those historical leaks and spills and will inform remediation activities. As part of the implementation of the CA, the WEC has developed a CSM and WEC Procedure RA-435, "Conceptual Site Model Development" to inform decisions about changes to its monitoring protocols based on information learned from investigations and sampling data. The WEC has committed to the use of procedure RA-435 to maintain the CSM (WEC 2021-TN7042). The WEC will continue to enhance the CSM as the remedial investigation (under the CA with the SCDHEC) is conducted. The entire monitoring well network is currently sampled at least semiannually. These analytical results are used for comparison with previous results and serve to detect potential leaks per the site's "Environmental Data Management Procedure", RA-434 (WEC 2021-TN7042). The WEC has also established and committed to the use of an environmental remediation procedure (RA-433) to be followed in the event of a release of contaminants to the ground surface or environmental mediums, the detection of groundwater contamination above MCLs, or the discovery of a past release through soil sampling (WEC 2020-TN6853, WEC 2021-TN7042). The purpose of the remediation procedure is to prevent the migration of contaminants offsite and to minimize the impacts of contaminant releases on future decommissioning activities. Consistent with the WEC's RIWP, approved by the SCDHEC, the WEC would document the results of all remedial investigation activities in a final Remedial Investigation Report that would also include a summary of the human health and ecological risks from the Baseline Risk Assessment that the WEC would perform after completing the remedial investigation activities. The remedial investigations and the Baseline Risk Assessment would inform the WEC's evaluation conducted to determine whether additional assessments are necessary for further focused assessment activities and appropriate remedial alternatives, which would be part of a Feasibility Study. The Feasibility Study would be provided to the SCDHEC within 90 days of the SCDHEC's approval

of the final Remedial Investigation Report. The WEC decommissioned the East Lagoon in 2021 and remediated the soil as necessary (WEC 2019-TN6555, WEC 2021-TN6921 and the SCDHEC 2021-TN7175). Because the WEC had identified the East Lagoon as a potential source of groundwater contamination, removal of the lagoon and remediation of the soil was a beneficial impact because a potential ongoing source of contamination was removed. The WEC has also indicated its intent to close the Sanitary Lagoon (WEC 2021-TN7133). The WEC has replaced four of the WWTP lagoon liners, which are expected to need to be replaced again during the proposed license term of 40 years, or the WEC may possibly remove the lagoons instead of replacing the liners. In addition, to meet the criteria for unrestricted release, the WEC must remediate the site to meet the public dose standard in 10 CFR 20.1402 (TN283) (i.e., less than 25 mrem/yr), including dose from groundwater. The WEC also must consider the volume of onsite subsurface material containing residual radioactivity that would require remediation when it is preparing its detailed cost estimate for the DFP for NRC review and approval. The WEC submitted its 2019 DFP and updated it to reflect recent environmental investigations (WEC 2019-TN6926). In 2020, the NRC staff approved the WEC's 2019 DFP and amended the license accordingly (NRC 2020-TN7002). The NRC staff considered the current state of site contamination and expected remediation that the WEC would implement when reviewing the DFP for approval.

If renewed, the WEC's license would include three new proposed license conditions. The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either the SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to the SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2, and 2.4.2 of this EIS. Additionally, as part of the NPDES permit (SC0001848) issued by the SCDHEC, the WEC monitors its discharges to the Congaree River and collects groundwater monitoring samples. Section 3.3 and Chapter 2 of this EIS provides a detailed discussion of the NPDES permit and the monitoring program, which are regulated by the SCDHEC under the Clean Water Act. The WEC's NPDES permit sets the requirements for its discharge into the Congaree River, including submission of monthly discharge monitoring reports. The WEC sends annual NPDES groundwater sampling reports to the NRC (WEC 2021-TN7106).

The NRC staff expects that ongoing remedial activities addressing known contamination and proposed remediation activities related to the environmental monitoring and sampling program tied to the proposed license conditions S-16, S-17, and S-18 would mitigate impacts from past and reduce the potential for future leak and spill events.

3.19.1.3 Activities on Undeveloped Portions of the CFFF Site

Current and expected future activities on the undeveloped portions of the CFFF site are logging and farming. Logging operations have been practiced on the undeveloped parcels of the WEC property for decades and have been compatible with CFFF operations. The environmental impacts of transportation associated with logging operations is negligible compared to the

impacts of CFFF's 1,138 employees already commuting daily to and from the site (see Table 3-13). Dominion Carolina Gas Transmission, LLC is installing a natural gas pipeline along Bluff Road that will be within 335 m (1,100 ft) northwest of the CFFF site. An EA was prepared for the pipeline, and it concluded that the impacts would not be significant for this particular portion of the route and that impacts on groundwater resources would be minor and temporary (FERC 2016-TN6939).

3.19.1.4 Activities Outside the CFFF Site

Planning documents for future growth in Richland County as a whole (Richland County 2015-TN6578) and for the southern or "lower" part of the county (Richland County 2014-TN6600) were issued in 2015. The county-wide document provides guidance related to Richland County's growth over the next 20 years and direction for future decisions so that the County can achieve its vision regarding that growth. The CFFF site is located in an area designated as the "southeast" in the county-wide plan, and Richland County expects that land use around the CFFF site would not change over the assessed upcoming 20 years (Richland County 2015-TN6578). Additionally, development over the next 20 years in the area around the CFFF site is hampered by limited water and sewer service and by environmental constraints (Richland County 2014-TN6600). Within 15 mi (24 km) to the northwest of the CFFF site, several road expansion projects are planned off of and along Bluff Road to encourage development within an existing industrial park. Phase 1 of this road expansion project was completed in 2017; Phase 2 is on hold as of the date of publication of this EIS. A fiberglass manufacturing facility is currently operational and within 15 mi of the CFFF site and may have minor effects to local traffic or environmental resources through permitted emissions (Wilkinson 2018-TN7022). Continued land use near the CFFF site, which is rural, could result in continued soil, nutrients, and other pollutants washing into the Congaree River from residential and agricultural storm water runoff, continued conversion and fragmentation of wildlife habitat from development, and the introduction of invasive species. Species with threatened, endangered, or declining populations are likely to be more sensitive to declines in habitat availability and quality and the introduction of invasive species. Future development, including population increases and construction of new impervious surfaces could result in an increase in local traffic, public health impacts, and frequency and intensity of flooding events.

A 1.6 ha (4 ac) Superfund site—South Carolina Recycling and Disposal, Inc.—is located on the north side of Bluff Road across from the CFFF site. The site was used for storage, recycling, and disposal operations until 1982. The site has contaminated groundwater and soil, primarily from VOCs, resulting from past activities. According to the EPA, the migration of contaminated groundwater has stabilized, there is no unacceptable discharge to surface water, and the site's contamination does not currently threaten people living and working near the site (EPA 2020-TN6522). The WEC indicated no concern about contaminant contribution from the Superfund site at this time (NRC 2018-TN6549).

In the future, it is possible that the WEC could undertake activities that does not require prior NRC approval, which could potentially result in new construction or land disturbance. For some requests, the WEC would need a license amendment, in which case the NRC would evaluate the potential environmental impacts of that action.

Additionally, Knight's Redi-Mix, Schneider Electric, and Devro all have manufacturing facilities within an 8 km (5 mi) radius of CFFF. Amazon, Nephron Pharmaceuticals, and DAK Americas are located within a 16 km (10 mi) radius. Fort Jackson U.S. Army Base is 11 km (7 mi) to the north of CFFF site and McEntire Joint National Guard Station is 9.6 km (6 mi) northeast. Any incremental impact from emissions from these facilities would be minor due to distance of these

facilities from the CFFF and because these facilities would have to comply with Federal, State and local regulatory requirements.

3.19.1.5 Subsequent License Renewal and Decommissioning

Continued operation of the CFFF for another 40 years increases the amount of time for radioactive and nonradioactive contaminants to accumulate in the environment, which could affect the WEC's plans for site decontamination and decommissioning as well as the amount of funding needed for decommissioning. It is also possible that the WEC could request another license renewal. The NRC would need to review and approve any request for subsequent license renewal.

Once operations have ceased, the CFFF site would be decommissioned. The WEC would be required to decontaminate and decommission the site to levels that would allow for the release of the facility under the NRC's regulations in 10 CFR Part 20 (TN283). After completing decommissioning activities, the WEC must complete radiation surveys to verify that the site meets the release criteria. Although there are no specific plans for decommissioning at this time, activities associated with decommissioning could cause impacts on the environment. During decommissioning, there could be increased transportation impacts due to increased shipments offsite and additional workers; increases in waste generated for disposal associated with removal of buildings and equipment; and temporary increases in dust and particulate emissions from demolition and emissions from equipment. Availability at a licensed LLRW disposal site for the waste from decommissioning activities requires long-term planning. Other potential impacts include effects on tax revenue and employment, changes in worker and public dose, and increased noise from demolition activities.

3.19.2 Cumulative Resource Impacts

3.19.2.1 Surface Water

Past operation of the CFFF has had a noticeable effect on the water quality of the onsite surface water bodies, including the current elevated Tc-99 concentrations in Gator Pond and the current exceedance of uranium residential screening levels in Mill Creek sediments. The existing surface water monitoring data indicate that there is a low potential for contamination to move offsite via a surface water pathway and noticeably degrade water quality in Mill Creek downstream from the CFFF site boundary. Withdrawals and consumptive use of water for CFFF operations would have negligible effects on other uses/users of the Congaree River. In addition, the incremental impact of CFFF discharges on the Congaree River's water quality is expected to be minimal. In addition to the CFFF's NPDES discharge permit, five other discharges are permitted to the Congaree River. As described in Section 3.3.1.1, the Congaree River is impaired for recreational use due to *E. coli* and aquatic life due to mercury in its headwaters within the City of Columbia. Downstream of the CFFF discharge, the Congaree River is impaired for aquatic life due to copper and mercury. The Congaree River is not impaired downstream of the CFFF discharge by any identified contaminants of potential concern attributed to CFFF operations. There are also no surface water withdrawals on the Congaree River between the CFFF discharge and the confluence with the Wateree River. Because the past operation of CFFF has had a noticeable effect on the water quality of the onsite surface water bodies that continues to be observed in the most recent data, the NRC staff concludes that the cumulative impacts on surface water from past and current CFFF operations activities are MODERATE. As described in Section 3.3.2, the incremental surface water impacts from the proposed action would be SMALL and would not result in a collectively greater impact on

surface water resources. No projects identified in Table 3-29 are expected to contribute additional cumulative impacts.

3.19.2.2 Groundwater

Past operation of the CFFF has had a noticeable effect on the water quality of the onsite groundwater, including the exceedance of water quality standards for several contaminants. The existing groundwater data indicate that the contaminant plumes resulting from past activities at the CFFF site currently remain within the boundaries of the site property, occur only in the surficial aquifer, and are not likely to travel beyond the CFFF site boundary during the period of the proposed action. As described in Section 3.4.2, there are significant uncertainties that affect the evaluation of the fate and transport of the existing contaminant plumes, including uncertainty about the ultimate outcome of the groundwater remediation that would occur under the CA process. The NRC staff determined that the proposed continued operations of CFFF could result in future inadvertent releases of contaminants that may noticeably affect the water quality of the onsite groundwater and exceed water quality standards. There is a low potential for contaminants to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources (e.g., the environmental sampling and monitoring program). As described above, however, significant uncertainties remain about the ultimate fate and transport of groundwater contamination at the site. Because the past operation of CFFF has had a noticeable effect on the water quality of the onsite groundwater that continues to be observed in the most recent data, the NRC staff concludes that the cumulative impacts on groundwater from past and current CFFF operations activities would be MODERATE. The incremental impact from the proposed action on groundwater resources would be SMALL to MODERATE (as described in Section 3.4.2) and would not result in a collectively greater impact on groundwater resources. No projects identified in Table 3-29 are expected to affect groundwater quality within the CFFF site boundary. As a result, no additional cumulative impacts are expected.

3.19.2.3 Terrestrial and Aquatic Ecology and Special Status Species

The cumulative aquatic impacts were evaluated based on the contamination to the Congaree River from the CFFF's discharges plus those of five other sources that have NPDES discharge permits. The Congaree River is impaired for recreational use due to *E. coli* and aquatic life due to mercury in its headwaters within the City of Columbia. Downstream of the CFFF discharge, the Congaree River is impaired for aquatic life due to copper and mercury. The CFFF discharge does not contribute to impairments of those constituents. Additional testing of 27 bluegill and sunfish by the SCDHEC in 2019 demonstrated uranium levels were below detectable amounts, fluoride was within health limits, and fluoride levels near the diffuser were not significantly different than the upriver and downriver controls sites (see Section 3.5.2.2). Therefore, the SCHDEC website states no additional fish tissue evaluation beyond the current one fish per year is needed at this time (SCDHEC Undated-TN7138).

The cumulative ecological terrestrial impacts were evaluated based primarily on land development practices at the CFFF site and in surrounding areas. Logging and agriculture have been practiced on undeveloped portions of the CFFF site for decades and are likely to continue in the future at similar levels (NRC 2019-TN6472). Development and urbanization in areas adjacent to the CFFF site could result in habitat fragmentation and degradation, but this is a rural area where land use practices are expected to remain the same for at least the next 20 years (Richland County 2015-TN6578; NRC 2019-TN6472). While some habitat

disturbances could occur in the future, there are several wildlife refuges in the area as well as the 10,634 ha (26,276 ac) Congaree National Park that benefit wildlife.

3.19.2.4 Air Quality

Increasing temperatures and stagnant air masses due to climate change may produce conducive atmosphere for ozone (O₃) (smog) formation. However, the regional monitors show O₃ values much lower than the current NAAQS (70 ppb) and therefore, the NO_x emissions from the continued operation of the CFFF are not expected to significantly increase regional O₃ concentrations. Nearby operation of the Dominion Natural Gas Pipeline is expected to generate fugitive methane emissions of 28,312 CO₂eq T/yr (FERC 2016-TN6901). Similarly, a fiberglass manufacturing plant is currently operational and estimated to emit 126 T/yr of PM₁₀, 1,194 T/yr of SO₂, 323 T/yr of NO_x, and 238 T/yr of fluorides (SCDHEC 2016-TN6900). The CFFF stack emissions along with such nearby major and minor operations (e.g., construction, logging) could slightly increase the air pollutants and GHG emissions in the region. Such future activities in combination with CFFF operations could lead to slightly poor air quality intermittently. However, their combined contribution should not affect the environment and climate significantly.

3.19.2.5 Historic and Cultural Resources

The geographic scope for assessing cumulative impacts on historic and cultural resources is considered to be the same as that of the APE defined for the proposed action (i.e., CFFF licensing activities occurring within the CFFF site licensed boundary). The description of the affected environment in Section 3.9 of this EIS serves as the baseline for the cumulative impact assessment in this resource area. As discussed in Section 3.9.1 of this EIS, there are five archaeological sites and five aboveground resources located within the APE. All have been determined to not be eligible for listing in the NRHP (SCDAH 2022-TN7357 and SCDAH 2022-TN7368). One of the referenced sites includes aboveground resources is the Denley Cemetery which is subject to SC Code of Laws, Section 16-17-600, regarding burial sites and cemeteries. The WEC would continue to follow the established and updated cultural resource procedures discussed in Section 3.9.2 of this EIS. As described in Section 3.9.1, the potential impacts from the proposed action would be SMALL.

In addition to the impacts from the proposed relicensing, this cumulative analysis of historic and cultural resources impacts considers impacts associated with other past, present, and reasonably foreseeable projects located within the geographic scope. Reasonably foreseeable projects within the geographic region of influence that may have a potential cumulative impact on historic and cultural resources include operational activities associated with the SCE&G substation, operation and maintenance of the uranium hexafluoride storage pad project, and ongoing hay and timber production. Development of such projects could affect historic and cultural resources if ground-disturbing activities occur, depending upon the extent of damage caused to archaeological resources and the extent of mitigation required.

3.19.2.6 Socioeconomics and Environmental Justice

Cumulative socioeconomic and EJ impacts were evaluated within the 20 mi radius identified in Section 3.11 of this EIS. Urbanization related to growth of the Columbia metropolitan area has been and will continue to be a principal source of socioeconomic impacts. In-migrating population causes growth in needs for housing, infrastructure, and community services, and increases demands for local goods and services, which helps grow the local economy in terms of jobs and income. The NRC also notes that the Lower Richland area surrounding the CFFF

site is a minority and low-income community, and public comments received point to potential cumulative health effects of previous industrial development in the local area. Additionally, comments suggest that the combined effects of poverty, crime, coronavirus, and climate impacts also may contribute to health effects and environmental impacts on subsistence resources such as fish and game. The NRC's impact analysis has not established any pathways by which previous or future environmental impacts would disproportionately affect EJ populations. Therefore, when the proposed action is combined with other past, present, and reasonably foreseeable future actions in the vicinity of the CFFF site, no disproportionately high and adverse cumulative health or environmental effects are expected. As described in Section 3.11.4 and Section 3.16.3, socioeconomic impacts from the proposed action would be SMALL and no disproportionately high and adverse health or environmental impacts on minority or low-income populations would be expected.

3.20 Summary of Environmental Consequences

This section summarizes the potential environmental impacts of the proposed action (i.e., renewing the WEC's CFFF license for an additional 40 years), the no-action alternative (i.e., denying the WEC's license renewal request), and the 20-year license renewal alternative (i.e., renewing the WEC's CFFF license for an additional 20 years). The potential impacts of the proposed action are discussed in terms of (1) unavoidable adverse environmental impacts, (2) irreversible and irretrievable commitments of resources, (3) short-term impacts and uses of the environment, and (4) long-term impacts and the maintenance and enhancement of productivity. The information is presented for each of the resource areas that may be affected by the proposed action. The specific impacts are described in Table 3-31 below.

The following terms are based on NUREG-1748 (NRC 2003-TN1983).

- Unavoidable adverse environmental impacts – applies to impacts that cannot be avoided and for which no practical means of mitigation are available.
- Irreversible – involves commitments of environmental resources that cannot be restored.
- Irretrievable – applies to material resources and will involve commitments of materials that, when used, cannot be recycled or restored for other uses by practical means.
- Short-term – represents the period from construction to the end of the decommissioning activities and, therefore, generally affects the present quality of life for the public.
- Long-term – represents the period of time following the termination of the NRC license, with the potential to affect the quality of life for future generations.

As discussed in Chapter 4 of NUREG-1748 (NRC 2003-TN1983), the significance of potential environmental impacts is categorized as follows:

- SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.
- MODERATE: The environmental effects would be sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- LARGE: The environmental effects would be clearly noticeable and are sufficient to destabilize important attributes of the resource.

Table 3-31 Summary of Environmental Impacts of the Proposed CFFF License Renewal

Resource Area	Unavoidable Adverse Environmental Impacts	Irreversible and Irrecoverable Commitment of Resources	Short-Term Impacts and Uses of the Environment	Long-Term Impacts and the Maintenance and Enhancement of Productivity
Land Use	<p>For the proposed action there would be a SMALL impact on land use. The WEC did not request any new construction or changes in current facility operations or buildings in the LRA that would result in significant land disturbances. However, future construction associated with the CFFF operations could require an NRC license amendment and associated environmental review.</p> <p>As part of the WEC's remedial investigations under the CA, the WEC continues to install groundwater monitoring wells, but these installations would involve minimal land disturbance. Remediation activities have been carried out and could continue during the proposed action, but most remediation would be conducted near the CFFF buildings.</p> <p>Logging and farming would be expected to continue on undeveloped portions of the CFFF site if the license is renewed. Land use in the surrounding area is not expected to change from its current uses, including the CFFF's operations.</p>	<p>No impact. There would be no irreversible and irretrievable commitment of land resources from implementing the proposed action. After the proposed license renewal term, the land would eventually be reclaimed and made available for other uses.</p>	<p>Short-term impacts associated with land use from the proposed renewal of the CFFF license for another 40 years would be SMALL.</p> <p>Installation of groundwater monitoring wells and collection of soil samples would be temporary activities and involve minimal land disturbance. Potential future construction proposed by the WEC could require a license amendment and subsequent environmental review.</p> <p>The use of the land on the CFFF site and in the surrounding area is not expected to change from its current uses. Therefore, the NRC does not expect a significant impact on land use during the proposed continued operations of the CFFF for an additional 40 years.</p>	<p>There would be SMALL or no long-term impacts on land use from implementing the proposed action. The land would be available for other uses by the WEC following decommissioning of the CFFF site and license termination.</p>
Geology, Seismology, and Soils	<p>There would be a SMALL impact on geology and soils from the proposed action. No significant disturbance of the soils and</p>	<p>No impact. No onsite or offsite geological resources would be required under the proposed action. No</p>	<p>Impacts on soils would be SMALL and localized to those soils near the plant buildings. Impacts would be negligible for the majority of</p>	<p>There would be no long-term impacts on geology and soils throughout the duration of the proposed action.</p>

Resource Area	Unavoidable Adverse Environmental Impacts	Irretrievable and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment	Long-Term Impacts and the Maintenance and Enhancement of Productivity
Surface Water Resources	<p>subsurface sediments from the proposed action are anticipated. Installation of groundwater monitoring wells and collection of soil samples are temporary activities and involve minimal land disturbance.</p> <p>Remediation efforts are expected to disturb surface soils only near the plant buildings.</p> <p>There would be a SMALL impact on surface waters resulting from the proposed action.</p> <p>Consumptive use of water from the City of Columbia for the CFFF operations would have negligible effects on other uses/users of the Congaree River. Discharges to the Congaree River would have minor effects on water quality that would not affect other users or uses of the river. Impacts on water quality for onsite waterbodies would be SMALL because the WEC would comply with the SCDHEC's NPDES permit, the SCDHEC CA, and the proposed license conditions S-16, S-17, and S-18 discussed in Chapter 2 and Section 2.2.2 of this EIS. The impacts from continued operations would be mitigated by regulatory and license requirements, which would minimize the likelihood of contamination moving offsite and</p>	<p>irreversible and irretrievable commitment of soil resources are expected.</p> <p>No impact. There would be no irreversible and irretrievable commitment of surface water resources from implementing the proposed action. The duration of permitted discharges would be the 40-year license term after which time the discharges would cease. Water quality for onsite waterbodies would comply with the SCDHEC's NPDES permit, the SCDHEC CA, and the proposed license conditions S-16, S-17, and S-18 as described in Chapter 2 and Section 2.2.2 of this EIS. The proposed license conditions require the WEC to report exceedances of the drinking water standards for the duration of the 40-year license term.</p>	<p>soils on the CFFF site and for all offsite soils.</p> <p>There would be a SMALL impact from renewal of the CFFF license for another 40 years. Treated wastewater would continue to be discharged into the Congaree River in accordance with the NPDES permit and there could be seepage into Sunset Lake and the Mill Creek drainage. Remediation efforts addressing known contamination would be evaluated as part of the CA with the SCDHEC. In response to the CA, the WEC is implementing the approved RIWP and developed a CSM to better understand the sources, extent, and migration of known contamination. In addition, the WEC's commitments under the license renewal application (e.g., data management and environmental remediation procedures) would mitigate impacts to surface water resources.</p>	<p>There would be a SMALL or no long-term impact on surface water resources from implementing the proposed action. There would be no long-term permitted discharges. Onsite water quality would meet water quality standards due to compliance with the SCDHEC's NPDES permit, the SCDHEC CA, and the proposed license conditions S-16, S-17, and S-18 discussed in Chapter 2 and Section 2.2.2 of this EIS, and activities associated with decommissioning of the CFFF site and license termination discussed in Section 2.3.</p>

Resource Area	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment	Long-Term Impacts and the Maintenance and Enhancement of Productivity
<p>affect water quality users of the local surface water resources. The renewal of the CFFF materials license for an additional 40 years does not involve changes in the current operating practices, including expected water usage or discharge amounts.</p>	<p>There would be a SMALL to MODERATE impact on groundwater resources from the proposed action. There would be no impacts from consumptive use of groundwater because no CFFF operations. Contaminants derived from the CFFF's past operations are currently present in onsite groundwater at concentrations above water quality standards. This contamination is currently being addressed with implementation of the RIWP as part of the CA with the SCDHEC. Continued operations could result in inadvertent releases of contaminants that may noticeably affect the water quality of the onsite groundwater and exceed water quality standards. Although there is a low potential for contaminants to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources, significant uncertainties remain about the ultimate fate and transport of groundwater</p>	<p>There would be no irreversible and irretrievable commitment of groundwater resources from implementing the proposed action. Any inadvertent contaminant releases that could affect groundwater quality would cease after the 40-year license term, and decommissioning activities would address residual soil contamination. Although the outcome of groundwater remediation activities is uncertain, with the removal of contaminant sources, groundwater quality would improve via natural processes to meet water quality standards.</p>	<p>There would be a SMALL to MODERATE impact on groundwater resources during the 40-year license renewal period. The occurrence of future inadvertent releases of contaminants to the subsurface is reasonably foreseeable. As required by the CA, the WEC is implementing the approved RIWP and developed a CSM to better understand the sources, extent, and migration of known contamination. In addition, commitments under the WEC license renewal application (e.g., data management and environmental remediation procedures) would mitigate impacts to groundwater resources. However, significant uncertainties remain about the ultimate fate and transport of groundwater</p>	<p>There would be a SMALL to MODERATE long-term impact on groundwater resources from implementing the proposed action. There is a low potential for contaminants to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources. However, significant uncertainties remain about the ultimate fate and transport of groundwater contamination at the site and the ultimate outcome of remediation efforts and decommissioning activities.</p>

Resource Area	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment	Long-Term Impacts and the Maintenance and Enhancement of Productivity
Ecological Resources	<p>contamination at the site and the ultimate outcome of remediation efforts under the CA.</p> <p>There would be a SMALL impact on aquatic and terrestrial ecological resources from the proposed action. The proposed continued operation of the CFFF would result in minor and temporary impacts on terrestrial species from elevated noise during daily operations and some minor land disturbances associated with the installation of groundwater monitoring wells per the CA with the SCDHEC and implementation of the RIWP.</p>	<p>No impact. There would be no irreversible and irretrievable impacts on ecological resources from the proposed action for the same six reasons as described to the left in the category, "Unavoidable Adverse Environmental Impacts."</p>	<p>There would be a SMALL impact on aquatic and terrestrial ecological resources with renewal of the CFFF license for another 40 years. Treated wastewater would continue to be discharged into the Congaree River in accordance with the NPDES permit. Pollutant releases to water bodies outside the CFFF site have been below the regulatory limits. Additionally, the WEC is not proposing any new construction that would disturb terrestrial habitats; and wildlife is habituated to daily operating noises.</p>	<p>There would be a SMALL or no long-term impact on ecological resources from the proposed action due to discharges to the Congaree River in accordance with the NPDES permit, and remediation efforts would be carried out as part of the implementation of the CA, decommissioning of the CFFF site, and license termination.</p>
	<p>No significant impacts are expected on aquatic life from the proposed action because: (1) there is a low potential for significant contamination to move offsite via surface water pathways; (2) there is also low potential that water quality will be noticeably degrade in waters of concern (i.e., Mill Creek and the Congaree River); (3) discharge of treated wastewater directly into the Congaree River is managed in accordance with the WEC's NPDES permit; (4) onsite contamination is being investigated and addressed via the CA between the WEC and the SCDHEC; (5) the SCDHEC did not detect any contamination concerns during their expanded fish tissue study in the Congaree</p>			

Resource Area	Unavoidable Adverse Environmental Impacts	Irreversible and Irrecoverable Commitment of Resources	Short-Term Impacts and Uses of the Environment	Long-Term Impacts and the Maintenance and Enhancement of Productivity
<p>River; and (6) the FWS and NOAA also concluded the proposed action is unlikely to negatively affect protected species and habitats.</p>	<p>There would be a SMALL impact on meteorology, climatology, and air quality resulting from the proposed action.</p> <p>The proposed action does not involve changes in equipment operations, workforce size, or truck shipments. The WEC would continue to comply with permit limits for criteria pollutants, fluorides, nitric acid, and opacity set by the SCDHEC and the stationary source standards set by the National Emission Standards for Hazardous Air Pollutants. The CFFF is located within an attainment area for the National Ambient Air Quality Standards.</p>	<p>No impact. There would be no irreversible and irretrievable commitment of air resources and local climate from implementing the proposed action.</p>	<p>There would be a SMALL impact on local air quality from the renewal of the CFFF license for another 40 years. Future activities such as logging and construction at the unincorporated CFFF site could slightly increase the fugitive dust in the local atmosphere. The CFFF is expected to continue to be monitored by the SCDHEC for its activities and impact on local air quality.</p>	<p>There would be no long-term impact on meteorology, climatology, and air quality resulting from the proposed action. The local and regional air quality is expected to improve following facility decommissioning of the CFFF site and license termination.</p>
<p>Climatology, Meteorology, and Air Quality</p>	<p>There would be a SMALL impact due to noise resulting from the proposed action. Under the proposed action, the WEC does not plan any new construction or any changes in CFFF operations. Given the distance of the CFFF from the site boundary and compliance with applicable noise regulations, the NRC expects that noise impacts would be of short duration (less than 8 hours), intermittent, and mitigated by engineering and administrative controls.</p>	<p>No impact. There would be no irreversible and irretrievable impacts from noise resulting from the proposed action.</p>	<p>There would be a SMALL impact of noise associated with the renewal of the CFFF license for another 40 years. Noise impacts would be short-term, intermittent, and mitigated by engineering and administrative controls.</p>	<p>There would be no long-term impacts of noise, such as hearing loss, expected from the proposed action. Occupational workers during operation would be expected to wear hearing protection, where appropriate. Upon ceasing operations, workers performing the decommissioning work would also be exposed to noise, however they would be expected to wear hearing protection. Noise impacts</p>
<p>Noise</p>	<p>There would be a SMALL impact due to noise resulting from the proposed action. Under the proposed action, the WEC does not plan any new construction or any changes in CFFF operations. Given the distance of the CFFF from the site boundary and compliance with applicable noise regulations, the NRC expects that noise impacts would be of short duration (less than 8 hours), intermittent, and mitigated by engineering and administrative controls.</p>	<p>No impact. There would be no irreversible and irretrievable impacts from noise resulting from the proposed action.</p>	<p>There would be a SMALL impact of noise associated with the renewal of the CFFF license for another 40 years. Noise impacts would be short-term, intermittent, and mitigated by engineering and administrative controls.</p>	<p>There would be no long-term impacts of noise, such as hearing loss, expected from the proposed action. Occupational workers during operation would be expected to wear hearing protection, where appropriate. Upon ceasing operations, workers performing the decommissioning work would also be exposed to noise, however they would be expected to wear hearing protection. Noise impacts</p>

Resource Area	Unavoidable Adverse Environmental Impacts	Irreversible and Irrecoverable Commitment of Resources	Short-Term Impacts and Uses of the Environment	Long-Term Impacts and the Maintenance and Enhancement of Productivity
Historic and Cultural Resources	<p>There would be a SMALL impact on historic and cultural resources resulting from the proposed action.</p> <p>Installation of monitoring wells and sediment samples was temporary and involved minimal land disturbance. Remediation efforts are expected to disturb soils but only near the plant buildings where soils have already been disturbed. No historic properties were identified. Additionally, impacts to unanticipated discoveries from the proposed action would be avoided or minimized considering the sitewide procedures that the WEC has put in place and the training that would be provided to personnel conducting ground-disturbing activities. A cultural resources survey completed by Brockington and Associates in 2021 resulted in the identification of five archaeological sites, four above-ground resources, and the Denley Cemetery, none of which were recommended as eligible to the NRHP (Brockington 2022-TN7251). The WEC's sitewide "Cultural Resources Protection Procedures" (RA-432) includes unanticipated discovery protection protocols as well as the requirement to conduct additional</p>	<p>No impact. No historic properties were identified. There would be no irretrievable commitment of historic and cultural resources from implementing the proposed action. Historic and cultural resources are nonrenewable resources and adverse effects while resolvable could result in an irreversible loss of the resource. Irreversible impacts on historic and cultural resources are possible if significant impacts cannot be avoided. Implementation of the WEC's sitewide cultural resource procedures and training of personnel would support avoidance or minimization of potential impacts. Irretrievable impacts as defined do not apply to historic and cultural resources.</p>	<p>There would be a SMALL short-term impact on historic and cultural resources from the proposed renewal of the CFFF license for another 40 years. Remediation efforts are expected to disturb soils but only near the plant buildings where soils have already been disturbed. Upon ceasing operations, the WEC would submit a decommissioning plan to the NRC for approval. The NRC staff would conduct the appropriate environmental review.</p>	<p>would cease following decommissioning of the CFFF site and license termination</p> <p>There would be a SMALL long-term impact on historic and cultural resources from implementing the proposed action. Remediation efforts are expected to disturb soils but only near the plant buildings where soils have already been disturbed. Impacts of the proposed action will likely have no significant impact or adverse effects on unanticipated discoveries given the procedures that the WEC has put in place and training of employees and contractors involved in ground disturbing. Upon ceasing operations, the WEC would submit a decommissioning plan to the NRC for approval. The NRC staff would conduct an environmental review. Beneficial impacts on historic and cultural resources could occur as a result of license termination by making the lands available for other uses which could include preservation. Impacts on historic and cultural resources could occur as a result of demolition, dismantling, facilities that are</p>

Resource Area	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment	Long-Term Impacts and the Maintenance and Enhancement of Productivity
Visual and Scenic Resources	<p>archaeological review if ground-disturbing activities are proposed in areas that have not been previously disturbed within the CAA and extend more than 4 ft beyond the present ground surface, as well as along the sandy levee ridges in the Congaree River flood plain if ground-disturbing activities extend more than 3 ft beyond the current ground surface. New activities that would result in construction activities could also require a license amendment, which would result in the staff conducting the appropriate NEPA environmental review.</p> <p>There would be a SMALL impact on visual and scenic resources resulting from the proposed action.</p> <p>The WEC does not anticipate any construction of new facilities or changes in operations that would alter the existing visual character of the local landscape of the site. Any minor visual alterations would be difficult to detect from the existing available views of the plant from public locations.</p>	<p>No impact. There would be no irreversible and irretrievable commitment of visual resources.</p>	<p>There would be a SMALL impact on visual and scenic resources from the renewal of the CFF license for another 40 years. During operation there would be no change in visual resource impacts apart from the continuance of the existing visual intrusion of the CFF, and short-term, temporary, and minor impacts during decommissioning.</p>	<p>50 or more years old if they have been determined to be eligible for listing on the National Register of Historic Places.</p>

Resource Area	Unavoidable Adverse Environmental Impacts	Irreversible and Irrecoverable Commitment of Resources	Short-Term Impacts and Uses of the Environment	Long-Term Impacts and the Maintenance and Enhancement of Productivity
Socioeconomics	<p>There would be a SMALL socioeconomic impact resulting from the proposed action.</p> <p>The proposed action is not expected to noticeably change the employment level of the CFFF. The CFFF would continue to be a significant employer in the Columbia metropolitan area and would continue to generate positive impact such as tax revenue and personal income, which would benefit the local economy through a multiplier effect as plant employees spend their income and the plant makes local expenditures. Local traffic would continue and change to the baseline impacts on local roadways and other infrastructure would not be expected.</p>	<p>No impact. There would be no irreversible and irretrievable commitment of resources apart from the continuance of financial outlays made to operate the CFFF.</p>	<p>There would be a SMALL impact on socioeconomics with renewal of the CFFF license for another 40 years. During operation there would be no increase in demands on local socioeconomic resources such as community services or infrastructure.</p>	<p>There would be no long-term impacts on socioeconomic resources during the duration of the proposed action.</p>
Public and Occupational Health	<p>The impacts of the proposed action could result in the potential direct and indirect exposure to members of the public or workers from releases of radiological and nonradiological hazardous materials. Based on the continued requirement to meet NRC dose limits to the public and workers, and the SCDHEC's regulatory requirements, the NRC staff considers direct and indirect impacts on the public or workers from renewing the CFFF license for an additional 40 years to be SMALL.</p>	<p>There would be no irreversible and irretrievable impacts on public and occupational health resulting from the proposed action.</p>	<p>There would be a SMALL impact on occupational and public health with renewal of the CFFF license for another 40 years. The impacts could result in the potential direct and indirect exposure to the public or workers from releases of radiological and nonradiological hazardous materials. Based on the continued requirement to meet NRC dose limits to the public, and the SCDHEC's regulatory requirements, impacts would be SMALL.</p>	<p>There would be no long-term impacts on public and occupational health during the length of the proposed action.</p>

Resource Area	Unavoidable Adverse Environmental Impacts	Irreversible and Irrecoverable Commitment of Resources	Short-Term Impacts and Uses of the Environment	Long-Term Impacts and the Maintenance and Enhancement of Productivity
Transportation	There would be a SMALL impact from the proposed action. During continued operation of the CFFF there would be no increase in local traffic counts associated with proposed action-related traffic on Highway S 48 or other roadways from the CFFF. The potential nonradiological and radiological impacts from operational chemical and radioactive material shipments to and from the CFFF under incident-free and accident conditions would be minimal.	No impact. There would be no irreversible and irretrievable commitment of resources except for fuel resources consumed by vehicles and equipment operation, heating, commuter traffic, and regional transport.	There would be a SMALL impact for the renewal of the CFFF license for another 40 years. During operation there would be no increase in local traffic counts associated with proposed action-related traffic on Highway S 48 or other roadways from the CFFF. The potential nonradiological and radiological impacts from operational chemical and radioactive material shipments to and from the CFFF under incident-free and accident conditions would be minimal.	There would be no long-term impacts on transportation during the length of the proposed action.
Waste Management	Under the proposed action, the WEC does not plan any changes in the CFFF operations. There would be a SMALL impact on waste generation rates and management practices related to the continued operation of the CFFF under the proposed action.	Waste generation during continued operation of the CFFF would result in offsite disposal at licensed facilities that represents irreversible and irretrievable commitment of resources, resulting in SMALL impact.	There would be a SMALL to MODERATE impact on waste generation rates and management practices from the renewal of the CFFF license for another 40 years. During fuel fabrication operations and decommissioning, waste generation and management actions involve hazards to the workers and risks for offsite disposal that represent short-term and minor impacts. Decommissioning of the CFFF site will generate significant volumes of LLRW. The WEC will work with private industry to prepare plans for the needed disposal capacity for decommissioning.	No impact. There would be no long-term impact on waste management following decommissioning of the CFFF site and license termination.
Accidents	The WEC evaluated accidents that, although considered to have a low probability of occurrence, could result in largest environmental consequences—criticality accident, a uranyl nitrate	No impact. Compliance with the NRC regulations at 10 CFR Part 70 ensures that accidents, consequences, and probability of occurrence are adequately evaluated.	None identified. There would be a SMALL impact from accidents. Compliance with the NRC regulations at 10 CFR Part 70 ensures that high and intermediate consequences for	There would be no long-term impacts from accidents during the proposed action.

Resource Area	Unavoidable Adverse Environmental Impacts	Irreversible and Irretrievable Commitment of Resources	Short-Term Impacts and Uses of the Environment	Long-Term Impacts and the Maintenance and Enhancement of Productivity
Environmental Justice	<p>release, radioactive and chemical releases from a uranium hexafluoride cylinder, and a major fire. Compliance with the NRC regulations at 10 CFR Part 70 ensures that high and intermediate consequences for credible accidents would be unlikely and highly unlikely. Identification of engineered and administrative control, and the implementation of emergency procedures would reduce the likelihood of accidents. Therefore, impacts from accidents would be SMALL.</p> <p>There would be no disproportionately high and adverse health or environmental effects on minority or low-income populations resulting from the proposed action.</p> <p>The CFFF site is located in and surrounded by census block groups that have minority populations exceeding EJ conditions. The NRC staff could not establish pathways linking these impacts on locally affected population. Further, health and environmental impacts identified were SMALL, except for groundwater resources. Therefore, it is not anticipated that these impacts would disproportionately affect EJ populations identified for this proposed action.</p>	<p>Controls must be in place to reduce the likelihood and consequences of accidents.</p>	<p>credible accidents would be unlikely and highly unlikely. Identification of engineered and administrative control, and the implementation of emergency procedures would reduce the consequences and the likelihood of accidents.</p>	<p>None.</p>

4.0 LIST OF PREPARERS

The NRC staff from the Office of Nuclear Material Safety and Safeguards assisted in the preparation and review of this final EIS. The names of the staff and the resources they evaluated are listed below.

All Sections

- Diana Diaz-Toro, NMSS/REFS, Environmental Project Manager
 - B.S., Chemical Engineering, University of Puerto Rico, 2001
 - M.B.A., Business Administration, American University, 2007
 - Years of Experience: 17
- Jean Trefethen, NMSS/REFS, Environmental Project Manager
 - B.A., Biology, Carroll College 1987
 - Years of Experience: 12
- Stacey Imboden, NMSS/REFS, Environmental Project Manager
 - B.S, Meteorology, Pennsylvania State University, 1999
 - M.S., Environmental Engineering, Clemson University, 2001
 - Years of Experience: 20

Additional NRC Staff

- Jin-Ping Gwo, NMSS/DFM, surface water and groundwater resources, geology and soils
 - Ph.D. in Civil Engineering, 1993
 - Years of Experience: 30
- Briana Arlene, NMSS/REFS, ecology, ESA Section 7 consultations
 - B.S., Conservation Biology, 2005
 - Years of experience: 14

Pacific Northwest National Laboratory

- Ann Miracle, Team Lead, ecology
 - B.A., Biology, University of Virginia, 1988
 - M.S., Population Genetics, University of Florida, 1993
 - Ph.D., Molecular Genetics, University of South Florida, 2001
 - Years of Experience: 25
- Lauren Rodman, Deputy Team Lead
 - B.A., Environmental Studies, University of Chicago, 2009
 - M.A., Resource Management, University of British Columbia, 2013
 - Years of Experience: 7

- Dave Anderson, socioeconomics, environmental justice, visual and scenic resources, cost-benefit analysis
 - B.S., Forest Resources, Oregon State University, 1989
 - M.S., Forest Economics, Oregon State University, 1991
 - Years of Experience: 25
- Amoret Bunn, waste generation and management
 - B.S., Biology, Virginia Polytechnic Institute and State University, 1982
 - M.S., Civil Engineering, University of New Hampshire, 1989
 - Ph.D., Engineering, University of New Hampshire, 1992
 - Years of Experience: 18
- Caitlin Condon, public and occupational health
 - B.S., Environmental Health and Industrial Hygiene, Colorado State University, 2013
 - Ph.D., Radiation Health Physics, Oregon State University, 2019
 - Years of Experience: 5
- Fleur dePeralta, site location and layout
 - B.S., Mechanical Engineering, University of California, Los Angeles, 1986
 - Years of Experience: 20
- Saikat Ghosh, climatology, meteorology, and air quality
 - M.S., Environmental Engineering, Texas A&M University, 2009
 - Ph.D., Chemical Engineering, Ohio University, 2020
 - Years of Experience: 3
- David Goodman, cumulative, land use, alternatives
 - B.S., Economics, James Madison University, 2004
 - J.D., Law, College of William & Mary, 2008
 - Years of Experience: 10
- Ellen Kennedy, historic and cultural resources
 - B.A., Anthropology, University of Mary Washington, 1993
 - M.A., Anthropology, Western Washington University, 1998
 - Years of Experience: 23
- Hunter Knox, geology
 - B.S., Geophysical Engineering, Colorado School of Mines, 2005
 - Ph.D., Earth and Environmental Science w/Specialty in Geophysics, New Mexico Institute of Mining and Technology, 2012
 - Years of Experience: 16

- Kim Leigh, public and occupational health, noise
 - B.S., Environmental Science, Western Kentucky University, 1998
 - Years of Experience: 20
- Steve Maheras, transportation, accidents
 - B.A., Zoology, University of New Hampshire, 1982
 - M.S., Health Physics, Colorado State University, 1985
 - Ph.D., Health Physics, Colorado State University, 1988
 - Years of Experience: 33
- Philip Meyer, geology and soils, surface water and groundwater resources
 - B.S., Physics, Cornell University, 1986
 - M.S., Civil Engineering, University of Illinois at Urbana-Champaign, 1988
 - Ph.D., Civil Engineering, University of Illinois at Urbana-Champaign, 1992
 - Years of Experience: 15
- Patrick Mirick, ecology, noise
 - B.A., Biology, Lewis and Clark College, 2004
 - M.S., Wildlife and Fisheries Science, Mississippi State University, 2011
 - Years of Experience: 8

5.0 DISTRIBUTION LIST

The NRC is providing copies of this final EIS to the organizations and individuals listed below. The NRC staff will provide copies to other interested organizations and individuals upon request.

5.1 Federal Agency Officials

U.S. Environmental Protection Agency
Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

Haigler Pate, Regional Energy Specialist
U.S. National Park Service
Atlanta Federal Center
1924 Building
100 Alabama Street, SW
Atlanta, GA 30303

Mark A. Caldwell
Deputy Field Supervisor
US Fish and Wildlife Service
South-Atlantic Gulf Region
South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407

Noah Silverman
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

James Michael Norris
Water Mission Area
Office of Quality Assurance
Manager of Environmental Document
Review Program
U.S. Geological Survey
331 Commerce Way
Pembroke, NH 03275

5.2 Tribal Government Officials

Wenonah G. Haire
Tribal Historic Preservation Office
Catawba Indian Nation
1536 Tom Steven Road
Rock Hill, SC 29730

Corain Lowe-Zepeda
Tribal Historic Preservation
Specialist
Muscogee Nation
P.O. Box 580
Okmulgee, OK 74447

Chief Harold Hatcher
Waccamaw Indian People
2112 Old Altman Road
Conway, SC 29526

Elizabeth Toombs
Tribal Historic
Preservation Officer
Cherokee Nation
P.O. Box 948
Tahlequah, OK 74465

Chief Michelle Mitchum
Pine Hill Indian Tribe
4055 Coburg Lane
Orangeburg, SC 29115

Russell Townsend
Tribal Historic Preservation
Specialist
Eastern Band of Cherokee Indians
P.O. Box 455
Cherokee, NC 28719

5.3 State Agency Officials

Elizabeth M. Johnson, Director
Historical Services, D-SHPO
State Historic Preservation Office
SC Department of Archives & History
8301 Parklane Road
Columbia, SC 29223

R. Gary Stewart, Manager
State Remediation Section
Bureau of Land & Waste Management
South Carolina Department of Health and
Environmental Control
2600 Bull St.
Columbia, SC 20291

5.4 Other Organizations and Individuals

Organization/Individual	Affiliation
Annette Pope	Westinghouse Columbia Fuel Fabrication Facility
Elise Malek	Westinghouse Columbia Fuel Fabrication Facility
Nancy Parr	Westinghouse Columbia Fuel Fabrication Facility
Tom Clements	Savannah River Site Watch
John Grego	Friends of Congaree Swamp
Andrew Hudson	198 Methods
Bill Stangler	Congaree Riverkeeper
Jean Galler	Blue Ridge Environmental Defense League
Pamela Greenlaw	Midlands Group of South Carolina Sierra Club
Andrea Issod	Midlands Group of South Carolina Sierra Club
Tracy Martin	Council of South Carolina Professional Archaeologists
Brenda Murphy	South Carolina State Conference National Association for the Advancement of Colored People
Robert Reese	South Carolina State Conference National Association for the Advancement of Colored People
Christopher Judge	South Carolina State Conference National Association for the Advancement of Colored People
Deborah Matherly	South Carolina State Conference National Association for the Advancement of Colored People
Coral McCord	South Carolina State Conference National Association for the Advancement of Colored People
Candee Peacock	South Carolina State Conference National Association for the Advancement of Colored People
Leslie Minerd	South Carolina State Conference National Association for the Advancement of Colored People
Pete Parr	South Carolina State Conference National Association for the Advancement of Colored People
Priscilla Preston	South Carolina State Conference National Association for the Advancement of Colored People
Charles Goldman	South Carolina State Conference National Association for the Advancement of Colored People
Virginia Sanders	South Carolina State Conference National Association for the Advancement of Colored People
Elaine Cooper	South Carolina State Conference National Association for the Advancement of Colored People

Organization/Individual	Affiliation
Carol Williams	South Carolina State Conference National Association for the Advancement of Colored People
Mary Desportes	South Carolina State Conference National Association for the Advancement of Colored People
Michelle Edgar	South Carolina State Conference National Association for the Advancement of Colored People
Robert Allen	South Carolina State Conference National Association for the Advancement of Colored People
Katherine Beard	South Carolina State Conference National Association for the Advancement of Colored People
Felicia Woods	South Carolina State Conference National Association for the Advancement of Colored People
Cecily Lilly	South Carolina State Conference National Association for the Advancement of Colored People

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APPENDIX A

CONSULTATION

A.1 Consultation Correspondence

The Endangered Species Act of 1973 (ESA) (16 U.S.C. § 1531 *et seq.*; TN1010), as amended, and the National Historic Preservation Act of 1966 (NHPA) (54 U.S.C. § 300101 *et seq.*; TN4157), as amended, require that Federal agencies consult with applicable State and Federal agencies and groups prior to taking action that may affect threatened and endangered species or historic and archaeological resources. This appendix contains consultation documentation and discussion between the U.S. Nuclear Regulatory Commission (NRC) staff and the corresponding Federal agencies specific to Westinghouse Electric Company, LLC's (WEC) request to renew its license for the operation of the Columbia Fuel Fabrication Facility (CFFF) for an additional 40 years. Table A-1 presents the chronology of associated consultation correspondence.

Table A-1 Chronology of Consultation Correspondence

Author	Recipient	Date of Letter	ADAMS Accession Number
U.S. Nuclear Regulatory Commission (L Chang)	Catawba Indian Nation (W Haire)	May 12, 2015	ML15104A250
U.S. Nuclear Regulatory Commission (L Chang)	South Carolina State Historic Preservation Officer (E Johnson)	May 12, 2015	ML15104A268
U.S. Nuclear Regulatory Commission (L Chang)	U.S. Fish and Wildlife Service (T McCoy)	May 12, 2015	ML15104A238
U.S. Fish and Wildlife Service (T McCoy)	U.S. Nuclear Regulatory Commission (L Chang)	May 20, 2015	ML15161A543
South Carolina State Historic Preservation Officer (E Johnson)	U.S. Nuclear Regulatory Commission (L Chang)	May 28, 2015	ML15161A537
U.S. Nuclear Regulatory Commission (B Grange)	National Marine Fisheries Service	August 15, 2017	ML17227A378
U.S. Fish and Wildlife Service ^(a)	U.S. Nuclear Regulatory Commission	July 25, 2017	ML17208A668
National Oceanic and Atmospheric Administration (S Furtak)	U.S. Nuclear Regulatory Commission (B Grange)	September 22, 2017	ML17276A076
U.S. Nuclear Regulatory Commission (B Grange)	National Oceanic and Atmospheric Administration (S Furtak)	October 2, 2017	ML17276A077
National Oceanic and Atmospheric Administration (S Furtak)	U.S. Nuclear Regulatory Commission (B Grange)	October 12, 2017	ML17292A087
U.S. Nuclear Regulatory Commission (B Grange)	National Oceanic and Atmospheric Administration (S Furtak)	October 19, 2017	ML17292A089
U.S. Nuclear Regulatory Commission (B Grange)	National Oceanic and Atmospheric Administration (S Furtak)	January 24, 2018	ML18025A295
National Marine Fisheries Service (R Crabtree)	U.S. Nuclear Regulatory Commission (B Grange)	April 12, 2018	ML18103A020
U.S. Nuclear Regulatory Commission (J Quintero)	U.S. Fish and Wildlife Service (T McCoy)	June 25, 2019	ML19178A010
U.S. Fish and Wildlife Service (M Caldwell)	U.S. Nuclear Regulatory Commission (J Quintero)	June 27, 2019	ML19178A011

Author	Recipient	Date of Letter	ADAMS Accession Number
U.S. Nuclear Regulatory Commission (J Quintero)	South Carolina State Historic Preservation Officer (E Johnson)	July 9, 2019	ML19219A242
U.S. Nuclear Regulatory Commission (B Grange)	National Oceanic and Atmospheric Administration (S Furtak)	July 10, 2019	ML19191A074
South Carolina State Historic Preservation Office (E Johnson)	U.S. Nuclear Regulatory Commission (J Quintero)	July 16, 2019	ML19219A242
U.S. Nuclear Regulatory Commission (J Quintero)	South Carolina State Historic Preservation Officer (E Johnson)	July 16, 2019	ML19219A242
U.S. Nuclear Regulatory Commission (J Quintero)	U.S. Fish and Wildlife Service (M Caldwell)	October 28, 2019	ML19301C173
U.S. Nuclear Regulatory Commission (J Quintero)	National Oceanic and Atmospheric Administration (S Furtak)	October 28, 2019	ML19301C175
U.S. Nuclear Regulatory Commission (J Quintero)	South Carolina State Historic Preservation Officer (E Johnson)	October 28, 2019	ML19301C176
U.S. Nuclear Regulatory Commission (J Quintero)	Catawba Indian Nation (W Haire)	October 28, 2019	ML19301C169
U.S. Fish and Wildlife Service (M Caldwell)	U.S. Nuclear Regulatory Commission (J Quintero)	October 29, 2019	ML19302F656
South Carolina State Historic Preservation Office (K Schroer)	U.S. Nuclear Regulatory Commission (J Quintero)	November 19, 2019	ML19331A601
Catawba Indian Nation (C Rogers)	U.S. Nuclear Regulatory Commission (J Quintero)	November 26, 2019	ML19331A585
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	South Carolina State Historic Preservation Officer (E Johnson)	July 31, 2020	ML20226A249
U.S. Nuclear Regulatory Commission (J Quintero)	Catawba Indian Nation (W Haire)	July 31, 2020	ML20211L680
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	U.S. Fish and Wildlife Service (M Caldwell)	July 31, 2020	ML20226A268
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	National Oceanic and Atmospheric Administration (S Furtak)	July 31, 2020	ML20226A301

Author	Recipient	Date of Letter	ADAMS Accession Number
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	Pine Hill Indian Tribe (M Mitchum)	August 28, 2020	ML20252A189
Catawba Indian Nation (W Haire)	U.S. Nuclear Regulatory Commission (WEC CFFF EIS E-mail Resource)	August 31, 2020	ML20247J535
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	South Carolina State Historic Preservation Officer (E Johnson)	August 6, 2021	ML21214A295
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	Catawba Indian Nation (W Haire)	August 6, 2021	ML21214A289
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	U.S. Fish and Wildlife Service (M Caldwell)	August 6, 2021	ML21342A040
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	National Oceanic and Atmospheric Administration (N Silverman)	August 6, 2021	ML21342A041
South Carolina State Historic Preservation Officer (E Johnson)	U.S. Nuclear Regulatory Commission (D Diaz-Toro)	September 20, 2021	ML21288A408
Catawba Indian Nation (W Haire)	U.S. Nuclear Regulatory Commission (WEC CFFF EIS E-mail Resource)	September 20, 2021	ML21266A335
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	Cherokee Nation (E Toombs)	December 7, 2021	ML21334A344
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	Eastern Band of Cherokee Indians (R Townsend)	December 7, 2021	ML21336A136
U.S. Nuclear Regulatory Commission (D Diaz-Toro)	Muscogee Nation (C Lowe-Zepeda)	December 7, 2021	ML21336A164
U.S. Nuclear Regulatory Commission (J Quintero)	South Carolina State Historic Preservation Officer (E Johnson)	May 26, 2022	ML22139A131

(a) Email generated from Information, Planning, and Consultation System (IPAC system) and is not official correspondence from USFWS

A.2 ESA Section 7 Consultation

The U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Services (NMFS) concluded that the proposed action to renew the WEC CFFF license for an additional 40 years is not likely to adversely affect federally listed threatened or endangered species (FWS 2019-TN6426 and NRC 2018-TN5588, respectively). The NRC staff and other regulatory agencies determined that there could be eight federally listed ESA species in the CFFF action area (Section 3.6.2 in this EIS; NRC 2019-TN6472). As described below, impacts on terrestrial species are expected to be minor because only low-impact site alterations are being proposed (e.g., drilling of additional groundwater test wells). Impacts are also expected to be low for aquatic sturgeon species because releases of the main pollutants of concern (i.e., ammonia, fluorides, and uranium) are within regulatory limits and below levels that could cause biological harm.

Consultation with the FWS began on May 12, 2015, when the NRC staff requested concurrence that the proposed 40-year license renewal is not likely to adversely affect terrestrial species under FWS jurisdiction (NRC 2015-TN5594). Because the WEC is not proposing to construct any new sites on undisturbed grounds, the NRC staff concluded that the impacts would be similar to those determined during the 2006 license renewal review, in which the FWS determined that the action would not result in adverse effects (FWS 2006-TN6427). On May 20, 2015, the FWS agreed with the NRC staff's rationale and provided its concurrence that the proposed 40-year license renewal is not likely to adversely affect federally listed species under its jurisdiction. The FWS requested that the NRC inform the FWS if new impacts arise (NRC 2015-TN5594). On June 25, 2019, the NRC staff informed the FWS (June 25, 2019) that new contamination leaks had been identified in 2018 and that new groundwater wells would be drilled onsite to better monitor contamination (NRC 2019-TN6473). Both the NRC and FWS agreed that these new groundwater wells would only cause minimal land disturbances, and the FWS confirmed its previous determination remained valid (NRC 2019-TN6473; FWS 2019-TN6429). After review of the October 2019 draft Environmental Assessment (EA), the FWS again confirmed that the proposed action is not likely to adversely affect federally listed species under its jurisdiction (FWS 2019-TN6426).

The NRC staff consulted with the NMFS concerning the shortnose and Atlantic sturgeons. After its review of the NRC staff's biological evaluation (NRC 2017-TN5603) and supporting information, NMFS concluded in April 2018 that the proposed action is not likely to adversely affect the two sturgeon species. The main focus of this consultation was the potential for impacts associated with the release of chemical pollutants from effluent releases into the Congaree River.

On August 15, 2017, the NRC staff provided its biological assessment to NMFS, which evaluated the potential for adverse impacts to the shortnose sturgeon (2017-TN5603). The NMFS recommended that the NRC also consider impacts on the Atlantic sturgeon because even though the species is not currently present in the Congaree River, it could be within the next 40 years if downriver migratory routes are re-established. The NRC staff initiated discussions (August 15, 2017) with submission of a biological assessment that requested concurrence from NMFS that the proposed 40-year license renewal is unlikely to have adverse impacts on shortnose sturgeon (NRC 2017-TN5603). The NRC staff concluded there would be insignificant impacts on sturgeon associated with releases of chemical pollutants contained in wastewater because (1) all discharged effluents must meet radioactive (10 CFR Part 20-TN283) and nonradioactive pollution limits set in their permit from the South Carolina Department of Health and Environmental Control; (2) the permit limits concentrations and volumes to protect

indigenous aquatic populations at the site; and (3) the effluent, that is within limits, is then diluted into the river and results in low exposure for sturgeon, their eggs and larvae, as well as for their prey species (NRC 2017-TN5603). The NRC staff also later clarified that the radioactive standards were based on a screening methodology from the U.S. Department of Energy that provides limiting radionuclide concentration values to prevent negative effects on aquatic and terrestrial biota (NRC 2017-TN5605).

On April 12, 2018, the NMFS concurred with the NRC staff's determination that the proposed 40-year license renewal is not likely to adversely affect shortnose or Atlantic sturgeon (NRC 2018-TN5588). The NMFS reached this conclusion after several information exchanges with NRC staff to better understand the potential impacts of radioactive uranium, as well as the nonradioactive impacts of ammonia and fluoride, because these are two of the main byproducts of nuclear fuel production and a focus of wastewater treatment (NRC 2017-TN5603; NMFS 2017-TN5577; NRC 2017-TN5605; NMFS 2017-TN5589; NRC 2017-TN5611). The NRC staff requested that NMFS re-concur on its *may affect, but is not likely to adversely affect* determination during the preparation of the October 2019 draft EA (NRC 2019-TN6419). The NMFS confirmed its position that its previous concurrence remained valid and that reinitiation of consultation was not required.

On July 31, 2020, the NRC notified the FWS and NMFS of the NRC staff's intent to prepare an environmental impact statement (EIS) for the WEC's license renewal application and invited them to participate in the scoping process (NRC 2020-TN6520). The NRC staff notified the FWS and NMFS of the publication of the draft EIS and will provide notification to NMFS upon issuance of this final EIS.

A.3 NHPA Section 106 Consultation

The scope of the NRC staff's review of the WEC's application for license renewal included consultation with the South Carolina State Historic Preservation Office (SHPO) and federally recognized Indian Tribe, the Catawba Indian Nation, under the NHPA Section 106 process. In May 2015, the NRC staff provided its determination of effects finding to the South Carolina SHPO (NRC 2015-TN5596) and Catawba Indian Tribe (NRC 2015-TN5595) explaining that the proposed 40-year renewal of the CFFF license would not adversely affect historic and cultural resources. The South Carolina SHPO concurred with NRC's finding on May 28, 2015 (SCAHC 2015-TN5608). In June 2018, NRC published a final EA and finding of no significant impact (FONSI) concluding there would be no impacts on historic and cultural resources because no new construction or changes to authorized CFFF operations were proposed by the WEC (NRC 2018-TN6416). In October 2019, the NRC staff decided to reopen its environmental review in response to a 2018 leak that released uranium and hydrofluoric acid to the subsurface, and the initiation of the WEC's investigations under the Consent Agreement (CA) with South Carolina Department of Health and Environmental Control (SCDHEC) regarding historical leaks and onsite contamination. On October 28, 2019, the NRC concurrently withdrew its June 2018 EA and FONSI and published a new draft EA (NRC 2019-TN6472) for public comment (84 FR 57777-TN6422).

In July 2019, prior to issuing the October 2019 draft EA (NRC 2019-TN6472) for public review and comment, the NRC staff informed the South Carolina SHPO that while the proposed action to renew the CFFF license for a 40-year license term had not changed, as part of the WEC's implementation of the CA, the WEC would be conducting further investigation into soil, surface water, and groundwater contamination, which required the installation of groundwater monitoring wells in previously undisturbed areas of the site. Installation of the new groundwater

wells would be conducted by the WEC's contractor who would follow procedures to address inadvertent discoveries and to avoid subsurface objects (e.g., human remains, underground utilities) and, thus, should be able to avoid digging in an area that could have remains or artifacts. Installation of the monitoring wells would be short-term and involve minimal land disturbance. The NRC staff requested concurrence on its preliminary determination that no impacts on historic and cultural resources would be expected from continued operation (NRC and SCSHPO 2019-TN6882). During discussions between the NRC staff and the South Carolina SHPO (NRC and SCSHPO 2019-TN6882 and NRC 2019-TN6474), the NRC staff clarified the scope of the groundwater monitoring wells/boreholes proposed by the WEC and shared the details of the WEC's cultural resource procedure and inadvertent discovery procedure developed then.

In October 2019, NRC published a draft EA (NRC 2019-TN6472) for public review and comment, and by letter invited the South Carolina SHPO and the Catawba Indian Tribe Tribal Historic Preservation Officer (THPO) to review and comment on the draft EA (NRC 2019-TN6541 and NRC 2019-TN6542, respectively). In those letters the NRC staff reiterated its original determination of effects finding that the proposed license renewal would have no effect on historic properties because the WEC did not request changes to its currently licensed operations or construction of new buildings or structures. Additionally, the WEC and contractor's procedures are "to avoid subsurface objects (e.g., human remains, underground utilities) and, thus, should be able to avoid digging in an area that might have remains or artifacts" (NRC 2019-TN6541). In response to this letter in November 2019, the South Carolina SHPO concurred with the NRC staff's finding that no historic properties would be affected by the project (SCDAH 2019-TN6701). The South Carolina SHPO recommended that its "office be consulted for review and comment if any future expansion or additional ground disturbance in previously undisturbed areas is proposed," and provided additional technical comments on the draft EA, which are addressed in this EIS. The South Carolina SHPO also stated that if archaeological materials are encountered during construction, the procedures codified at 36 CFR 800.13(b) (TN513) would apply. In a letter dated November 26, 2019, the Catawba Indian Nation indicated that they had no concerns regarding sacred sites, traditional cultural properties, or Native American archaeological sites at the CFFF site, but did request to be notified if Native American artifacts or human remains were encountered during ground-disturbing activities (Catawba Indian Nation 2019-TN6418).

On June 5, 2020, the NRC staff decided to prepare an EIS (NRC 2020-TN6519) because new information (WEC 2020-TN6751), provided by the WEC to SCDHEC (and subsequently to the NRC) (SCDHEC/WEC 2019-TN6554), revealed uncertainty related to the source and extent of contamination onsite and the potential future migration pathways offsite, and precluded the NRC staff from making a FONSI, through the EA. In July 2020, the NRC staff invited the South Carolina SHPO and the Catawba Indian Nation THPO to participate in the EIS scoping (NRC 2020-TN6529, NRC 2020-TN6539, respectively). The NRC staff explained that the proposed action had not changed and the WEC continued to conduct remedial investigation activities under the CA with SCDHEC. The NRC staff reiterated its previous no effects determination findings and basis—no significant impacts on historic or cultural resources expected from the proposed continued operation of the CFFF for an additional 40 years (NRC 2019-TN6472). No response was provided by the SHPO. The Catawba Indian Tribe responded on August 31, 2020, stating that they would like to be consulted specifically on the proposed action and they still wish to be informed of any proposed ground disturbance and inadvertent discoveries (Catawba Indian Nation 2020-TN6534). The Catawba Indian Tribe also requested that archaeological Phase I testing be completed prior to well installation to conduct subsurface monitoring, and recommended that the scope of the EIS be expanded to the Congaree River to

address impacts on archaeological and historical resources that have been recently identified in these areas (Catawba Indian Nation 2020-TN6534). Impacts from the installation of monitoring wells and sediment sampling, from potential ground-disturbing activities, and indirect effects during the proposed license renewal term are discussed in Section 3.9 of the EIS and are not anticipated to be significant or adverse.

On June 29, 2021, the NRC staff held a call with the South Carolina SHPO to provide a status update and share additional information provided by the WEC in response to the NRC staff's requests for additional information (NRC 2020-TN6788 and NRC 2021-TN7047). The NRC staff also shared the sitewide cultural resources procedures the WEC has in place (RA-432 [WEC 2021-TN7060], RAF-104-5 [WEC 2020-TN6872], TAF-500-11 [WEC 2020-TN6873], SYP-233 [WEC 2021-TN7064], RA-136 [WEC 2021-TN7062], and TRN-170 [AECOM Undated-TN7063]). As discussed in Section 3.9 of this EIS, the NRC staff does not anticipate that historic properties would be affected by the proposed action.

On August 6, 2021, the NRC staff transmitted the draft EIS to the South Carolina SHPO and the determination of effects in accordance with the Section 106 regulations at 36 CFR 800.4(d)(1) (NRC 2021-TN7120). The South Carolina SHPO responded on September 21, 2021 (SCDAH 2021-TN7191) and provided recommendations regarding the description of the area of potential effects (APE), evaluation of indirect effects from the proposed action, resolution of adverse effects, if any, and recommended the findings and recommendations from the WEC's cultural resource survey be included in the final EIS. During the preparation of this final EIS, the NRC staff discussed these comments with the South Carolina SHPO.

On August 6, 2021, the NRC staff also transmitted the draft EIS to the Catawba Indian Nation. In its letter, the NRC staff described the impact evaluation on historic and cultural resources and effects determinations (NRC 2021-TN7122). On September 20, 2021, the Catawba Indian Nation provided comments to the NRC staff on the draft EIS and requested that the comment period be extended until after the cultural resource survey of the CFFF site was completed. On September 28, 2021, the NRC staff announced a 60-day extension and re-opening of the public comment period through November 19, 2021 (86 FR 53694-7186). The comments focused on the Green Hill Mound (located near the CFFF site but outside the license area boundary), the APE, and impacts from monitoring wells on the Denley Cemetery (located inside the CFFF site). Additional information about impacts on historic and cultural resources, including Green Hill Mound and the Denley Cemetery can be found in Section 3.9 of the final EIS.

On December 7, 2021, in response to comments provided by the U.S. Department of Interior and the South Carolina SHPO on the draft EIS, the NRC staff used the U.S. Department of Housing and Urban Development's Tribal Directory Assessment Tool to identify additional Tribes with ancestral ties or interests in Richland County, South Carolina, and coordinated internally with NRC's Division of Materials Safety, Security, State, and Tribal Programs. Based on these activities, in December 2021, the NRC staff provided the draft EIS to the Muscogee Nation (NRC 2021-TN7125), the Cherokee Nation (NRC 2021-TN7124), and the Eastern Band of Cherokee Indians (NRC 2021-TN7123), who have ancestral ties to Richland County, South Carolina. The NRC staff did not receive a response from these Tribes.

The WEC conducted a cultural resource survey of the CFFF site and found there are no NRHP eligible historic and cultural resources located on the CFFF Site (Brockington 2022-TN7251). The SCDAH concurred with Brockington Cultural Consulting's recommendations and that the archaeological resources (38RD1512 – 38RD1516) and aboveground resources identified by the cultural resources survey are not NRHP eligible (SCDAH 2022-TN7368 and SCDAH 2022-

TN7357). Based on the findings that no historic properties are located at the CFFF site at the WEC and that no places of potential Tribal religious or cultural significance would be impacted, the NRC staff does not anticipate that historic properties would be affected. The NRC staff will notify all consulting parties of its finding, in accordance with 36 CFR 800.4(d)(1). The NRC staff anticipates providing its effects determination, via transmission of the final EIS to all consulting parties (South Carolina SHPO, the Catawba Indian Nation, the Muscogee Nation, the Cherokee Nation, and the Eastern Band of Cherokee Indians). The NRC staff sent a letter, dated May 26, 2022, to the South Carolina SHPO summarizing the consultation activity and concluding NHPA Section 106 consultation (NRC 2022-TN7460).

Additionally, during the preparation of this EIS, the NRC staff reached out to the Pine Hill Indian Tribe and interested members of the public to discuss the scope of the proposed action and the NRC's regulatory role. The NRC staff notified and transmitted the draft EIS to the Pine Hill Indian Tribe and provided notification of the draft EIS public comment webinar. The Pine Hill Indian Tribe provided comments on the draft EIS on September 20, 2021. The NRC staff has addressed their comments in Appendix D of this final EIS.

The National Park Service (NPS) requested to be a consulting party under the NHPA Section 106 process and expressed concern about the overall cultural resource sensitivity of the region (NPS 2020-TN6543). In the Scoping Summary Report (NRC 2021-TN6934), the NRC staff noted the interest of other groups regarding the protection of historic and cultural resources and indicated that information submitted by the NPS would be considered as part of the NRC staff's evaluation of impacts on historic and cultural resources. The NRC staff notified the U.S. National Park Service of the publication of the draft EIS. The DOI provided comments on the draft EIS on September 17, 2021 (DOE 2021-TN7216), and the NRC staff has addressed these comments in Appendix D of this final EIS. The NRC staff will provide notification to the NPS upon issuance of this final EIS.

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APPENDIX B

CUMULATIVE IMPACTS

The content of this appendix has been moved to Section 3.19 of this EIS.

APPENDIX C

COST BENEFIT ANALYSIS

The cost-benefit analysis uses proprietary information and is being withheld under Section 2.390 of Title 10, *Energy*, of the *Code of Federal Regulations* (TN6204).

References

10 CFR Part 2. *Code of Federal Regulations*, Title 10, *Energy*, Part 2, "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders." TN6204.

APPENDIX D

DRAFT ENVIRONMENTAL IMPACTS STATEMENT COMMENTS AND RESPONSES

In December 2014, Westinghouse Electric Company, LLC (WEC, the licensee) submitted a license renewal application (LRA), including an environmental report (ER), to renew Special Nuclear Materials (SNM) License SNM-1107 (WEC 2014-TN6421) to continue to operate its Columbia Fuel Fabrication Facility (CFFF) in Hopkins, South Carolina, for additional 40 years. On June 15, 2018, the U.S. Nuclear Regulatory Commission (NRC) published a final environmental assessment (EA) (NRC 2018-TN6416) and a finding of no significant impact (FONSI) in the *Federal Register* (83 FR 28014-TN6415). Shortly thereafter, in July 2018, the WEC identified a leak that released uranium and hydrofluoric acid into the subsurface environment. Additionally, under the purview of the South Carolina Department of Health and Environmental Control (SCDHEC), the WEC initiated an investigation into a leak that occurred in 2011 from a buried pipe that allowed uranium to enter the subsurface under the main facility building. Based on this new information and public concern about the releases, the NRC staff decided to reopen its environmental review. Also, in response to the NRC staff's request (NRC 2019-TN6557), the WEC submitted an updated LRA (including an updated ER) in March 2019 (WEC 2019- TN6510). On October 28, 2019, the NRC staff concurrently withdrew its June 2018 EA and FONSI and published a new draft EA (October 2019 draft EA, NRC 2019-TN6472) for public review and comment (84 FR 57777-TN6422).

On June 5, 2020 (NRC 2020-TN6519), the NRC staff decided to prepare an environmental impact statement (EIS) because new information (WEC 2020-TN6751), provided by the WEC to SCDHEC under the Consent Agreement (SCDHEC/WEC 2019-TN6554), revealed uncertainty related to the source and extent of contamination onsite and the potential future migration pathways off-site, and precluded the NRC staff from making a FONSI, through the EA. On July 31, 2020, the NRC staff issued a *Federal Register* notice (FRN) informing the public of its intent to prepare an EIS and the beginning of the scoping process related to the licensing review of the WEC's request to renew the materials license for its CFFF for a 40-year period. If granted, the renewed license would allow the WEC to continue NRC-licensed operations and activities at the CFFF site for a period of 40 years from the date the NRC approves the renewal.

The NRC staff prepared and published a draft EIS consistent with NRC regulations at 10 CFR 51.73, for public review and comment (86 FR 43276-TN7178) on August 6, 2021. The 45-day public comment period began on August 6, 2021, upon the U.S. Environmental Protection Agency's (EPA's) publication of its notice of availability in the *Federal Register* (86 FR 43236-TN7187). In response to requests from the public and other external stakeholders to extend the draft EIS public comment period, on September 20, 2021, the NRC staff announced a 60-day extension and re-opening of the public comment period through November 19, 2021 (86 FR 53694-7186).

The NRC staff noticed and advertised the publication of the draft EIS, public comment period, and August 26, 2021, public comment webinar in the *Federal Register* (86 FR 43276-TN7178); via NRC e-mail distribution and NRC listserv (<https://www.nrc.gov/public-involve/listserver/fuel-cycle-fac-correspondence.html>); and in local newspapers and radio stations. The NRC staff notified other Federal and State agencies, U.S. Congressional representatives, and South Carolina Legislature representatives. The NRC staff also sent postcards via U.S. mail to residences in the immediate vicinity of the CFFF noticing the availability of the draft EIS, the

public comment period, and public comment webinar. The NRC also issued a press release and advertised via social media (see Section 1.3.4; 86 FR 43276-TN7178). A flyer (or informational sheet) containing information about the conclusions in the draft EIS, the public comment period, and the public webinar was distributed via NRC distribution e-mail and through the NRC listserv and uploaded to the NRC public web site.

The August 26, 2021, public comment webinar was also noticed in the NRC’s public meeting notice system and a copy of the informational slides the NRC staff used during the webinar was distributed ahead of the public webinar via NRC distribution e-mail, and subsequently uploaded to the NRC’s ADAMS and public web site (<https://www.nrc.gov/info-finder/fc/westinghouse-fuel-fab-fac-sc-lc.html>). The transcript of the public webinar was also made available via NRC’s ADAMS and the public web site and distributed via NRC distribution e-mail. Additionally, the NRC staff published in its YouTube channel two videos related to the draft EIS. The first video provided an overview of the draft EIS (<https://youtu.be/96L91-HDXTE>) and the second video provided a summary of the potential environmental impacts on surface water and groundwater resources from the proposed action (<https://youtu.be/hBnHzYNCGTE>). The web links to these recorded presentations were distributed via NRC distribution e-mail and uploaded to the NRC public web site.

In total, 71 people provided oral and written comments. This appendix provides responses from the NRC staff to these comments by subject matter. Where applicable, the responses note where changes were made to the EIS as a result of those comments. Table D-1 lists commenters in alphabetical order to identify the individuals who provided written comments, their affiliations (if provided), and the Agencywide Documents Access and Management System (ADAMS) accession numbers that can be used to locate the correspondence. ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html>. Table D-2 lists commenters that attended the public comment webinar and provided oral comments. Table D-3 lists commenters that left voice mail comments.

The comments are presented by subject area following Table D-3. Each subject area includes a response followed by the individual comments associated with that response. The comments are presented by correspondence ID and the comment number identified within the correspondence.

Table D-1 Individual Providing Comments during the Draft Comment Period

Commenter	Affiliation (if stated)	Correspondence ID	ADAMS Accession Number
Anonymous	<i>None stated</i>	18	ML21274A605
Blackwell, Majken	<i>None stated</i>	5	ML21259A268
Brawley, Wendy	SC House of Representatives	15	ML21274A608
Brawley, Wendy	SC House of Representatives	15	ML21279A296
Brawley, Wendy	SC House of Representatives	25	ML21319A132
Carroll, Vivian	<i>None stated</i>	14	ML21266A329
Clements, Tom	Savannah River Site Watch	9	ML21259A272
Clements, Tom	Savannah River Site Watch	49	ML21323A187
Commenters, Multiple	<i>None stated</i>	1	ML21245A428
Commenters, Multiple	<i>None stated</i>	48	ML21340A038
Cooper, Ira	<i>None stated</i>	36	ML21326A220

Commenter	Affiliation (if stated)	Correspondence ID	ADAMS Accession Number
Cothran, Penny Delaney	<i>None stated</i>	7	ML21259A270
Fite, Mark	U.S. Environmental Protection Agency, Region 4	34	ML21323A058
Fleming, Jory	<i>None stated</i>	33	ML21323A050
Fralix, Cassandra	<i>None stated</i>	4	ML21259A267
Ghanem, Sahar	Environmental Review, Inc.	39	ML21323A191
Gifford, Grace	<i>None stated</i>	32	ML21323A048
Gossett, Charles	<i>None stated</i>	46	ML21327A146
Greenlaw, Pamela	<i>None stated</i>	17	ML21274A075
Grego, John	Friends of Congaree Swamp	11	ML21266A332
Haire, Wenonah	Catawba Indian Nation	13	ML21266A335
Harrison Jr., James	<i>None stated</i>	23	ML21313A221
Hendley, Viola	<i>None stated</i>	45	ML21327A150
Hutchinson, Marc	<i>None stated</i>	8	ML21259A271
Irick, Karen,	<i>None stated</i>	35	ML21326A068
Johnson, Elizabeth	South Carolina Department of Archives History	20	ML21288A408
Judge, Christopher	<i>None stated</i>	12	ML21266A334
Kirkland, Mary	<i>None stated</i>	35	ML21326A068
Lee, Rick	State of South Carolina Governor's Nuclear Advisory Council	26	ML21319A138
Love, Sophia	<i>None stated</i>	44	ML21327A142
Malek, Elise	Westinghouse Electric Company	42	ML21327A156
Martin, Joy	<i>None stated</i>	22	ML21274A609
Martin, Tracy	The Council of South Carolina Professional Archaeologists	10	ML21266A330
May, Stephen	<i>None stated</i>	29	ML21322A333
McPherson, Susan	Columbia Chamber of Commerce	38	ML21323A188
Mitchum, Chief Michelle	Pine Hill Indian Tribe	16	ML21273A296
Parnell, Claudia	<i>None stated</i>	27	ML21320A008
Plauche, Mary	Environmental Review, Inc.	39	ML21323A191
Plauche, Mary	Environmental Review, Inc.	39	ML21327A158
Plowden III, Henry	<i>None stated</i>	2	ML21259A265
Preston, Priscilla	Midlands Group of the South Carolina Sierra Club	40	ML21326A060
Reese, Robert	<i>None stated</i>	35	ML21326A068
Riggin, Lorianne	South Carolina Department of Natural Resources	47	ML21327A152
Sanders, Virginia	<i>None stated</i>	37	ML21326A223

Commenter	Affiliation (if stated)	Correspondence ID	ADAMS Accession Number
Shepherd, Rebecca	The Council of South Carolina Professional Archaeologists	10	ML21266A330
Singleton, Raymond	<i>None stated</i>	24	ML21319A131
Stangler, Bill	Congaree Riverkeeper	19	ML21288A279
Stangler, Bill	Congaree Riverkeeper	43	ML21326A268
Stanley, Joyce	U.S. Department of Interior	21	ML21299A112
Stewart, James	The Council of South Carolina Professional Archaeologists	10	ML21266A330
Taylor, Ken	South Carolina Department of Site Assessment, Remediation & Revitalization	41	ML21323A190
Volskay, Ted	League of Women Voters of South Carolina	30	ML21322A334
Weems, Elizabeth	<i>None stated</i>	28	ML21322A332
Williams, Joanne	<i>None stated</i>	3	ML21259A266
Witter, Patricia	<i>None stated</i>	6	ML21259A269
Woods, Felicia	<i>None stated</i>	31	ML21322A338
Woods, Felicia	<i>None stated</i>	35	ML21326A068
Woods, Felicia	<i>None stated</i>	50	ML21326A064

Table D-2 Individuals Who Provided Comments as Recorded on Correspondence ID 1 (ADAMS Accession Number ML21245A428)

Commenter	Affiliation (if stated)
Brown, Erniko	NAACP
Clements, Tom	Savannah River Site Watch
D'Arrigo, Diane	Nuclear Information and Resource Service
Gifford, Grace	<i>None stated</i>
Greenlaw, Pamela	<i>None stated</i>
Irick, Karen	<i>None stated</i>
Johnson, Jermaine	South Carolina House of Representatives
Judge, Christopher	<i>None stated</i>
Kirkland, Mary	<i>None stated</i>
McDaniel, Annie E	South Carolina House of Representatives
Mitchum, Chief Michelle	Pine Hill Indian Tribe
Newton, Chakisse	South Carolina House of Representatives
Overly, David	<i>None stated</i>
Preston, Priscilla	<i>None stated</i>
Reese, Robert	<i>None stated</i>
Sanders, Virginia	<i>None stated</i>

Table D-3 Individuals Who Submitted Voice Mail Messages with Correspondence ID 48 (ADAMS Accession Number ML21340A038)

Commenter	Commenter
Alexander, Evelyn	Gray, Ellen
Anderson, Shirle	Hightower, Louis
Anonymous	Johnson, Alan
Anonymous, James	Mayo, Michael
Brown, Andre	McRant, Ella
Brown, Edward	Mosley, Johnny
Davis, Ethel Lee	Raynor, Luby
Eddy, Rosetta	Williams, Kathle
Fralix, Cassandra	Wilson, Carletta
Grant, Rena	Witter, Patricia

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D.1 Comments Concerning Accidents

D.1.1 Worker Contamination Event

Comment: "On August 17, 2021, at approximately 0230 [EDT], a Westinghouse employee was washing piping over a container of nitric acid in the Conversion Decontamination Area. The piping fell into the container of nitric acid and employee reached into the container to retrieve the piping and received nitric acid burns to hands and left wrist. Appropriate treatment for exposure to nitric acid was provided by on-site medical response staff. With an abundance of caution, after review with on-site medical, the employee was transported to an off site medical facility [Prisma Hospital]. Per procedure the employee's hands and arm were wrapped in plastic, and the employee was transported to an off site medical facility accompanied by plant health physics personnel for evaluation.

"Contamination was detected on the exposed area of the employee's skin during Health Physics surveys. Direct survey results were 1500 dpm/100 cm squared alpha for the left hand and 900 dpm/100 cm squared alpha for the right hand. All smear results of the exposed area were below clean area limits (<200 dpm/100 cm squared). Contamination surveys were performed in the ambulance and at the hospital and all results were below clean area limits indicating no spread of contamination during care for the employee. All potentially contaminated materials associated with the issue were collected and returned to the [Commercial Fuel Fabrication Facility] CFFF for disposal. Operator was provided with over the counter medication and released.

"The task that the employee was performing required a chemical suit, chemical gloves, fresh air bubble hood, chemical boots, and required taping the gloves to the sleeve of the acid suit jacket with chemical tape. After inspection of employee's personal protective equipment, it was noted that chemical tape was not applied to the gloves which enabled the nitric acid solution to enter the left glove and acid suit sleeve when employee reached into the nitric acid container."

NRC Regional staff was notified.? Will this event be reviewed by the NRC? Will the NRC make comments to Westinghouse or prepare a written report for public review? What does the event say about the ease by which workers can be exposed without proper PPE? Will the myriad of pathways to worker exposure, including the one in the event, be reviewed in the final EIS? Will the impacts of proper and improper use of duct tape (or other tape) be reviewed?
(9-5-16 [Clements, Tom])

Response: *On August 17, 2021, the WEC submitted a 24-hour report to the NRC (EN55412) for an unplanned medical treatment event where an employee was washing piping over a container of nitric acid and received nitric acid burns to the hands and left wrist. The WEC reported that treatment for exposure to nitric acid was provided by onsite medical response staff, and the employee was transported to an offsite medical facility. The licensee submitted their 30-day follow-up report dated September 15, 2021 (ADAMS accession number: ML21258A403), in accordance with 10 CFR 70.50. The WEC also entered the event into the corrective action program.*

As part of the NRC's event review process described in MD 8.3, "NRC Incident Investigation Program," the NRC staff reviewed the event and documented the findings in the Integrated Inspection Report 07001151/2021004 dated January 14, 2022 (ADAMS Accession Number ML22012A238). As documented in the inspection report, the "inspectors reviewed licensee records to verify that the potential spread of contamination was minimized by wrapping

contaminated areas in plastic prior to transport by ambulance and that a licensee HP [health physics] technician accompanied the worker in the ambulance in accordance with licensee procedures. Smear samples taken at the site, ambulance, and hospital confirmed that smearable contamination was below the licensee's free release limits and there was no spread of contamination." No violations of NRC requirements were identified, and the item was closed. No changes to the EIS were made as a result of this comment.

D.1.2 Severe Accidents

Comment: This particular facility is over 50 years old which is cause for concern if safety measures have not been updated to protect the employees who work there, and the hundreds of citizens who live in close proximity to the facility. These citizens could be subjected to life altering health problems created by radiological accidents, spills and discharge of hazardous chemicals and waste into the air, groundwater below the facility, and harmful waste flowing offsite into the Congaree River. The Congaree River flows into the Wateree River and the Wateree into Lake Marion. An accident at this facility could cause thyroid problems, leukemia, infertility and other major health issues for citizens in or around this plant and could be a "ticking time bomb". (24-2 [Singleton, Raymond])

Comment: Over the course of the past several years, there have been frequent and numerous events that injured or put workers in danger. In fact, the EIS was issued because of the plant's poor handling of accidents and issues that came to light after the NRC issued a draft EA and FONSI in June 2018. Less than a month after issuing the draft Environmental Assessment and FONSI in June 2018, a leak at Hydrofluoric Acid Spiking Station #2 released uranyl nitrate and hydrofluoric acid into the soil, an incident that further raised concerns about WEC's environmental and safety record.

WEC's initial response to the report of this incident also raised alarms; they planned to monitor any COPC (Constituents of Potential Concern) migration using an existing monitoring well 190 feet away from the site; at typical rates of groundwater flow, contamination would not be detected for over a year. Fortunately, South Carolina Department of Health and Environmental Controls (SCDHEC) requested a more aggressive sampling plan. (35-6 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Response: *The NRC's regulations at 10 CFR 70.62 include the requirement for licensees to establish and maintain a safety program that demonstrates compliance with performance requirements in 10 CFR 70.61. The safety program includes process safety information, integrated safety analysis (ISA), and management measures. Each license application must include a description of the applicant's safety program. The applicant must also submit an ISA Summary with the license or renewal application in accordance with 10 CFR 70.65. The NRC reviews the safety program, including the ISA program and the ISA Summary, to determine whether the applicant has established a safety program that complies with and will continue to comply with 10 CFR Part 70, Subpart H. Also, the NRC's oversight function includes inspection of licensed facilities to verify that the elements of the safety program are being implemented and maintained. Any incident such as leaks or spills that impact safety or security will be addressed through WEC's corrective action program. During the license renewal term, the inspection program will assess WEC's performance and ensure that the licensee is implementing and maintaining safety programs in accordance with regulatory requirements.*

As discussed in Section 3.15 of the EIS, Subpart H of 10 CFR Part 70 requires certain fuel cycle facilities licensed under Part 70 to perform an ISA. Subpart H of 10 CFR Part 70 applies to the

WEC's CFFF. An ISA is defined in 10 CFR 70.4 as "... a systematic analysis to identify facility and external hazards and their potential for initiating accident sequences, the potential accident sequences, their likelihood and consequences, and the items relied on for safety." The ISA evaluates compliance with 10 CFR 70.61 performance requirements, which require that controls be implemented to make credible high-consequence events highly unlikely or the consequences less severe than those in 10 CFR 70.61(b)(1)-(4) and to make credible intermediate-consequence events unlikely or the consequences less severe than those in 10 CFR 70.61(c)(1)-(4). An ISA Summary, which summarizes the ISA results, is updated and submitted to NRC annually and is used to inform NRC's inspections of WEC's implementation of its safety program. In addition, the risk of nuclear criticality accidents must be limited by assuring that all nuclear processes are subcritical and in compliance with 10 CFR 70.61(d). The engineered or administrative controls and measures necessary to meet these performance requirements are known as items relied on for safety (IROFSs).

The NRC staff's analysis of compliance with 10 CFR 70.61 and 70.62 requirements will be documented in a safety evaluation report. This safety review of the License Renewal Application determines whether the ISA methodology provides reasonable assurance that the potential failures, hazards, accident sequences, and scenarios have been evaluated. IROFSs identified and management measures are established to ensure that IROFSs are available and reliable to reduce the likelihood of occurrence and consequences of the accident sequences to acceptable levels in accordance with the performance requirements of 10 CFR 70.61. No changes were made to the EIS as a result of these comments.

D.1.3 Particulate Releases

Comment: The draft EIS says (on page 2-13) that "operations at CFFF generate gaseous and liquid effluents." Are there no particulate discharges or could there be in the event of an accident? (9-3-19 [Clements, Tom])

Response: Section 2.2.1.1 of the EIS discusses the CFFF's gaseous effluents, which come mainly from the process stacks, equipment, and from fugitive dust and consist of fluorides, ammonia, and uranium compounds. Section 3.15 of the EIS discusses accidents, which consist of any abnormal event that results in a radiological and/or nonradiological release of materials into the environment, including uranium compounds. No changes were made to the EIS as a result of this comment.

D.1.4 Discussion of Lagoon Failure Accident

Comment: In Section 3.15 - Accidents, Table 3-24 includes a lagoon failure as a potential Category 1 or 2 accident, but such an event is not discussed at all in the text of Section 3-15. (41-1-3 [Taylor, Ken])

Response: Table 3-24 in the EIS identified a spectrum of potential accidents in different areas of the Columbia Fuel Fabrication Facility that the WEC considered, including a lagoon leak, massive dike/liner failure, and flooding. The WEC assigned a severity level of 1 and 2 to this potential accident in its environmental report submitted as part of the license renewal application. As described in Table 3-24, Category 1 accidents are those most likely to occur during normal plant operations and have the least environmental impacts of the three categories. Category 2 accidents are those that would occur infrequently during the plant's operating life, could release concentrations of radiological and nonradiological pollutants to the onsite (and possibly offsite) environment that would exceed normal effluent releases and could

cause significant impacts, if not controlled or mitigated. Separately as part of the safety review, the WEC's evaluation of accident sequences is documented in its ISA, where both the likelihood of occurrence and consequence of the accident are evaluated to determine whether the accident sequences exceed the acceptable levels. The WEC implements items relied on for safety (IROFSs) to reduce the likelihood of occurrences and consequences of the credible accident sequences to acceptable levels in accordance with the performance requirements of 10 CFR 70.61.

The EIS, however, discusses only those accidents that could result in the largest environmental consequences (release of uranyl nitrate, release of uranium hexafluoride, and a criticality accident). Other accidents such as the lagoon failure are not discussed in the EIS because the consequences associated with these accidents would be bounded by the consequences of the accidents that are discussed. No changes were made to the EIS as a result of this comment.

D.2 Comments Concerning Alternatives

D.2.1 Length of License Renewal Term

Comment: I also question why more weight is being focused on the uncertain future in a 20, or 40-year license rather than reflecting on what we know of 52 years of factual evidence, which is cluttered with violations and hazards. (1-3-8 [Mitchum, Chief Michelle])

Comment: Okay, thank you. Yes, I have a couple of questions on here. Well, the first thing, I live in this area, I represent part of Lower Richland, so this directly affects myself, my family, and my constituents. So, I have a few questions about what's going forward, and what the NRC is proposing to do about it. Up until today I've been hearing 40 year, 40 year. I've talked to Westinghouse, and it's been 40 year, 40 year, 40 year. But then in this slideshow that we've been watching, I saw 20 years about something, so if somebody could address that, I would really appreciate that.

Because I don't see a point in doing 40 years, I've said this multiple times, over, and over again. That I appreciate what Westinghouse is attempting to do now, as of last year, what they've been attempting to do. However, still, 40 years is pretty much beyond a lot of our lifetimes, some of the people who are on this call may not even be here in 40 years. So, this is just a concern for me. (1-5-1 [Johnson, Jermaine])

Comment: Okay, all right, well thank you again, just as I'm closing off, and just to reiterate that I have a two-year-old son right now, and in 40 years, he could potentially be a grandfather by the time they come up for a license renewal, and I just don't think that's a smart decision. So, thank you so much. (1-5-3 [Johnson, Jermaine])

Comment: Just for clarification, so as of today the NRC does not support 40 years, but the NRC could support a 20 years? (1-5-4 [Johnson, Jermaine])

Comment: Thank you. This is Chakisse Newton, and I represent Richland County District 11, which includes part of Lower Richland that runs adjacent to the area where the Westinghouse plant is, and I wanted to follow up, and really reiterate the concerns that Representative Johnson made regarding the timeline for the proposed renewal. But I also wanted to ask a follow up question, because I wasn't clear on the answer that you gave to Representative Johnson. So, there are a lot of concerns that you'll from the community, that I also share, but I am really concerned about the 40-year licensing request. That is a very long time, and there

are those of us on the call, and on the Webex who haven't been alive for that long, and so just would really encourage us looking at shorter licensing renewals for the plant. But just to follow up on Dr. Johnson's question, because again, I apologize, I didn't hear the answer clearly, it said that you evaluated three options. You evaluated basically the denial option, you evaluated the 20-year option, and you evaluated the 40-year option. Are you recommending the 20-year option as your preferred stance? (1-6-1 [Newton, Chakisse])

Comment: A 40-year license, it makes—there is no reason for it. I read what you had written in the draft EIS, and there's no logic to it. It's going to prevent—let me try to stay to my script so I don't get very emotional here. Regulation 10 CFR 54.31B caps renewed licenses at 20 years, and a renewed license may not exceed 40 years, and that's the remaining time on current license plus license renewal period. (1-7-2 [Greenlaw, Pamela])

Comment: On the criteria of safety record alone, a 40-year span of time is unsubstantiated. There is no proven safety record, effective record at this time that Westinghouse has. They don't have a proven safety record we can go by. They've made improvements, but they haven't proven themselves, and other people will cover that some more later. A 40-year span is also premature based on NRC's own analysis. In January, February of this year, 2021, the NRC held public meetings to consider technical issues in guidance development related to license renewals for 40 and for 100 years. In February of 2020, NRC sought technical information for 40-year licenses for aging facilities. All the commenters on those public hearings roundly decried the effort of NRC to extend these licenses without having means to follow up on solving technical, and safety issues, and participating in development of guidance documents. So, this idea of a 40-year license is very premature. It also prevents the NRC and Westinghouse from being required to include the public. I agree with Mr. Reese, who knows what's going to continue after a 40-year license is granted. It just doesn't work. (1-7-4 [Greenlaw, Pamela])

Comment: On the other hand, the owners, Brookfield Assets Management is a private equity firm with their headquarters in Bermuda. They want Westinghouse to continue to produce at the rate they've been able to, and in the future even increase it. So, we have different pressures on human nature here, working. So, we cannot predict what's going to happen in 40 years. Westinghouse has to have permission, a license for special nuclear materials. (1-7-7 [Greenlaw, Pamela])

Comment: Staff has to go where, you're going to laugh, they have to go to ADAMS, and look it up. And none of us want to deal with ADAMS, even people in NRC, it's just too wonky. So, there are lots of reasons not to have a 40-year license. If you—not you personally, but NRC is turning this on its head, it's going to disenfranchise the community that is asking for accountability, and you're actually going to weaken your own regulatory requirements by allowing the various instances that have happened in the past to go unnoticed, and okay, well they've made a few improvements, they haven't proven their safety record. (1-7-11 [Greenlaw, Pamela])

Comment: Now, concerning something that a lot of people have spoken about is the 40-year license. I'm concerned that the impacts of a ten-year license with certain conditions has not been reviewed in the draft EIS. Savannah River side Watch, and many others call for a license period of no more than ten years to be considered. I didn't hear anybody at the public scoping meeting, or other meetings voice support for a 20-year license extension. So, I don't know where that came from, and reading the draft EIS, I can't determine why a 20-year license was chosen by the NRC when people spoke, not necessarily in favor of a ten-year license, but the

impacts of a ten-year license should be reviewed. The EIS scoping process summary report from February mentions that the commenters call for a ten-year license extension, but then it's not included in the document that was put out. So, I'm quite concerned about that. (1-10-2 [Clements, Tom])

Comment: The document also says at the beginning that, let me quote this, concerning a renewal term of 20 years. The NRC staff found that the potential environmental impacts from this alternative would be similar to the potential impacts from the proposed action, except that the impacts would occur over a shorter time frame. I mean that is totally ludicrous. The impacts of operating for 40 years with inadvertent releases, and MPDES discharges, and air discharges, there's no way it's the same. So, I question the conclusion that the NRC seems to have made, that the impacts of a 40-year license, or 20-year license are essentially the same. We have seen a lot of inadvertent events, and accidents over the past five years, and basically, the NRC admits there will be future inadvertent releases. So, comparing the 20 years to 40 years as NRC has done is just totally incorrect. (1-10-3 [Clements, Tom])

Comment: And then finally, I believe a 40-year permit, I agree with Pamela Greenlaw, Priscilla Preston that this is far too long, and a much shorter license should be issued if we can clear up all of these environmental, and cultural issues that have been brought to the table tonight, thank you. (1-12-6 [Judge, Christopher])

Comment: And I don't know all the political leaders that have been on the line, they've heard it, not one person has said that they recommend that we go with the 20-year license, everybody has said that the community is supporting a shorter license, and I don't know to what end this will matter. But I'm hopeful that the people in this community will hear loud, and clear, that it will resonate loud, and clear as a person from this community, and I don't propose to speak for the entire community, I'm speaking for a swathe of this community that 40 years is too long. (1-17-6 [Reese, Robert])

Comment: And one last thing I will say for Representative Johnson, and Councilwoman Chakisse Newton, I will tell you that I contacted the NRC, and they said that only once have they not given the maximum time frame for a nuclear plant that has made a request. Only one time have they not given a full license to that requestor. So, for them to, I don't even understand why there was some ambivalence on the phone about how much time, or the license span that they were requiring, or that they were suggesting, because in their own records, they haven't given anything less than the maximum time. (1-17-8 [Reese, Robert])

Comment: Thank you, good evening, everyone. First of all, I joined the conference call a little later in the evening, so my question may have been answered. I appreciate all that I have heard, I want to say to you guys that you are just not hearing our fear. You are also hearing our anger. We have been saying this to you since I know, 2018, when I started making my voice heard in concern with this issue. I have a very simple question, and maybe you've already answered it. I've put it in the question, and answer section, but my question is why are we talking about 40 years guys? Chances are 40 years from now, all of us on this call will not be here. But 40 years is a very long time to consider giving folks this opportunity that has a long history of health, and safety issues, not just to our community, but to the workers themselves. And so, I just, I mean I am at a loss to figure out why are we talking 40 years rather than a shorter period of time? (1-19-1 [Irick, Karen])

Comment: I mean when you start a new job, you have a probationary period to show you know what you're doing. Once you show you know what you're doing, then you get the job. Well,

these guys have been here for a very long time, and they have not been good neighbors. Now, I must admit that to 2018 they have, Westinghouse, you guys have tried, you sent out newsletters, and you are trying to keep the directly affected parties informed of things that you're doing in the community. You are trying to become a good neighbor, and we appreciate that, but you still have it together, and your facility is aging just like me. We are falling apart. So, NRC, hear us, 40 years is a long time. We are not just fearful, we are angry. So please, I heard you, I heard the community, take into consideration everything that you have heard from us tonight, as well as everything you have heard from us over the years. That is my comment for this evening, I appreciate this opportunity, so I'm done, thank you. (1-19-2 [Irick, Karen])

Comment: Furthermore, a 40-year licensure is entirely too long not to be held accountable for these types of chemicals in our community. (1-20-7 [Brown, Erniko])

Comment: MS. KIRKLAND: Okay. So, I heard everyone talk about, the statements that you, the NRC was considering a 40-year renewal. Why wouldn't you consider a ten-year renewal with the issues that Westinghouse is having, why was that not a consideration? (1-22-3 [Kirkland, Mary])

Comment: Okay, all right, so that [the 10-year license renewal] is on the table, correct? (1-22-4 [Kirkland, Mary])

Comment: MS. KIRKLAND: Okay, all right, well thank you. With that being said, you know I think my recommendation, that they do the ten-year renewal, because of the safety issues, and the site that you are finding all of these contaminants, and the weather has been changing, the floods, and stuff like that, 20 years is a lot of time not to have any recourse if any issue comes up. So, ten years should suffice, and that -- where we can have recourse in case issues come around due to climate change, and the aging facility. (1-22-5 [Kirkland, Mary])

Comment: I ask that you consider a shorter permit period of 5 years. 40 years is too long. half a lifetime. There has been a number of issues addressed but not cleaned up/completed. My hope is that a shorter permit period would encourage Westinghouse to be more diligent and follow through on a daily basis concerning the hazards and long-term damage they create or can create to our community. With a 40-year permit period, they become too lax and a LOT of damage can be done before being addressed. It's frightening. (5-1 [Blackwell, Majken])

Comment: Absolutely NOT! I would not be agreeable to your timeline of 40 years for this nuclear plant to have a renewable license. (6-1 [Witter, Isaac])

Comment: There has been things happening without recourse and has affected people in and around this and surrounding areas. Sure they are so concerned right now, but in reality, it is a game for them. The leakage in the plant and the fire in the barrel would not have been brought to my attention except for the news coverage. I am appalled and disgusted that there is so little concept of life. What happens at this Plant can affect my life and others for decades and cause much sickness and death!! I would suggest and recommend that this Plant have a 5-year recertification plan and anything that happens in between that time is addressed right away. I will not accept anything less! Thank you for your time (6-2 [Witter, Isaac])

Comment: WESTINGHOUSE CAN'T BE TRUSTED WITH A NEW 40-YEAR LICENSE (7-1 [Cothran, Penny Delaney])

Comment: This facility has a history of pollution and safety issues as well as documented impacts to groundwater and surface water resources. The currently proposed 40 year license is not acceptable. A 10 year license term would be a better option as frequent oversight has proven necessary with this facility. (8-1 [Hutchinson, Marc])

Comment: For nuclear power plants, license renewal is limited to 20 years by 10 CFR 54.31(b). The NRC says on its "Fuel Cycle Facilities Licensing" web page (<https://www.nrc.gov/materials/fuel-cycle-fac/licensing.html>) that "Fuel cycle material facility licenses can be renewed for up to 40 years if certain conditions are met. The review of the renewal applications includes evaluation of safety, safeguards, and environmental impact." But no adequate explanation is given for why a 40-year license extension for a fuel cycle facility is allowed or justified. Where is this written in regulations or law? It is clear that regulations allow for a 10-year extension, correct? (9-1-17 [Clements, Tom])

Comment: Based on observation of performance over the last decade and numerous accidents and releases of nuclear materials into groundwater and the admission by the NRC of anticipated future problems, it remains the case that SRS Watch believes that only a 10-year license extension should be reviewed. The draft EIS totally ignores earlier "stakeholder" input submitted for the record that called for a review of a 10-year license renewal. Impacts of a 10-year license renewal must be analyzed. (9-1-19 [Clements, Tom])

Comment: Oral comments during the NRC's webinar of the draft EIS on August 26, 2021 were unanimously against a 40-year license extension. Are those comments being taken into account? Nobody spoke in favor of a 20-year license extension. (9-1-20 [Clements, Tom])

Comment: I did not hear anyone at public meetings voice support for a 20-year license extension, for which limited justification is presented in the draft EIS. Why is consideration of a 10-year license extension, which has public support, not being considered and reviewed? (9-2-2 [Clements, Tom])

Comment: Likewise, in the SRS Watch EIS scoping comments of August 20, 2020, we objected to a 40-year license and said that a 10-year licensed should be analyzed. Our comment, repeated here, was ignored in the draft EIS: "Given that an extension of the operating license for 40 years would mean that unpredictable events having environmental and health impacts could occur at any point during that period of time, I request that a much shorter period of time be analyzed. I request that the license extension be analyzed for only an additional 10-year period of time and that conditions be attached to that period of time, such as accomplishment of clean-up milestones, no significant health or environmental problems or events and no discovery of old, yet unknown problems or contamination." (9-2-3 [Clements, Tom])

Comment: The request by "stakeholders" to consider a 10-year license extension has been ignored and "the alternative of renewing the license for less than 40 years" does not mean that a 10-year license is actively being considered. Is it? If not, why not? (9-2-4 [Clements, Tom])

Comment: While claiming to base its "preliminary" support of the 40-year license extension on, in part, "input from other stakeholders," which is the category for the public, I now wonder if the NRC will ignore public input on the draft EIS. By already supporting a 40-year license extension before draft EIS comments are received may well reveal a disturbing and potentially harmful bias by the NRC. Citizen requests for review of a 10-year license extension have been summarily dismissed with no explanation, which is troubling. (9-2-5 [Clements, Tom])

Comment: Also on page xv it is stated “The NRC staff also considered as an alternative approving the WEC's a license renewal request with a shorter license renewal term, i.e., a renewal term of 20 years. The NRC staff found that the potential environmental impacts from this alternative would be similar to the potential impacts from the proposed action except that the impacts would occur over a shorter timeframe.”

This claim of essentially the same impacts over 40 years or 20 years makes no sense. If the facility operated for a full 40 years, there would be unpredictable and perhaps serious impacts for the last 20 years of operation. Given the nature of past accidents, it is all but assured that impacts for that additional 20 years would be greater than for operation of only 20 years. It appears that the NRC is alleging that after the first 20 years of additional operation that there would be no further discharge or new impacts. Such an assertion is ludicrous and the data and plant record do not support such a claim. And, the NRC elsewhere admits that there will be "future inadvertent releases," belying the claim that impacts for the two periods of time under consideration would be similar. (9-2-11 [Clements, Tom])

Comment: The draft EIS fails to analyze “reasonable” alternatives, such as a license extension for 10 years. No reason is given for not analyzing the 10-year-license alternative. A 10-year license extension, as recommended by stakeholders, must be analyzed. Why was it not? (9-2-19 [Clements, Tom])

Comment: Again, a discrete 10-year license-renewal period must be considered in this section. No reason has been given for not considering 10 years. Significant detrimental events have occurred at the facility in the last five years, a predictor of what could happen over 40 years. (9-3-9 [Clements, Tom])

Comment: Again, why has the “License Renewal for 20 Years” alternative been considered (page 2-25) but, given groundwater contamination, 10-year license extension has not been reviewed despite numerous request from stakeholders for this alternative? (9-4-13 [Clements, Tom])

Comment: The draft EIS makes this claim (on page 2-26): "The nature/type of potential environmental impacts from continued licensed operations for an additional 20 years would be similar to those from the proposed action (i.e., proposed 40 years of continued operation)." As stated earlier and bearing stating again, this statement is ludicrous as more leaks and accidents could well occur in the second 20 years of a 40-year license extension. The NRC's statements seems to assume no further discharge into the environment from the facility. Back up this claim. (9-4-14 [Clements, Tom])

Comment: The draft EIS provides ample information to deny a 40-year license extension. I request that the 10-year license-extension alternative be analyzed and that any license extension be no longer than 10 years. (9-6-7 [Clements, Tom])

Comment: Friends of Congaree Swamp would like to offer the following comments on the draft Environmental Impact Statement for Westinghouse Electric Company LLC/Columbia Fuel Fabrication Facility (WEC). We will note WEC's poor record of notification and compliance and do not feel that their actions under the previous permit warrant a 40-year extension; we request reconsideration of postponement, the no-action alternative or a 20-year extension instead. (11-1 [Grego, John])

Comment: Some of the discussion of alternatives (40-year license--the preferred alternative, 20-year license, no action alternative) is disingenuous. Future impacts are often minimized,

since existing conditions would not change, but simply occur later (or end sooner). The NRC repeatedly uses the phrase "only the timeline would change", but that statement minimizes the impact of living with detrimental impacts for another generation or two of Richland County residents. (11-14 [Grego, John])

Comment: As a final observation, note that existing issues at the plant required WEC to enter into a Voluntary Clean-up Contract with SCDHEC in August 2016. As new problems arose, the VCC needed to be superseded by a Consent Agreement with SCDHEC in February 2019, and NRC itself had to set aside its draft Environmental Assessment and Finding of No Significant Impact (FONSI) in June 2018. This cascading series of actions by regulatory agencies in response to problems at WEC points to a plant with a troubled history. With several issues in the Consent Agreement left unresolved, NRC's license renewal is premature. We strongly recommend either postponement, decommissioning, or a shorter renewal period. (11-16 [Grego, John])

Comment: Seriously consider the fact, mentioned by most who commented during the webinar, that a 40 year license is far too long of a period of time, for the operation of this facility. This is an issue of public health. (12-7 [Judge, Christopher])

Comment: A 40-year license assumes no significant human error or non-compliance will occur. It also assumes that 2 full generations of residents within 20 miles of the WEC-CFFF do not need and should not have a voice with regard to decisions by NRC about Westinghouse, and WesDyne/Westinghouse Government Services. No one recommends this. Even Westinghouse did not contemplate this until urged by the NRC to request the 40 year span of time.

A. Both Representative Jim Clyburn and SC DHEC have looked askance at this sudden and unrealistic 40-year length of time for the license, especially given Westinghouse's track record prior to the Consent Agreement. (17-2 [Greenlaw, Pamela])

Comment: II. Arguments for a License of not-over 20 years

A. The additional safety precautions and more stringent plans for more management policies have yet to be tested and proven effective before a long license can be granted (17-9 [Greenlaw, Pamela])

Comment: [II. Arguments for a License of not-over 20 years...]

B. Current regulation does not allow routine extension of a renewal permit beyond 20 years for nuclear power plants. Because the DEIS must explain why this rule does not apply to the WEC-CFFF. See 10 CFR 54.31(b). (17-10 [Greenlaw, Pamela])

Comment: [II. Arguments for a License of not-over 20 years...]

C. The owner of Westinghouse and Westinghouse Government Services, aka WeDyne, is an equity company, Brookfield Asset Partners, whose office is offshore in Bermuda. In the recent past they have pressured Westinghouse to work "leaner" and produce more. (The latest word is that they may be seeking to sell. That is an incessant rumor; however, at present there is no one put Brookfield Partners in check. Could this 40 year license be at the behest of Brookfield's management for guaranteed returns over 40 years, even if the return dividends drop?) (17-11 [Greenlaw, Pamela])

Comment: [II. Arguments for a License of not-over 20 years...]

III. Trusting a generic model without having tested it for this particular site's geometry, soils, weather patterns and likely additional 100-year-flood events. (Congaree's cresting has a history of being over 28 feet. (17-12 [Greenlaw, Pamela])

Comment: This site has already been polluting our groundwater and eventually that will reach our beautiful waterways. I urge the commission to consider a much shorter license - perhaps 10 or 20 years. Forty years is far too long. (18-1 [Anonymous, Anonymous])

Comment: I am writing on behalf of Congaree Riverkeeper, a grassroots non-profit organization that works to protect the Broad, Lower Saluda and Congaree Rivers, to submit the following comments on the draft environmental impact statement (EIS) related to Westinghouse Electric Company's request to renew the operating license for its Columbia Fuel Fabrication Facility (CFFF) in Richland County, South Carolina. First and foremost, after reviewing the draft EIS and the NRC's public presentations, we contend that the NRC staff's preliminary recommendation to renew the facility's operating license for an additional 40 years is a significant error, is not supported by the findings of the EIS, and is widely opposed by the community. (19-1 [Stangler, Bill])

Comment: The EIS evaluated the proposed 40-year license renewal, as well as two alternatives: no action, and a 20-year license renewal. While the EIS states that the impacts from the proposed action (the 40-year license) and the alternative 20-year license are similar, the actual discussion suggests otherwise. The following are excerpts from the draft EIS (emphasis added): "The nature/type of potential environmental impacts from continued licensed operations for an additional 20 years would be similar to those from the proposed action (i.e., proposed 40 years of continued operation). However, the extent of the impacts would differ in light of the amount of time the CFFF would operate and uncertainties associated with the outcome of the ongoing remedial investigations per the CA process." (Page 2-26) "With consideration of the history of the site, remaining uncertainties about past leaks, and the potential for the risk of leaks to increase with the age of plant components, the NRC staff concludes that future inadvertent releases of contaminants to the subsurface are reasonably foreseeable." (Page 3-43) These statements indicate that a shorter license term would in fact reduce the potential for the inadvertent release of contaminants, and reduce the potential environmental impacts associated with continued operations. As such, the 20-year license alternative should be seen as having less potential environmental impact than the proposed 40-year license. (19-2 [Stangler, Bill])

Comment: The EIS also discusses the costs and benefits of the proposed action and alternatives and concludes that "the 20-year alternative also would result in a positive economic benefit-cost ratio similar to the proposed action," suggesting that, based on the public health and safety factors that should guide the NRC's final decision, the shorter license term should be the preferred option. (19-3 [Stangler, Bill])

Comment: Additionally, numerous elected officials, citizens, and organizations have expressed concerns about the proposed 40-year license, and have advocated for a shorter license term. We urge the NRC to listen to this feedback from the community. We recommend that the NRC renew the operating license for a period of 20 years. This will allow the NRC and others to learn more from the ongoing remedial investigations being conducted and evaluate the effectiveness of the actions that are being, and will be taken as part of the DHEC consent agreement. This would also be consistent with the previous license renewal for this facility, which was renewed in 2007 for a 20-year term. We appreciate the opportunity to provide these comments. (19-4 [Stangler, Bill])

Comment: [The Department [DOI] is concerned that an existing subsurface contamination plume from the CFFF could have potential impacts to Congaree National Park (CONG) and the Congaree River as it migrates through a highly interconnected hydrogeologic system within the

park...We recommend several strategies to address this concern as part of any renewal decision by Nuclear Regulatory Commission (NRC) for a WEC operating license...]

Alternatives: We support selection of the 20-year license alternative, which would allow "for an examination for potential relicensing and evaluation of environmental impacts over a shorter span of time." (page 3-140, line 36). The rationale for consideration of this alternative is based on the effects on the environment from the 2015 historic flooding event; the multiple leaks or spills that have resulted in subsurface contamination at the CFFF site since the last license renewal; and the ongoing remedial investigations with South Carolina Department of Health and Environmental Control. Selection of this alternative would ensure a systematic, in-depth update given all of the current uncertainties regarding contaminant plume source, transport, and fate as well as re-evaluation in the face of anticipated development and climate change impacts. (21-2 [Stanley, Joyce])

Comment: If a facility has a stellar record for safety as it relates to the environment and is doing no harm to the residents who live in close proximity of the facility, perhaps an extended license would be appropriate but nothing resembling 40 years. These type facilities should be kept on a "short Leash" and monitored regularly to ensure they are in compliance with all federal, state, and local regulations, practices / procedures and guidelines. Westinghouse has not earned the right to have a 40, 20, or even a 10 year license based on it's safety record. (24-3 [Singleton, Raymond])

Comment: The permit renewal for the Westinghouse facility in Hopkins, which is located in my District, should not exceed 20 years. (25-1 [Brawley, Wendy])

Comment: It is our understanding that there is a lot of discussion within some special interest groups regarding whether the license renewal should be 20 years or 40 years in length. These groups advocate for a 20-year license and argue that it is the best method to ensure Westinghouse stays focused on environmental or operational issues. The advocates are concerned that there will be no regulatory oversight and inspections for compliance by the NRC to address problems which might arise from operations if a 40 year relicense is granted. In our discussions we concluded that such a position ignores the regular inspections performed by the NRC on facilities and operations. Their position also fails to acknowledge the actions by the SC Department of Health and Environmental Control (DHEC) regarding environmental compliance throughout the grounds and plant. (26-1 [Lee, Rick])

Comment: As to the duration of the license issued by the NRC, GNAC is very familiar with the long-term nature of the nuclear industry and the many years that reactor fuel is ordered in advance of actual need. Westinghouse is an important part of the nuclear energy community in South Carolina and throughout the US serving as a major supplier of reactor fuel. Because nuclear reactors schedule their refueling outages and delivery of new fuel rods many years in advance of actual due dates, we are concerned that a 20-year license will create uncertainty regarding Westinghouse's ability to meet those long-term commitments. We can well imagine a scenario around years 12-15 wherein the possibility of a 20-year license not being renewed creates uncertainty regarding delivery of fuel and causes customers to purchase fuel from other suppliers resulting in a wind down of the current Westinghouse facility. (26-3 [Lee, Rick])

Comment: I am opposed to the Nuclear Regulatory Commission's lengthy time period of 40 years for the Westinghouse permit renewal. I agree with SC Rep. Wendy Brawley that the permit must last no longer than 20 years and that significantly more inspections and regulatory oversight are required if the NRC extends Westinghouse's permit. (27-1 [Parnell, Claudia])

Comment: Based on Joyce Stanley's report (she is the Regional Environmental Officer for the United States Department of the Interior), I think a ten-year license is needed so the CFFF can address the many concerns she states.

Her report is titled DEIS-Columbia Fuel Fabrication in Richland County, SC (NUREG-2248). (28-1 [Weems, Elizabeth])

Comment: The Westinghouse Electric Company (WEC) is in the process of renewing their license to continue operation of its Columbia Fuel Fabrication Facility (CFFF) for an additional 40 years. The League of Women Voters of South Carolina (LWVSC) recommends renewal of the WEC license to operate the CFFF for 10 years. (30-1 [Volskay, Ted])

- **Comment:** The LWVSC has been at the forefront of efforts to protect SCs air, land and water resources. Extensive documentation including a September 17, 2021 letter from the U.S. Department of the Interior (DOI) to the U.S. Nuclear Regulatory Commission (NRC) indicates that the WEC CFFF has a history of uncontrolled releases of radioactive and non-radioactive hazardous wastes into the environment (main.jsp (nrc.gov)). Statements, concerns and a recommendation from the letter include:

- There have been "multiple leaks or spills that have resulted in subsurface contamination at the CFFF site since the last license renewal".
- "Investigations of subsurface contamination from past events have not been definitive in identifying the sources of contaminants, the initiation of contaminant releases, and the total amounts of contaminants released to the environment."
- "The methods by which the groundwater quality objectives of the consent agreement will be met are unknown."
- DOI is concerned that an existing subsurface contamination plume from the CFFF could have potential impacts to Congaree National Park (CONG) and the Congaree River.
- DOI recommends a license alternative less than 40-years which would allow for an examination for potential relicensing and evaluation of environmental impacts over a shorter span of time. (30-2 [Volskay, Ted])

Comment: Releases of hazardous contaminants from the CFFF are preventable and therefore unacceptable. Likewise, effective measures to remediate soil and groundwater impacted by historical releases should be prioritized. Limiting the CFFF operating license to 10-years may incentivize WEC to become better stewards of SC's environment and natural resources. (30-4 [Volskay, Ted])

Comment: I am writing this e-mail, asking the NRC to consider extending the environmental assessment license for no more than 20 years instead of 40 years proposed from the Westinghouse Fuel Fabrication facility in Hopkins, SC. There have been several incidents at the plant recently (problem with a scrubber, drum fire, spiking station issues). Westinghouse has a long history of repeated violations of safety & negative environmental impacts for residents in Lower Richland. (31-1 [Woods, Felicia])

Comment: The LR community is asking for the NRC to grant Westinghouse an environmental assessment renewal not exceeding 20 years. The community response should be at the heart of the NRC's decision. The focus should be on helping our community to thrive and providing a safe environment for residents to live and work. (31-11 [Woods, Felicia])

Comment: A 40 year license is too long-please reduce it to 10 or fewer years. (32-4 [Gifford, Grace])

Comment: 3) License Times for Review Are Too Long

I find the license options the NRC has selected for the draft EIS of 20 years and 40 years to both be too long. With the 40-year option, I would be nearly 70 years old (I am currently 27) before I could have another opportunity to provide input for this facility. I find that completely unacceptable. I feel that if this option is selected, I will not likely contribute again in my old age because my input is clearly of little value. Further, 20 years is longer than other local documents that I can contribute to and are meant to be commented on regularly by the public. For example, I mentioned that I participated in Columbia's public input process to their new 15-year plan. They will have another plan in due time (e.g., 15 years from now), and before that 15-year window they will begin a new cycle of public input several years in advance. I am thus asked to contribute to the city's direction approximately every 10-15 years and can elect to do so more frequently if I contact local officials. I do not understand why the NRC has elected to choose licensing options that are far longer than other important local documents where public input matters and is considered crucial like this example I mentioned. (33-4 [Fleming, Jory])

Comment: 10. Section 2.4.2 "License Renewal for 20 years", page 2-26, suggests that uncertainties with a 20-year license renewal vs. a 40-year license renewal would be similar, though the extent of the impact would differ. Given that the environment in and around the facility has already seen a significant impact from past and ongoing operations, and the uncertainties involving the sources and migration of radionuclides, nitrate, fluoride, and VOC plumes, the difference between the extent of contamination between 20 and 40 years seems like it would be more significant than is being stated in the DEIS. We recommend that the Final EIS provide a discussion regarding how the cumulative effect may differ between the 20-year and 40-year permit options. We also recommend that monitoring continue on a quarterly basis along with annual reports that demonstrate the cumulative impacts for the 20-year verses the 40-year permits. (34-2-1 [Fite, Mark])

Comment: During the August 26, 2021, NRC Public Meeting on the Draft Environmental Impact Statement for the License Renewal of the CFFF, NRC staff heard support from the community for the No-Action Alternative as well as the 20 Year Alternative. There was also a discussion about a 10 Year Alternative. However, it was clear there was no support for the 40 Year renewal. Because the Commission has approved license terms for less than 40 years on a case-by-case basis where there are concerns about safety risk to the facility or where a licensee introduces a new process or technology, we support the approval of the 20 Year Alternative. (35-3 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: Moreover, 87% of respondents to the Lower Richland Area (LRA) Westinghouse Electric Corporation (WEC) Perception Survey supported the 20-or 10-Year Alternative, and conversely, only 13% of our neighbors supported the 40 Year renewal option. This survey also revealed 59% of the directly affected parties, and 39% of the community-at-large believes WEC causes cancer, whether it is through groundwater contamination or through the air. (35-4 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: We write this e-mail, asking the NRC to consider extending the Environmental Assessment license for no more than 20 years, instead of 40 years proposed to the WEC Fuel Fabrication facility in Hopkins, SC. There have been several incidents at the plant recently (problem with a scrubber, drum fire, spiking station issues). WEC has a long history of repeated violations of safety and negative environmental impacts for residents in the Lower Richland

Community. The workforce deserves the highest quality of safety standards and a 20 year license holds the plant management to a more stringent criteria for safety protocol. (35-14 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: I am writing out of concern for the Westinghouse license renewal frequency. I understand they are asking for 40 years. This is a ridiculously long period of time. This should be no more than 20 years considering the threat to the community and to the Congaree Swamp. This is a dangerous process building these rods and now we know that they are being used in nuclear bombs. Given the problems and coverups, 40 years is far too long. This is common sense. Please stop the insanity. Grant a maximum of 20 year renewal. (36-1 [Cooper, Ira])

Comment: 2) The period of renewal: forty years is a long term for renewal given the current status of the report. It would be recommended to reduce the renewal period (e.g., 20 years, like the last renewal) for the following reasons:

a. Reducing the renewal period will allow for a formal examination for evaluation of environmental impacts on a more timely basis to ensure that the facility operator takes these matters seriously. The facility has a documented history of causing environmental impacts and spills including:

- Leaks from a buried pipe discovered in 2008 and 2011 released unknown amounts of uranium into the subsurface
- In 2012, level readings of the South Lagoon indicated that a leak had developed in the lagoon's liner, which had been recently replaced.
- In 2014, there was a leak from a tank transfer line from the Cylinder Recertification Tank (T1405) to the Waterglass Processing Tank (T-1160A).
- In 2015, a historic flooding event occurred in the area. As a result, two process lagoons were overfilled beyond containment. The West II Lagoon depth was approximately 38 cm (15 in.) beyond the liner onto the surrounding ground and remained within the berm.
- In 2016, a large mass of material inside the scrubber inlet transitioned. It was uranium that the mass for it exceeded the limit
- In 2018, the discovery of contamination within the sub-slab soils beneath Hydrofluoric Spiking Station (HFSS) #2. uranium was detected at levels exceeding the remedial action levels.
- In 2019, during a routine inspection of storage containers holding drums of uranium-bearing materials, it was discovered that the structural integrity of the storage containers was compromised. (39-2 [Ghanem, Sahar] [Plauche, Mary])

Comment: The renewal decision relies on contaminant mitigation measures that still need to be implemented. However, since there is no guarantee that those will be effective so contingencies should be developed. Given the deficiencies, a shorter renewal license term (e.g., 10 or 20 years) seems to be more appropriate. (39-4 [Ghanem, Sahar] [Plauche, Mary])

Comment: The NRC should not issue a 40 year license as requested by Westinghouse, but should instead choose a shorter license term given Westinghouse's history of violations and aging infrastructure. I believe 10 years would be a reasonable term. (45-1 [Hendley, Viola])

Comment: I don't think this operation should continue unfettered for forty years, their license needs to be considerably shorter they will be subject to an EIS more often. (46-1 [Gossett, Charles])

Comment: My comment is that I disagree with having this, this document in place for another 40 years. Oh no, that is definitely too long. This needs to be looked at every 5 years and renewed at that time. 40 years is too long. They have had too many problems out at that, out that place in Hopkins. It needs to, like I said it, be renewed every 5 years not just holding 40 years where they can just do anything and get away with, whatever is going on out there. (48-1-1 [Whitter, Patricia])

Comment: I think 40 years is entirely too long to have an extended contract. They should look at reducing the timeframe for the contract and also find a better way of communicating to people in the community about any leaks or anything that happens over there at the plant. (48-2-1 [Wilson, Carletta])

Comment: I'm just concerned more of the 40-year contract. If there is a spill or something, we that live in the neighborhood will be locked-in until it can be cleaned up. So, is there any way that the 40 years could be revisited? Rather than for 40 years maybe possibly 20, every 20 years, you know, reevaluate. (48-3-1 [Anderson, Shirle])

Comment: 40 years is too long. I think every five years it should have a review on. (48-4-1 [Brown, Andre])

Comment: And I would like to submit my No for another 40 years permit. I think it should be done on a yearly or every two or three year basis. My answer is no. (48-16-1 [McRant, Ella])

Comment: I am writing this e-mail, asking the NRC to consider extending the environmental assessment license for no more than 20 years instead of 40 years proposed from the Westinghouse Fuel Fabrication facility in Hopkins, SC. There have been several incidents at the plant recently (problem with a scrubber, drum fire, spiking station issues). Westinghouse has a long history of repeated violations of safety & negative environmental impacts for residents in Lower Richland. (50-1 [Woods, Felicia])

Comment: The LR community is asking for the NRC to grant Westinghouse an environmental assessment renewal not to exceed 20 years. The community response should be at the heart of the NRC's decision. The focus should be on helping our community to thrive and providing a safe environment for residents to live and work. (50-13 [Woods, Felicia])

Response: *The NRC has established a maximum license term of up to 40 years for new and license renewal of fuel cycle facilities that are required to submit integrated safety analysis summaries in accordance with 10 CFR Part 70, Subpart H, "Additional Requirements for Certain Licensees Authorized to Possess a Critical Mass of Special Nuclear Material" (see SRM-SECY-06-0186 [NRC 2006-TN6558, NRC 2006-TN6985]). The Commission also approved license terms for less than 40 years on a case-by-case basis where there are concerns about safety risk to the facility or where a licensee introduces a new process or technology.*

As part of the safety review the NRC staff is conducting in accordance with the AEA, the staff will determine whether there is reasonable assurance that the facility can and will operate in a manner that will not be inimical to the common defense and security and will adequately protect the health and safety of workers, the public, and the environment. And, therefore, whether the WEC's safety programs are adequate to ensure safe and secure operation for the proposed

maximum 40-year license renewal period. Otherwise, as discussed above, it is appropriate to consider a shorter renewal period.

In addition to the safety review, in the EIS the NRC staff analyzed the impacts on environmental resources from the proposed action (40-year license renewal), a 20-year license renewal term, and the no-action alternative (i.e., decision to deny the proposed 40-year license renewal request). Section 2.4.2 of the EIS describes both the no-action alternative and the 20-year license renewal alternative. The 20-year license renewal alternative was selected for analysis, in part, based on the last license renewal term approved by the NRC of 20 years. While the no-action alternative would result in denial of the proposed 40-year license renewal request, the CFFF can continue to operate through the expiration date of the current license in 2027. Section 3.17.2 analyzed the resource impacts of the 20-year license renewal alternative, finding that the environmental impacts would be similar to the proposed action's impacts.

Further, because the impacts of the 20-year license renewal alternative have been determined to be similar to the 40-year license renewal alternative, it is reasonable to conclude that the impacts of a license renewal term of less than 20 years (such as 15 or 10 years) would be bounded by the impact analysis in the EIS. Additionally, it is reasonable to conclude that the impacts of a license renewal term shorter than 10 years would be similar to those of the No-Action Alternative, which considers the impacts of continued operation of the CFFF until 2027 (when that current license expires) because a renewed term, if granted, would start on the NRC's approval date.

The NRC staff is recommending the 40-year license renewal as described in Section 2.6 of the EIS. NRC staff recognizes that, throughout preparation of the NRC's EIS, there has been community opposition to the proposed action or support for a shorter license renewal term. Uncertainties to the nature and pathways of contamination will be addressed through three proposed license conditions and under the Consent Agreement with the SCDHEC. License condition S-16 would require the WEC to enter groundwater and surface water results above Federal and State limits into its Corrective Action Program; license condition S-17 would require the WEC to resubmit its environmental sampling and monitoring program for NRC review and approval once either SCDHEC approves the WEC's final Remedial Investigation Report or within 5 years of the license renewal, whichever comes first. License condition S-18 would require WEC to submit its environmental sampling and monitoring program to the NRC for review and approval within 90 days of submittal of the CA final written report to SCDHEC. The S-17 and S-18 license conditions allow staff to re-evaluate the sufficiency of WEC's environmental monitoring based on the outcome of the ongoing site investigation as part of the Consent Agreement (under SCDHEC purview).

D.3 Comments Concerning Aquatic Ecology

D.3.1 Missing State Species

Comment: Also, please note that according to the SCDNR Heritage Trust Database, a repository for all rare and both federally and state threatened species data, there are several species that could potentially inhabit the site. Please see the attached table (Attachment A) of known occurrences of species within five miles of the site and a known element of occurrence from the SCDNR Heritage Trust Database of white catfish on the property and Mill Creek is likely to contain Flat Bullhead, Banded Killifish and Cedar Creek Crayfish. All these species are of moderate conservation priority under the South Carolina State Wildlife Action Plan¹.

¹SCDNR State Wildlife Action Plan www.dnr.sc.gov/swap (47-5 [Riggin, Lorianne])

Comment: For regulated species the following were missing from the appropriate tables.
* Table 3-3 should include the following state listed species: Spotted Turtle (threatened), Carolina Gopher Frog (endangered), Carolina Pygmy Sunfish (threatened), Southern Hognose Snake (threatened), and Wood Stork. (47-6 [Riggin, Lorianne])

Response: *The NRC staff reviewed the additional species recommended in these comments and agrees to add the suggested state species in Section 3.6 of the EIS. Section 3.6 of the EIS has been revised accordingly.*

D.3.2 Fish Surveys

Comment: As for the discussion that "the species compositions of Sunset Lake and Mill Creek are unknown," (page 3-52, line 8), we recommend inclusion of a commitment to conduct site-specific fish inventory that would serve as baseline data for subsequent monitoring and decommissioning work. (21-20 [Stanley, Joyce])

Comment: Based on the data, comprehensive biological receptor surveys should be conducted. The renewal of the license should not be granted until such time that the uncertainties are addressed or an adequate plan for addressing them is prepared. (39-16 [Ghanem, Sahar] [Plauche, Mary])

Comment: Page: 3-52

Line: 9-10

Current Wording: "The NRC staff identified no existing survey data about these aquatic features during its review."

Suggested Wording: "~~The NRC staff identified no existing survey data about these aquatic features during its review~~ **Aquatic Resources were evaluated as described in the NRC 1977 Environmental Impact Appraisal.**"

Justification: There is aquatic survey data available from the 1977 NRC Environmental Impact Appraisal. Suggest replacing sentence. (42-11-11 [Malek, Elise])

Response: *A fishery survey was conducted and documented in the NRC's 1977 Environmental Impact Appraisal (ML17292A037). The NRC staff reviewed this 1977 appraisal and determined that the fish counts were from the Congaree River and Sunset Lake combined (per Table 2.17 of the 1977 report). The species composition of Sunset Lake and Mill Creek remains unknown because it is uncertain which of the total fish were taken from the Congaree River and which were taken from Sunset Lake (and if they even sampled in Mill Creek). The species from Table 2.17 that could possibly inhabit Sunset Lake and Mill Creek, but remain unverified, include bluegill, golden shiners, longnose gar, bowfin, spotted sucker, yellow bullheads, brown bullheads, channel catfish, unified catfish, flier, warmouth, and black crappie.*

Notwithstanding, the NRC staff's impact analysis and determination of effects on aquatic species considered (1) that contamination in onsite surface water bodies (e.g., Sunset Lake) is being addressed by the WEC under the Consent Agreement with the SCDHEC, and (2) the SCDHEC conducted fish tissue sampling in August 2019 by the wastewater diffuser (and above/below it as controls) in the Congaree River and found (a) no signal of uranium; (b) that fluoride signals at the diffuser were not statistically different than the control sites; and (c) neither uranium nor fluoride were contaminants of concern for bluegills and sunfish. Further, as discussed in Section 3.3.2.3 of the EIS, the NRC staff expects that there is a low potential for significant contamination to move offsite via a surface water pathway and noticeably degrade water quality in Mill Creek downstream from the CFFF site boundary. The proposed continued

operation of the CFFF for an additional 40 years could result in future inadvertent releases that may contribute additional contaminants to the onsite surface water bodies. However, the potential for significant impacts on these water bodies that might result in offsite movement of contaminants would be minimized by the existing inspection, monitoring, and reporting requirements currently in place at the CFFF site, and those activities and programs are expected to continue at the site under the proposed action. The WEC's monitoring and sampling program includes fish sampling at the Congaree River on an annual minimum frequency that includes isotopic uranium and Tc-99. Therefore, if elevated levels of contaminants are identified, the WEC would be aware and would be able to take further action to investigate. Section 3.5.1.2 was revised to include information and context for the 1977 study.

D.3.3 Fish Hatcheries

Comment: And does the Westinghouse pollutant affect freshwater fish hatcheries that are in the area? I bring that up because one fish hatchery in the state is named after one of our ancestors, the Glenmore Shawry Hatchery (Phonetic.) so I'm concerned about that, because there is a fish hatchery in West Columbia, I'm not sure what the distance is from that, but that's the Cohen Campbell Hatchery (Phonetic.) and also the Barnwell Hatchery. (1-9-3 [Mitchum, Chief Michelle])

Response: *In Section 3.5.2.2 of the EIS, the NRC staff described the accumulation of uranium and fluoride in fish consumed by recreational anglers as a potential concern. The SCDHEC conducted additional fish tissue sampling (bluegills and sunfish) in 2019 near the plant's discharge pipe into the Congaree River. Uranium was not detected in the fillets and fluoride was within human consumption limits. Fluoride signals were also not significantly higher near the plant's wastewater diffuser than up- or downriver. Additionally, the Cohen Campbell fish hatchery is not affected by the CFFF because the hatchery (on an upriver tributary of the Congaree River) is located upstream of the CFFF discharge diffuser. The Barnwell Hatchery is not affected because it is part of a different river system (an upriver tributary of the Combahee River). No changes were made to the EIS as a result of this comment.*

D.3.4 Fish Sampling and Contamination Concerns

Comment: As part of the Consent Agreement, Westinghouse tested for uranium and fluoride near its outflow on the Congaree River, as well as two locations far downstream (centered at U.S. 601) and far upstream (centered at the Thomas Newman boat landing) from the out-take. Westinghouse has a permit for the outflow to discharge process wastewater, contaminated wastewater, and sanitary wastewater; the first two may include uranium. Results from the study indicated that fish at the discharge were in slightly poorer condition and had higher concentrations of fluoride than fish from the control sites, though no differences in uranium concentration were found. Westinghouse tried to argue away the results for fluoride by citing possible alternative explanations for the fluoride results, none of which were explicitly tested. To be clear, the test was designed to identify differences in CPOC's in fish tissues between the out-take and control sites, and differences were in fact detected. In the draft EIS, NRC noted that a single fish was sampled each year from the Congaree River near WEC's discharge. We consider that testing to be insufficient, and we recommend that additional testing take place at the discharge site, as well as Mill Creek and the Sunset Lakes; additional species such as freshwater mussels and macroinvertebrates should be sampled as well. (11-13 [Grego, John])

Comment: [The Department [DOI] is concerned that an existing subsurface contamination plume from the CFFF could have potential impacts to Congaree National Park (CONG) and the Congaree River as it migrates through a highly interconnected hydrogeologic system within the park....We recommend several strategies to address this concern as part of any renewal decision by Nuclear Regulatory Commission (NRC) for a WEC operating license...] The biological monitoring design also should be expanded in scope and detail to meaningfully detect and monitor potential bioaccumulation. The current approach, for example, does not account for important differences in biogeochemical cycling in the floodplain/Mill Creek area as opposed to the Congaree River and does not account for the potential use of tree tissue to map and monitor VOC plumes. Specifically, we request expansion of the frequency, density, sites, (event) triggers, and specific targets outlined by the monitoring program (see details below); and timely, transparent reporting of all monitoring data to National Park Service (NPS) at cong_resource_management@nps.gov. (21-4 [Stanley, Joyce])

Comment: The Department concurs with the NRC finding that "sampling of fish tissue in Mill Creek could potentially further reduce the impacts of the proposed license renewal," (page 3-29, line 15). Unfortunately, this additional mitigation measure is not a requirement being imposed upon the licensee as described in the EIS. The EIS does identify that, "The NRCs radiation protection regulations...also protect nonhuman biota (page 3-55, line 31)." We request that additional fish sampling should be required, especially with so many questions acknowledged regarding the source, transport, and fate of groundwater contaminants (which are inherently linked to both soil and surface water systems). (21-18 [Stanley, Joyce])

Comment: Fish sampling needs specific criteria for species, age, and size requirements as well as target tissues for analysis. Analyses should not use a single sample, but geometric mean of multiple samples. Sampling sites should also include Mill Creek. USGS research has shown huge differences in the bioaccumulation of mercury, for example, between the Congaree River and the Edisto River (<https://pubs.usgs.gov/sir/2009/5021/pdf/sir2009-5021.pdf>). The Edisto River is an intra-coastal plain system very akin to Cedar Creek at Congaree National Park and Mill Creek on the WEC CFFF. The differences in bioaccumulation are due to biogeochemical differences between blackwater (high dissolved organic load) and brownwater (high suspended [clay] load) systems. Other USGS studies support these complexities (<https://pubs.usgs.gov/bsr/2001/0009/bsr20010009.pdf>, <https://pubs.usgs.gov/wri/2000/4159/report.pdf>, https://toxics.usgs.gov/pubs/wri99-4018/Volume2/sectionB/2301_Krabbenhof/pdf/2301_Krabbenhof.pdf) while providing methodological references. Sampling frequency and density should also be significantly increased at both CONG and Mill Creek sites; frequency of monthly or quarterly - and at least late summer after typical low flow conditions may confine fish in areas with higher concentrations of contaminants - is suggested. Research at CONG, for example, clearly shows that fish do significantly disperse across the floodplain - to and from features such as Mill Creek - during high water events (<https://onlinelibrary.wiley.com/doi/abs/10.1002/rra.2828>). (21-19 [Stanley, Joyce])

Comment: SCDNR finds the sample size of one fish per year to be a poor indicator of uranium and Tc-99 levels. Appropriate sample sizes should include at least 3-5 individuals and samples should be collected at multiple locations to allow for statistical comparison. Suggested locations for additional fish sampling would include a site on Mill Creek above possible contamination and other sites within Sunset Lake and Gator Pond. (47-1 [Riggin, Lorianne])

Comment: I would consider this sampling plan for fish to be inadequate. I was curious and looked up some information on how other federal agencies treat sampling of fish and noted this

document I found linked from NOAA Fisheries Seafood Inspection webpage (CFR Title 50 - Part 260 <https://www.govinfo.gov/content/pkg/CFR-2009-title50-vol7/pdf/CFR-2009-title50-vol7-part260.pdf>), where on pages 842-846 I see that a typical sample size is far greater than 1 fish. (33-7 [Fleming, Jory])

Response: *As described in Section 3.5.2.2 of the EIS, the WEC collects and samples one fish per year by the plant's wastewater diffuser into the Congaree River as part of their NRC environmental sampling and monitoring program. The EIS also indicated that the SCDHEC conducted additional fish tissue sampling in August 2019 by the wastewater diffuser (and above/below it as controls) and found (1) no signal of uranium; (2) that fluoride signals at the diffuser were not statistically different than the control sites; and (3) neither uranium nor fluoride were contaminants of concern for bluegills and sunfish. The SCDHEC website (accessed January 2022) discusses findings and stated that no additional evaluation was planned due to the results of this study, unless new information warrants it.*

Additionally, SCDHEC intentionally selected bluegill and sunfish for these tests because they consume invertebrates and that makes them more susceptible to uranium contamination as described in Section 3.5.2.2 of the EIS. They would also be more susceptible to fluoride contamination, because it accumulates in the skeletal tissue of invertebrates these fish prey on. The low contamination levels in fish tissue therefore indicate that levels would also be lower for other trophic levels, which include invertebrates and mussels, in the Congaree River. See the SCDHEC website for additional information: <https://scdhec.gov/environment/environmental-sites-projects-permits-interest/westinghouse/westinghouse/westinghouse-bureau-water>.

Sections 3.3.1.2, 3.3.2.2, and 3.3.3 of the EIS also describe how contaminants present in onsite surface waters (e.g., Sunset Lake) are currently being addressed by the WEC under the Consent Agreement with the SCDHEC. Regarding ecological contamination concerns with Mill Creek and Sunset Lakes, in Section 3.3.3 of the EIS, the NRC staff identified a mitigation measure addressing further reduction of potential ecological impacts onsite through sampling of fish tissue in Mill Creek. This additional mitigation is not a requirement imposed upon the licensee. The WEC's monitoring and sampling program includes fish sampling at the Congaree River on an annual minimum frequency that includes isotopic uranium and Tc-99. Further, as discussed in Section 3.3.2.3 of the EIS, the NRC staff expects that there is a low potential for significant contamination to move offsite via a surface water pathway and noticeably degrade water quality in Mill Creek downstream from the CFFF site boundary. The proposed continued operation of the CFFF for an additional 40 years could result in future inadvertent releases that may contribute additional contaminants to the onsite surface water bodies. However, the potential for significant impacts on these water bodies that might result in offsite movement of contaminants would be minimized by the existing inspection, monitoring, and reporting requirements currently in place at the CFFF site, and those activities and programs are expected to continue at the site under the proposed action. No changes were made to the EIS as a result of these comments.

D.3.5 Congaree River Designation and Contamination Concerns

Comment: [The Department [DOI] is concerned that an existing subsurface contamination plume from the CFFF could have potential impacts to Congaree National Park (CONG) and the Congaree River as it migrates through a highly interconnected hydrogeologic system within the park...We recommend several strategies to address this concern as part of any renewal decision by Nuclear Regulatory Commission (NRC) for a WEC operating license...] *Congaree River and the Nationwide Rivers Inventory: A section of the Congaree River downgradient of the*

facility, from its confluence with Congaree Creek below Cayce to its confluence with the Wateree and Santee rivers, a reach of 45 miles that includes its entire course through Congaree National Park, is listed on the Nationwide Rivers Inventory (NRI). We have concerns regarding the outstandingly remarkable values (ORVs) of the river in the face of continued project operations and contaminant releases to the river. We administer the NRI as part of its legal obligations under the Wild and Scenic Rivers Act (WSRA). NRI-listed streams and rivers are considered potential candidates for inclusion in the Wild and Scenic Rivers System given the existence of ORVs such as scenery, geology, wildlife, and recreational potential. Pursuant to Section 5(d)(1) of the WSRA and related guidance, all federal agencies must seek to avoid or mitigate actions that would adversely affect NRI rivers. (21-6 [Stanley, Joyce])

Comment: [The Department [DOI] is concerned that an existing subsurface contamination plume from the CFFF could have potential impacts to Congaree National Park (CONG) and the Congaree River as it migrates through a highly interconnected hydrogeologic system within the park....We recommend several strategies to address this concern as part of any renewal decision by Nuclear Regulatory Commission (NRC) for a WEC operating license...] The Congaree River is a nationally significant waterbody, noted for its outstandingly remarkable scenic, recreational, geologic, fish, wildlife, historic, and cultural values. For this reason, the Department requests that the NRC address in the final EIS any potential impacts to the Congaree River's ORVs associated with the release of radiological or other contaminants. This should include characterizing fate and transport of water-borne contaminants and their potential cumulative ecological and human health risks in the downstream environment. (21-7 [Stanley, Joyce])

Response: *In Sections 3.1.1, 3.3.1, and 3.5.1 of the EIS, the NRC staff provided overviews similar to the one provided in these comments regarding the Congaree River and Congaree National Park. In summary, the CFFF is adjacent to the CONG and to a portion of the Congaree River that is listed on the NRI of the WSRA. Federal agencies (per a 1979 executive memorandum (Office of the President 1979-TN7067)) must "take care to avoid or mitigate adverse effects" on rivers on the NRI in relation to ORVs. The proposed action could affect the ORVs related to deterioration of water quality, but chemical discharges are within health standards, as described in the Section 3.5.2.2 on aquatic impacts. Continued operation of the CFFF could also potentially affect the ORV related to noise disturbance, but minimal noise from the plant is expected to reach the Congaree River because the CFFF site is approximately 5–6 km (3–4 mi) away.*

Additionally, in Section 3.5.2.3 of the EIS, the NRC staff concluded that the impacts on surface water resources would be SMALL because there is a low potential for contaminants to move offsite because of the implementation of activities and programs to minimize the effects of releases on other users of the local surface water resources (e.g., spill prevention controls, the environmental sampling and monitoring program). Section 3.19 of the EIS also addresses cumulative ecological and human health concerns in the "downstream environment" (i.e., Congaree River), which are mainly attributed to fish consumption. The Congaree River is impaired for copper and E. coli downstream of the CFFF discharge diffuser, but the CFFF discharge does not contribute to these contaminants. Additional fish tissue sampling near and downstream of the diffuser (downstream of Mill Creek) did not yield uranium signals; fluoride levels were within consumption limits; and fluoride levels were not significantly higher near the diffuser compared to an upriver control. No changes were made to the EIS as a result of these comments.

D.3.6 Aquatic Editorial

Comment: Page: 3-55

Line: 3-13

Current Wording: "A third potential aquatic concern is that Tc-99, uranium, and TCE were detected in surface water samples taken at the CFFF site in 2019 (WEC 2020-TN6526). However, contamination levels were below MCL levels in Sunset Lake and will continue to be addressed via the CA with the SCDHEC. Regarding uranium, all samples from Sunset Lake were less than 7% of the MCL (i.e., <2 ug/L of the 30 ug/L MCL [Table 4 in WEC 2020-TN6526]). Similarly, all Tc-99 samples were also less than 7% of the MCL (i.e., <50 pci/L of the 900 pci/L MCL) in Sunset Lake and there is a low potential for contaminants to move offsite (see Section 3.4 of this EIS). Regarding TCE, high levels were found in the drainage ditch between the CFFF buildings and Sunset Lake (i.e., 14 and 16 ug/L compared to the 5 ug/L MCL); however, TCE volatilizes rapidly in surface water (ATSDR 2019-TN6948) and that may explain why all of the samples taken in Sunset Lake were <21% of the MCL 5 ug/L (WEC 2020-TN6526)."

Suggested Wording:

Justification: Suggest removing all references to MCLs for surface water.

Surface water samples are not within the scope of EPA's drinking water standard and, as a result, no MCLs exist for these environmental sample types. In the absence of a regulatory standard, Westinghouse has instituted **internal investigation levels** for gross alpha in surface water of 50 pCi/L and gross beta of 300 pCi/L. These investigation levels are delineated in CFFF procedure RA-434, Environmental Data Management.

<https://www.epa.gov/dwreginfo/radionuclides-rule> (42-12-3 [Malek, Elise])

Comment: Page: 3-62

Line: 23-25

Current Wording: "...(2) onsite contaminations of Sunset Lake (i.e., uranium, Tc-99, TCE) during the 2019 site investigation have been below the MCLs (<7%) and continue to be addressed via the CA with the SCDHEC; and..."

Suggested Wording:

Justification: Suggest removing all references to MCLs for surface water.

Surface water samples are not within the scope of EPA's drinking water standard and, as a result, no MCLs exist for these environmental sample types. In the absence of a regulatory standard, Westinghouse has instituted **internal investigation levels** for gross alpha in surface water of 50 pCi/L and gross beta of 300 pCi/L. These investigation levels are delineated in CFFF procedure RA-434, Environmental Data Management.

<https://www.epa.gov/dwreginfo/radionuclides-rule> (42-12-7 [Malek, Elise])

Response: *The NRC staff agrees with the suggestions for clarifications regarding reported contamination levels and how these are reported with regard to exposure to aquatic species. Section 3.5.2.2 and Section 3.6.6.1 of the EIS have been revised to provide clarity.*

D.4 Comments Concerning Benefit-Cost Balance

D.4.1 Use of Proprietary Information

Comment: 2) Inability to Access Quantitative Information

I was also confused that the NRC has elected to withhold crucial information in the draft EIS that has prevented me from feeling like I can comment effectively. When I began to read through the draft EIS, I was looking for specific, quantitative information on the proposed costs and

benefits and thus read through Section 3.18. There is not a single number in the text of Section 3.18 concerning costs except for 3 numbers in Table 3-28, all of which are not environmental costs. I was surprised to learn that the content relevant to knowing the size, types, quantity, and other specific information about environmental costs is all in Appendix C. The fact that this quantitative information is fully laid out in Appendix C is helpfully mentioned 5 times in section 3.18. Appendix C is completely hidden from public review (see page C-1). I was very upset that I could not view any information on the size, types, quantity, or any other specific information on environmental costs because they are all in Appendix C. As just one example, section 3.18 says that “The proposed action poses the least disruptive alternative from the cost-benefit perspective” (line 3, page 3-129), but I cannot see numeric information of any of the costs. What if I disagree with the analysis or assumptions made in the economic analysis? What if I am concerned by some of the specific costs? How many costs are there? What is the number representing the costs' size, length of time over which they occur, etc.? What if the discount rate selected didn't value the future as much as I do? (33-2 [Fleming, Jory])

Comment: I called the NRC staff contact to ask if I could view information on environmental costs and was told no. I then asked why the NRC had made the decision to withhold this information from public view, and was surprised to learn that the company had made the decision to withhold the information by submitting an affidavit saying that any information they selected was proprietary information. When I asked if the NRC challenged, reviewed, or in any way judged whether this request was reasonable, I was told no. When I asked if anyone else could challenge this interpretation and ask for information to be available to the public, I was told no. As I write this letter, it still astounds me that I cannot view environmental costs in an environmental impact statement, because the company creating the cost has decided it is in their self-interest to prevent me from viewing it. I feel that this decision made by the NRC very clearly indicates my public comment has little value when weighed against a letter from the company. (33-3 [Fleming, Jory])

Comment: The decision in choosing between 20 years of renewal and 40 years of renewal appears to be primarily based on the cost benefit analysis (pp. 3-130). Appendix C is only listed, but the details are not shown; provide that. (39-12 [Ghanem, Sahar] [Plauche, Mary])

Response: *By letter dated December 18, 2020, the WEC requested that the proprietary portions of the responses to the NRC staff's requests for additional information be withheld from public disclosure pursuant to 10 CFR 2.390. The WEC's accompanying affidavit (at ADAMS Accession Number ML20353A336) explains the basis for the request. The information sought to be withheld is specific to the cost-benefit analysis in the EIS. While the NRC staff documented the cost-benefit analysis of the proposed action and alternatives in a nonpublicly available appendix to the EIS in consideration of the 10 CFR 2.390, Section 3.18 of the EIS discusses the staff's analysis and conclusions without disclosing the proprietary information. Section 3.18 of the EIS has been updated to provide additional information about the analysis that was conducted, including the discount rates used.*

D.5 Comments Concerning Cumulative Impacts

D.5.1 Cumulative Impacts - Other Past, Present and Reasonably Foreseeable Activities

Comment: Again my name is State Representative Annie E. McDaniel, and I represent all of Fairfield County, a portion of Chester County, and also a portion of Richland County, and we do have the nuclear reactors from now Dominion Energy located within Fairfield County, and I'm

also very concerned about what happens in East Dover with the Westinghouse Plant, as it is still a portion of the great state that I reside in, and that is the State of South Carolina. (1-1-3 [McDaniel, Annie E])

Comment: So, I want to say that one, I reside in the Lower Richland community, and grew up in this area, and I come from a family that has about five generations of relatives that grew up in this community, and I was really pleased to hear the president lay out his vision for America that included tackling the climate crisis, and confronting our racial inequities, and possibly solving the most pressing problems of our day while ensuring that public health is a priority. And it was interesting also to hear the EPA administrator, Michael Regan, talk about the first 100 days, and that the EPA work force was moving with urgency to deliver on this administration's agenda. What was problematic, or what has been problematic is to know that I live in a community that the president says he is focusing on, and we're still plagued with racial inequalities, or inequities. That our most pressing issues are a nuclear power plant, a coal powered plant, a paper plant, and a fiberglass plant all in our community. (1-2-1 [Reese, Robert])

Comment: Again, the ground water contamination is the main concern from a health, and environmental point of view. And the NRC, and Westinghouse have failed to properly address the disproportionate, and harmful impacts of future facility operations on the surrounding poverty area frequently referred to as the environmental justice community, including the cumulative, and synergistic impacts of other sources of pollution in the area. And as Chief Mitchum mentioned, Hopkins is designated as a medically underserved population, and area, and as such it requires a higher level of protection from contaminants which could threaten the health of the community. (1-8-4 [Preston, Priscilla])

Comment: What best science methodologies, or best practice standards has the NRC directed Westinghouse to implement to eliminate exceeding water quality standards of uranium in residential screening levels if the pollutants, and contaminants are limited to Westinghouse site only as previously indicated, why are Mill Creek sediments affected by the Westinghouse activity? Has the NRC fined, or reprimanded Westinghouse for past exceedance of water quality standards, and the current exceedance of uranium residential screening levels in Mill Creek sediments? And that's a quote right out of the draft, since 1969. And based on the evidence, the evidence based history of Westinghouse, the NRC seems to have concluded that the, and I'm quoting again, the cumulative impacts to ground water, and surface water from past, and current operations are moderate, and I have to defer back to a previous commenter that this sounds very high risk to me. (1-9-9 [Mitchum, Chief Michelle])

Comment: We in Lower Richland not only have to deal with Westinghouse, we have other polluters in the area. So, for you to take into consideration the air, and the water pollution that affects us in Lower Richland, we have, and you at NRC should take that into consideration when you talk about giving a 40 year permit. It's a compound of paper mills, of coal burning power plant, of a huge land fill, and then you're going to give Westinghouse a 40 year permit without even taking into consideration the compounding affects of us living in an EJ community with all those things that are killing us health wise. A lot of people in my community don't have access to healthcare. They don't have health insurance. All of those factors should be taken into consideration before you make a decision to give Westinghouse a 40 year permit. (1-13-6 [Sanders, Virginia])

Comment: [Westinghouse can't be trusted with a new 40 year license...] The NRC and Westinghouse have failed to comply with Environmental Justice regulatory requirements. While acknowledging that the Westinghouse Nuclear Fuel Fabrication Facility is sited in a

predominately African American and low income residential community, with numerous additional sources of environmental hazard including an adjacent Superfund Hazardous Waste Site and the nearby Wateree coal-fired power plant, NRC and Westinghouse have failed to properly address the disproportionate and harmful impacts of future facility operations on the Environmental Justice (EJ) community or poverty area, including the cumulative and synergistic impacts of other sources. (7-4 [Cothran, Penny Delaney])

Comment: I have been living within a half-mile of an asphalt plant for about 15 years. This facility is helping to pave the Grand Strand. It is also affecting the health and quality of life of our community. The community around the Westinghouse plant is similar because there are known and as yet unknown health impacts to the surrounding residents. (32-2 [Gifford, Grace])

Comment: The EPA concerns are based on past operational incidents and violations over the last 15 years, including one which occurred as recently as August 2021. A Health and Safety Plan consistent with Occupational Safety and Health Administration guidance was submitted by CFFF to the South Carolina Department of Health and Environmental and Control (SCDHEC) in response to a Compliance Agreement (CA). On August 17, 2021, CFFF reported to the NRC that an individual working in the facility suffered chemical burns and was contaminated with radioactive material. There have been incidents onsite where radiological contaminants have been released to the environment outside of the production area for reactor fuel fabrication, but no contamination has been detected offsite.

Recommendations

To better understand the overall compliance issues with CFFF over the past 52 years, we recommend that a non-compliance table be developed showing air releases in chronological order. We also provided more specific recommendations to NRC that should be more clearly addressed in the Safety Evaluation Report and summarized in the Final EIS related to uranium concentrations, level of impacts for workers, and updates on reported employee injuries (See EPA Specific Comments dated November 10, 2021). Additionally, the EPA recommends that a more in-depth analysis be conducted to estimate the cumulative impacts from air releases to the environment and local communities (including down-wind communities). (34-1-1 [Fite, Mark])

Comment: Environmental protection and groundwater contamination has been an issue at the Westinghouse CFFF for years. The effects on the environment from the 2015 historic flooding event and multiple leaks or spills that have resulted in the contamination of the subsurface at the CFFF and an injured workforce are all of great concern to us and our community. (35-5 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: Our community has been affected by environmental injustices from a variety of corporate entities. Our pristine ecosystem is threatened by the smallest changes in its biological makeup, and the NCR licensing process is one way for this rural community to enlist regulatory assistance to address environmental and workforce safety needs. (35-16 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: Of course, they're building this big ole meat plant up here just a few miles up here from me, so it's going to be in the same area as this nuclear plant. So, we don't know how that is going to affect that plant. (48-10-3 [Anonymous, Anonymous])

Response: *Environmental resource-specific impacts from the proposed continued operation of the CFFF for an additional 40 years are described in the relevant resource sections of Chapter 3. In particular, Section 3.16.3 describes the environmental justice impacts of the proposed action, for which the NRC staff found that no disproportionately high and adverse health or*

environmental effects would result from the proposed action when considered with effects of other past, present, and reasonably foreseeable activities in the geographic region. Furthermore, a list of all existing and reasonably foreseeable projects, activities, and actions in the geographic region with effects that have a reasonably close causal relationship to the license renewal for the CFFF project are listed in Section 3.19 of the EIS. These include projects that the individuals raised in the comments submitted on the draft EIS. As discussed in Chapter 3 and Section 3.19, the small incremental impact contribution from the proposed action would not result in a collectively significant impact when considering the effects of other past, present and reasonably foreseeable projects, except for surface water and groundwater resources.

Past operations of CFFF have had a noticeable effect on the water quality of the onsite groundwater that continues to be observed in the most recent data and, therefore, the NRC staff concluded that the cumulative impacts on groundwater would be MODERATE. Further, as described in Section 3.2.4 of the EIS, the impact from the proposed action on groundwater resources would be SMALL to MODERATE and would not result in a collectively greater impact on groundwater resources, which are currently assessed as MODERATE. Similarly, past operation of CFFF has had a noticeable effect on the water quality of the onsite surface water bodies. While the NRC staff found that cumulative impacts on surface water from past and current CFFF operations activities are moderate, the incremental surface water impacts from the proposed action would be SMALL and would not result in a collectively greater impact on surface water resources (see Section 3.3.4). The EIS was revised to add a new section (3.19) in Chapter 3 that summarizes the detailed cumulative impacts analysis documented in Section 3.19 of the EIS.

Regarding the August 17, 2021, unplanned medical treatment event at the CFFF (EN55412) in which an employee was washing piping over a container of nitric acid and received nitric acid burns to the hands and left wrist, the NRC staff reviewed the event in accordance with MD 8.3, "NRC Incident Investigation Program." The NRC staff's findings were documented in the Integrated Inspection Report 07001151/2021004 dated January 14, 2022 (ADAMS Accession Number ML22012A238). As documented in the inspection report, the "inspectors reviewed licensee records to verify that the potential spread of contamination was minimized by wrapping contaminated areas in plastic prior to transport by ambulance and that a licensee HP [health physics] technician accompanied the worker in the ambulance in accordance with licensee procedures. Smear samples taken at the site, ambulance, and hospital confirmed that smearable contamination was below the licensee's free release limits and there was no spread of contamination." No violations of NRC requirements were identified and the item was closed.

D.5.2 Cumulative Impacts - Climate Change

Comment: And that the climate is wreaking havoc on Lower Richland. There's a reason why we're called lower, and not just Richland County. The demography of our area is that we are at the lower part of the county, so flooding is more prevalent, and that we have a nuclear plant right next door to the state's only national park, a swamp. And it's interesting also, that we just had a hundred year flood that impacted our area, and as many of us know on this call, we've got the expectations for increased rainfall for the next few years because of the way that water is being evaporated from our oceans. And then we're having higher incidence of rainfall, and the water is just collecting in our community, and that water is also migrating to the Westinghouse area, and impacting the floor, or whatever contaminants that are there on that plant.
(1-2-2 [Reese, Robert])

Comment: Thank you. Again, Grace Gifford, I live in Horry County, my congressman, Tom Rice, has spent a lot of time recently dealing with flooding. We have money to buy out many homes, and the fact is that we really don't know where the next flood is going to come. I expect the same thing is true in Hopkins, and with the recent tropical downpours that we've had cars washing off the road from not even a hurricane, just some rain, it does concern me that there is a building that has toxic substances in it that could be swept out by flood waters. So, the intergovernmental panel on climate change, ITCC has come out with their report, code red, and one of the things that they specify is that it would take 20 to 30 years to see how global temperatures stabilize. So, a 40 year lease, or permit would be well beyond the 20 to 30 years. So, things with our climate are happening very quickly, and we need to not make any assumptions that we know how water is going to go, or what our weather is going to be like. (1-11-1 [Gifford, Grace])

Comment: We have a community that is low lying, we have a community that is called Lower Richland, we have flooding that happens in our community, and on top of the flooding that happens in our community, at the upper end of our community it's about to be expansive residential development. Which will do away with the trees, which will do away with eroding, which will cause additional flooding that goes right down to Westinghouse, that will then push more, and more water into the Congaree River all through that Westinghouse site. I rode by there Sunday, and there was standing water all over Westinghouse's facility. The water's just standing there after the long rain that Ms. Sanders just talked about that we had all last week. And as I realized that their predictions of rain are for even more rainfall levels in the years to come, rainfall levels that would then have detrimental impact on an aging plant. (1-17-3 [Reese, Robert])

Comment: [The Department [DOI] is concerned that an existing subsurface contamination plume from the CFFF could have potential impacts to Congaree National Park (CONG) and the Congaree River as it migrates through a highly interconnected hydrogeologic system within the park...We recommend several strategies to address this concern as part of any renewal decision by Nuclear Regulatory Commission (NRC) for a WEC operating license...] *Long-term Development, Climate Change, and Flood Forecasts:* The current framework underestimates ongoing development pressures and climate change impacts to the watershed, floodplain, and surrounding community. Local development pressures are particularly intense in the area, which will likely continue to increase over the next 20 to 40 years. All of this has significant bearing on potential: (a) flood risks from increased impervious surfaces in the Mill Creek Watershed, (b) increased transportation and traffic impacts associated with new development, and (c) public health impacts. These changes are compounded by climate change, which is already showing trends towards increased precipitation events in the Congaree River watershed and across the southeast. (21-5 [Stanley, Joyce])

Comment: She cites long-term development in the area, climate change and flood forecasts as other issues that need to be addressed. There is much more in her seven page report. (28-3 [Weems, Elizabeth])

Comment: The DEIS states that the CFFF is in an area where climate change is actively impacting the facility from severe weather events by increased temperature and increased precipitation (and floods) from the extreme weather events such as hurricanes. The events are anticipated to occur at greater frequency and magnitude. These effects increase the potential for local flooding, as the flooding event of October 2015 may have demonstrated, and thereby increase the potential of fate and transport of contaminant releases to the surficial aquifer systems and the cumulative impacts to downstream users on the Congaree River.

Recommendations

The EPA recommends that the discussions in Section 3.7.1.6 "Climate Change" about climate events provide a more in-depth discussion for impacts locally at CFFF due to climate change. The EPA recommends the Final EIS, and the Safety Evaluation Report include a more in-depth discussion on the cumulative effects associated with severe weather events that could potentially impact the local and down-stream communities, as well as preventive measures the CFFF can introduce to mitigate the impacts to local and down-stream communities.

Specifically, the EPA recommends that the NRC consider in its decision-making:

- (1) the ongoing and long-term risks posed by climate change where nuclear facilities and associated structures are placed, (i.e., floodplains), and
- (2) if such infrastructure is in areas with elevated risk of damage due to climate change, investments should be made to increase the resilience of the facility infrastructure. (34-1-7 [Fite, Mark])

Comment: The NRC should also consider requiring applicants to develop climate adaptation plans informed by the U.S. Fourth National Climate Assessment. Additionally, the EPA recommends that the NRC consider in the NEPA analysis potential climate impacts, including, but not limited to, rising sea levels, drought, high intensity precipitation events, and increased fire risk. (34-1-8 [Fite, Mark])

Comment: Since global warming is expected to significantly affect the climate over the term of the proposed renewal period, the report should include a section which evaluates how the facility may be affected and what measures, if any, are planned to ensure safe operations. (39-14 [Ghanem, Sahar] [Plauche, Mary])

Comment: The EIS should more thoroughly evaluate the potential impacts of climate change and upstream development, and the associated increased risk of spills, leaks or other releases of pollutants. Climate change is expected to result in extreme rainfall events with increased frequency and intensity, as well as increased flooding risks. This facility has already experienced at least two documented releases from the wastewater lagoons on site (the 1971 leak, and the 2015 flooding event) and the cumulative effects of climate change and increased development are likely to increase the risk of future similar events. Additionally, the increased risks associated with climate change and upstream development also favor a shorter license term than the proposed 40 years. (43-1 [Stangler, Bill])

Comment: The EIS should more thoroughly consider the potential impacts of climate change, specifically increased extreme weather events like flooding, and how that could result in additional spills and releases of pollutants into the environment. (45-3 [Hendley, Viola])

Response: *Section 3.7.2.3 discusses the greenhouse gas contribution from the proposed operations of the CFFF for an additional 40 years. The WEC is a minor source and has not previously been subject to South Carolina Prevention of Significant Deterioration (PSD) standard evaluation. The actual 2020 emissions are lower than the 25,000 T threshold and the WEC is currently not required to report to EPA. Additionally, the estimated greenhouse gas emissions are below the 75,000 T/yr CO₂eq threshold in the Greenhouse Tailoring Rule for major source provisions requiring best available control technology. Section 3.19 of the EIS also acknowledges that climate change, including the increased frequency of hurricanes, intensification of drought and extreme rainfall events, warming winter temperatures, and changing fire patterns, may have an impact on the CFFF and the region. Section 3.19 cites the 2018 Fourth National Climate Assessment (GCRP 2018-TN5847), which highlights the effects of these changes.*

Furthermore, the NRC's regulations at 10 CFR 70.62 includes the requirement for licensees to establish and maintain a safety program that demonstrates compliance with performance requirements in 10 CFR 70.61. The safety program includes process safety information, integrated safety analysis (ISA), and management measures. The NRC reviews the safety program, including the ISA program and the ISA Summary, to determine whether the applicant has established an ISA program that complies with and will continue to comply with 10 CFR Part 70, Subpart H. Also, the NRC's oversight function includes inspection of licensed facilities to verify that the elements of the safety program are being implemented and maintained. In accordance with Subpart H of 10 CFR Part 70 (TN4883), the WEC performed an Integrated Safety Analysis (ISA). ISA is defined in 10 CFR 70.4 as "... a systematic analysis to identify facility and external hazards and their potential for initiating accident sequences, the potential accident sequences, their likelihood and consequences, and the items relied on for safety." The ISA evaluates the licensee's compliance with performance requirements described in 10 CFR 70.61, which require that controls be implemented to make credible high-consequence events highly unlikely or their consequences less severe than those in 10 CFR 70.61(b)(1)–(4) and to make credible intermediate-consequence events unlikely or their consequences less severe than those in 10 CFR 70.61(c)(1)–(4). The WEC's license renewal application describes the ISA methodology and management measures. The NRC's safety review of the LRA includes an assessment of accident scenarios caused by man-made and natural hazards such as flooding. No changes were made to the EIS as a result of these comments.

D.5.3 Cumulative Impacts - Tritium-Producing Burnable Absorbers Rods (WesDyne Operations)

Comment: One thing that hasn't been mentioned is the problem of Westdyne, I believe that's been considered out of scope. But I don't think that the fact that you have a nuclear weapons facility, something making TP bars for nuclear weapons within the same facility, and it's unclear how it's regulated, and what sort of contaminants are coming from it, that's a huge concern. So, before any additional licensing goes into effect, we need to know who is responsible for that facility that's on the Westinghouse property. (1-8-6 [Preston, Priscilla])

Comment: So, one final thing about the tritium rod fabrication, the tritium producing burnable absorber rods. This makes the Westinghouse facility a dual military commercial facility, no way around it. And that is of real concern from a nuclear nonproliferation perspective, but concerning potential waste from the facility, the EIS made the determination, as was said earlier, that the TP bar issue is outside the scope. Yet there was no documentation, or comment, or anything, explanation as to why it was determined to be outside the scope. They left the issue as hanging. This has to be addressed. (1-10-5 [Clements, Tom])

Comment: Now, I'm writing a report about the TP bar matter, and I want to reveal a little bit to everybody who is listening right now, that contradicts what the NRC has said. The NRC has said that the DOE's National Nuclear Security Administration regulates the TP bar fabrication, but NNSA is not a regulatory agency, as the NRC knows. Now I want to quote from DHEC this month. DHEC has issued the air, and MPDES permits for the Westinghouse Columbia Fuel Fabrication Facility, and the facility is registered as a large quantity hazardous waste generator. Hazardous waste generated at the facility, including any hazardous waste resulting from the production of the TP bar assemblies is managed under the Westinghouse Fuel Fabrication Facility hazardous waste registration. Yet the draft EIS totally excludes TP bar fabrication, and thus the waste streams, from discussion. DHEC further told me a couple weeks ago, all of the manufacturing at the Columbus facility is done by the Westinghouse Columbia Fuel Fabrication Facility, including the manufacture of the TP bar assemblies. Westinghouse Government

Services does not have manufacturing operations at the Columbia facility. Then, a few days later, in response to another question, DHEC said we do not have any permits issued to WesDyne, and WesDyne does not have any manufacturing operations at the Westinghouse fuel facility, and for those of you that don't know, there's a little bit of confusion of who is producing the TP bars, is it WesDyne, or the subsidiary Westinghouse Government Services. DHEC says it's Westinghouse. So, if it's Westinghouse, the draft EIS needs to discuss the waste streams that are being managed by Westinghouse, and I'll conclude with a citation, or a reading from a Freedom of Information Act request response that I got from the National Nuclear Security Administration concerning the NNSA, NIS for the WesDyne contract, and this was from 2017. It says the contractor, who they indicate is WesDyne, will provide for ultimate disposal of waste products, including coordination with Pacific Northwest Labs as appropriate from the fabrication process. And the contractor is responsible for the waste. So, what is going on with TP bar manufacturing? I don't care who is licensed to do it, it sounds like the waste is going to the Westinghouse side of the plant, and this needs to be discussed more fully in the environmental impact statement, and I'll file my probably 20 page report on the matter for the record. Thank you very much. (1-10-6 [Clements, Tom])

Comment: They have another company, WesDyne, on their facility. We have been asking our DHEC office for the last two years about WesDyne, and they refuse to give us information on it. They pretend that they didn't even know that WesDyne was operating on that plant. Now the NRC is telling us that they're not in charge of inspecting WesDyne, DHEC isn't in charge of inspecting WesDyne, so pray tell, who is in charge of inspecting WesDyne? Who is in charge of telling us, or letting us know what kind of pollutants are being discharged along with the Westinghouse discharge? Which would be a double whammy on us, the members of this community. (1-13-4 [Sanders, Virginia])

Comment: My other comment is also going to be about WesDyne, and we know that you all cannot answer these questions, and yet I just want to make sure that people are aware of a couple other angles about WesDyne. They have a separate -- as a subsidiary of Westinghouse, they actually are a separate company, they have their own EIN, their own way to pay their taxes to the feds, and they make money, and they're not paying the Richland County taxes. They did not tell Richland County that they are a company operating in the county, that is required by law. They have been skipping out for I don't know how many years, that should alarm our representatives that a company regulated by another part of the federal government, if NRC is not regulating it, that they can do this hide, and hope no one seeks game. It's patently unfair, and really borders on illegal. I don't know if you all can look into the fact that Westinghouse is their cover. Certainly Westinghouse is aware that they are there, because they comingle the emissions, they're not separated, they use the same smoke stacks, they use the same other ways that they emit pollution, the way it's discharged. So, I think NRC really needs to take a close look at what WesDyne is doing, and support our state, and our county, and don't allow companies to have cover for other companies who are for profit companies, and not behaving legally. And I understand that's not the job of NRC, but I want the listeners who are remaining on this line to understand how serious, and compounded the issues are with WesDyne. It's not just that their wastes are not separated, so we don't know what they're contributing, we don't know what the technetium plume is from, I wonder what else is there that hasn't been caught yet, and we don't know where it's from. That is no way to run any business at all, in any way, shape, or form. (1-15-4 [Greenlaw, Pamela])

Comment: Please consider my comment on the Draft EIS for the Westinghouse fuel plant: It has come to the attention of residents in Columbia SC that the hazardous waste streams from processing TPBARs do not come under the regulating and licensing of the NRC. This seems to

be a dangerous oversight. Please make sure this is required before any new license or extension for Westinghouse is issued. (3-1 [Williams, Joanne])

Comment: Please provide a full explanation of the management of waste streams from TBAR (Tritium Producing Burnable Absorber Rods) production at Westinghouse Government Services and how they are regulated. Is it not required that this process be regulated by the NRC? I live 30 minutes from the facility and I am deeply concerned about the waste and the lack of regulations at Westinghouse Government Services. NRC must regulate them and require an environmental impact statement. (4-1 [Fralix, Cassandra])

Comment: [Westinghouse can't be trusted with a new 40 year license...] Westinghouse Government Services, LLC, a duly registered company with the SC secretary of state, appears to be operating under the same roof as the Westinghouse fuel fabrication facility, where uranium rods are fabricated for foreign and domestic nuclear power plants. Westinghouse Government Services, previously known as WesDyne, produces specialized rods that are irradiated to produce tritium gas for nuclear weapons. The Nuclear Regulatory Commission claims it does not regulate the facility and the SC Department of Health and Environmental Control says it has issued no permits to the facility and that waste goes to the fuel plant. It is unclear who is regulating the facility or what sort of contaminants it is generating. (7-10 [Cothran, Penny Delaney])

Comment: On page 35 of the same document more is indicated about WEC's "TPBAR HVAC Replacement," noting the value of TPBARs in the facility: TPBAR cladding has a special coating causing it to have a fairly high value of roughly a couple thousand dollars each. At current production levels, we have roughly up to 1,800 cladding tubes in various stages of production. A completed TPBAR is valued at roughly \$11,000, meaning at any given time in TPBAR we could have anywhere from approximately \$4 million to \$20 million worth of product that we would risk having to scrap should we lose the ability to control humidity. The current DX Split System HVAC unit for TPBAR is approaching 20 years old. The expected life of such units is 15-20 years. Internal components of the unit have become obsolete and difficult to find. Over the past year and a half the unit has required numerous repairs. One such repair required parts found only on Ebay, an unreliable location to find parts. There is a leak in the unit as maintenance has had to add refrigerant more than once over the last year and a half. The required refrigerant is being phased out and federal regulations stipulate how much and how often that particular refrigerant can be added to a unit. As the leak worsens, we risk not being able to use that unit at all due to the federal regulations. The above confirms a WEC role in TPBAR facility maintenance. If WEC is admitting that TPBAR fabrication is in its facilities, or that it is in charge of maintenance aspects of those facilities, how can it be that such activities are not covered by WEC's NRC license? (9-1-1 [Clements, Tom])

Comment: What this search reveals is troubling. It appears that WesDyne does not have a business license in Richland County and has not paid county business taxes. Thus, how can it operate without a business license and without paying taxes? Richland County should investigate this situation. This issue of the status of businesses license and payment of taxes by Westinghouse subsidiaries is possibly of greater concern given that the area nearest to the WEC facility in Lower Richland has a large African-American population that is paying more attention to how Westinghouse operates. (9-1-2 [Clements, Tom])

Comment: Then, on August 20, Mr. Porter, in response to another inquiry by SRS Watch further clarified DHEC's understanding about WesDyne operating at the Westinghouse fuel plant or not: We do not have any permits issued to WesDyne, and WesDyne does not have any

manufacturing operation at the Westinghouse fuel facility. Do the DHEC emails reveal that WEC itself is producing waste from TPBAR manufacture? If so, why isn't such waste being regulated by the NRC and being reviewed in the draft EIS? (9-1-3 [Clements, Tom])

Comment: There appears to be no doubt that WEC is involved in aspects of TPBAR management, and possibly fabrication. But how can WesDyne, which appears to be an independent subsidiary, be doing the TPBAR fabrication without the required air-discharge permit and a National Pollutant Elimination System (NPDES) permit that it should have? How can WesDyne be operating under the WEC permits that would apply to the uranium fuel fabrication part of the facility? These questions must be answered in the EIS. (9-1-4 [Clements, Tom])

Comment: If the Westinghouse Electric Company, which operates the fuel fabrication facility, also operates TPBAR fabrication under the same environmental permits as the uranium fuel fabrication part of the operation, then waste streams from TPBAR manufacture are under the control of WEC and thus must be covered in the Environmental Impact Statement being prepared on the license renewal for WEC. (9-1-5 [Clements, Tom])

Comment: Those waste streams, apparently passed from the TPBAR area of work to the uranium fuel fabrication area, may become indistinguishable from fuel fabrication waste at some point and thus can't be separated out in the EIS analysis. Thus, the TPBAR operations are not "outside the scope" of the EIS, as claimed by the NRC in the summary of "scoping" comments received in advance of preparing the EIS on the facility's license renewal. (9-1-6 [Clements, Tom])

Comment: DHEC affirms that WesDyne has no stand-alone air permit and no National Pollutant Discharge Elimination System (NPDES) permit, both of which are required, and says that WesDyne operates under the WEC permits (9-1-9 [Clements, Tom])

Comment: It appears that there is no NRC inspection of TPBAR fabrication or waste production or waste management though there may be a NRC requirement for a Quality Assurance program covering TPBAR fabrication; (9-1-10 [Clements, Tom])

Comment: There is no accounting for management and disposal of waste from TPBAR fabrication and thus no NRC reports of any kind about TPBAR activities taking place under the roof of the WEC facility; (9-1-11 [Clements, Tom])

Comment: The draft EIS must clarify who regulates TPBAR operations and what wastes it produces and how that waste is managed. That information must not be classified. (9-1-12 [Clements, Tom])

Comment: The final EIS, due in early 2022, must discuss TPBAR waste streams and offer full explanation, based on regulations and law, as to why the NRC claims it does not regulate the TPBAR area of the WEC facility or the waste from it. (9-1-15 [Clements, Tom])

Comment: The draft EIS mentions the Scoping Process Summary Report but the response to comments that were captured are inadequate. For example, things related to WesDyne (Westinghouse Government Services, LLC) were determined to be "outside of scope" of the EIS. Why? No explanation for that determination was given. The draft EIS concludes that WesDyne is outside the scope of the EIS and says this has been excluded: "concerns regarding regulation and oversight of dual-use facilities, including the relationships to U.S. Department of Energy's National Nuclear Security Administration." Documents on any

agreement between the NRC and Westinghouse Government Services and/or WesDyne and/or between the NRC and Westinghouse fuel plant as it pertains to fabrication of Tritium Producing Burnable Absorber Rods (TPBARs) must be presented for the EIS record. (9-3-5 [Clements, Tom])

Comment: Documents must be presented to back up the NRC's unsubstantiated claim that WesDyne operations are "outside the scope" of the EIS. On this matter, DOE's National Nuclear Security Administration must be engaged as a cooperating federal agency in preparing the draft EIS. More on the WesDyne matter will be presented later and in a separate comment. (9-3-6 [Clements, Tom])

Comment: Does the applicant, Westinghouse Electric Company LLC (WEC), have subsidiaries engaged in any activities at the Westinghouse facility that should be regulated by the NRC? Are the entities WesDyne International, LLC, Westinghouse Government Services or Westinghouse Government Environmental Services Company LLC or any other subsidiary engaged in any activities at the Westinghouse fuel plant that require Richland County business licenses, NRC licenses or SC DHEC licenses? Do any of these companies produce or manage any type of waste that is or should be covered in the draft EIS? If such waste are not covered by the draft EIS, why not? If the WEC facility is relicensed, will any WEC subsidiaries be required or should be required to seek similar relicensing or licensing by the NRC and state and county authorities? (9-4-20 [Clements, Tom])

Comment: The South Carolina Department of Health & Environmental Control (DHEC) says that WesDyne produces hazardous waste and that it goes to the fuel fabrication side of the Westinghouse facility. Thus, what is the role of WEC in managing that waste? (9-5-18 [Clements, Tom])

Comment: DHEC affirms that neither WesDyne nor Westinghouse Government Services have no stand-alone air permit and no National Pollutant Discharge Elimination System (NPDES) permit, both of which are required, and says that TPBAR fabrication is being done under the WEC environmental permits. Is this the case? (9-5-19 [Clements, Tom])

Comment: It appears that there is no NRC inspection of TPBAR fabrication work -perhaps being done under some form of generic Quality Assurance program -no accounting for management and disposal of TPBAR waste and thus no NRC reports of any kind about TPBAR activities taking place under the roof of the WEC facility. How is this possible and why aren't these activities covered in the EIS? (9-6-1 [Clements, Tom])

Comment: The draft EIS must clarify who regulates TPBAR operations and what wastes it produces and how that waste is managed. This information must not be classified and must be included in the EIS record.

Something is very fishy about TPBAR fabrication and waste streams from that part of the WEC facility. The TPBAR issue and waste from it demands explanation from the NRC. (9-6-2 [Clements, Tom])

Comment: It thus appears that WesDyne is essentially unregulated and its operation for nuclear-weapons related activities inside WEC facilities makes the Westinghouse facility a dual-use civilian-military facility. Does the NRC allow such dual use civilian-military activities at facilities it regulates? If so, under what law or regulation? Please discuss and provide document for the EIS record. (9-6-3 [Clements, Tom])

Comment: Even if some form of confidential agreement is in place between NNSA, Westinghouse, WesDyne and/or the NRC, such operation clearly crosses the imaginary red line between civilian and military nuclear operations and poses a risk to international nuclear non-proliferation norms. Thus, what NRC non-proliferation policy allows TPBAR fabrication, a nuclear-weapons related activity, in a civilian facility? (9-6-4 [Clements, Tom])

Comment: It is inexplicable that waste from the TPBAR operation are unregulated. If the TPBAR production is operating under WEC air and NPDES permits and if the waste from TPBAR production goes to WEC, the TPBAR operation and its wastes MUST BE ANALYZED IN THE DRAFT EIS. It's time for the NRC to come clean about the part of the WEC facility engaged in the secretive TPBAR production. The amount of hazardous waste generated, air discharges and discharge of any form of waste water must be revealed and quantified. How those waste are processed and disposed of must be discussed and documented in the EIS. (9-6-5 [Clements, Tom])

Comment: Given that the NRC has dodged the issue of TPBAR production and associated waste production, I request that the EIS be left open until such time as waste streams from Westinghouse Government Services/WesDyne are revealed and the public has had time to review and comment about them as part of the draft EIS. (9-6-6 [Clements, Tom])

Comment: As discussed, the NRC must address the waste streams produced by TPBAR fabrication at the Westinghouse facility. (9-6-8 [Clements, Tom])

Comment: 6) Clarification whether all environmental impacts at the facility are included in the draft EIS After reading an article in The State titled "Secretive defense plant operating in the shadow of atomic fuel factory near Columbia" (see attached), I would like to clarify whether the draft EIS reports all potential environmental impacts from all activities in the geographic locations indicated in Figure 2-2. As a member of the public, I am concerned that the draft EIS document I reviewed is incomplete and may not report potential environmental impacts accurately. (33-10 [Fleming, Jory])

Comment: We are concerned that WESDYNE, LLC (Westinghouse Government Services), operates at the same Westinghouse site and fabricates Tritium Producing Burnable Absorber Rods (TPBARS) for transport to Tennessee Valley Authority (TVA) where they are irradiated and subsequently transported to Savannah River Site (SRS) where the tritium gas is extracted for use in nuclear warheads. The waste emissions from WESDYNE/Westinghouse Government Services are co-mingled with those of Westinghouse. NRC is claiming that it does not regulate the facility and therefore does not mention it in the EIS. The SC Department of Health and Environmental Control says it has issued no permits to the facility and that waste goes to the fuel plant which is regulated by NRC. That results in ambiguity about who is regulating the wastes from the facility. More importantly, the site is being used as a dual-use commercial-nuclear weapons facility. (40-4 [Preston, Priscilla])

Comment: Page: 2-1, Line: 11

Current Wording: "nuclear power reactors."

Suggested Wording: "...nuclear power reactors. **Other products fabricated by WEC at CFFF include neutron absorbing assemblies such as Tritium-Producing Burnable Absorbers (TPBAR). TPBARs contain no radioactive material subject to NRC regulation. TPBARs are used by the U.S. Department of Energy's Tritium Readiness Program and are designed to produce tritium when placed in a low- enriched uranium fuel assembly and**

irradiated in a nuclear power reactor. The WEC."

Justification: Clarification of products fabricated by Westinghouse at CFFF. (42-1-6 [Malek, Elise])

Comment: On page 35 of the same document more is indicated about WEC's "TPBAR HVAC Replacement," noting the value of TPBARs in the facility: TPBAR cladding has a special coating causing it to have a fairly high value of roughly a couple thousand dollars each. At current production levels, we have roughly up to 1,800 cladding tubes in various stages of production. A completed TPBAR is valued at roughly \$11,000, meaning at any given time in TPBAR we could have anywhere from approximately \$4 million to \$20 million worth of product that we would risk having to scrap should we lose the ability to control humidity. The current DX Split System HVAC unit for TPBAR is approaching 20 years old. The expected life of such units is 15-20 years. Internal components of the unit have become obsolete and difficult to find. Over the past year and a half the unit has required numerous repairs. One such repair required parts found only on Ebay, an unreliable location to find parts. There is a leak in the unit as maintenance has had to add refrigerant more than once over the last year and a half. The required refrigerant is being phased out and federal regulations stipulate how much and how often that particular refrigerant can be added to a unit. As the leak worsens, we risk not being able to use that unit at all due to the federal regulations. The above confirms a WEC role in TPBAR facility maintenance but does not state where the TPBAR facility is located on the WEC site, either under the same roof or in a separate building. As WEC is admitting that TPBAR fabrication is in its facilities⁷² and that it is in charge of maintenance aspects of those facilities, how can it be that such activities are not covered by WEC's NRC license? Why is waste from TPBAR activities not covered in the draft EIS prepared for the license-renewal application by Westinghouse? (49-2-1 [Clements, Tom])

Comment: What this search reveals is troubling. It appears that neither WesDyne nor Westinghouse Government Services have business licenses in Richland County and have not paid county business taxes. Thus, how can they operate without a business license and without paying taxes? Richland County should investigate this situation and should not accept any possible claim by Westinghouse that those entities operate under a Westinghouse business license and that business taxes were paid as part of Westinghouse tax payments. (49-2-2 [Clements, Tom])

Comment: Additionally, if WEC is actually doing any TPBAR work this must be publicly revealed to the community and the NRC must explain in the facility license-extension process, including the EIS, why it appears not to be monitoring and regulating waste streams from TPBAR fabrication. (49-2-3 [Clements, Tom])

Comment: Then, on August 20, Mr. Porter, in response to another inquiry by SRS Watch further clarified DHEC's understanding about WesDyne operating at the Westinghouse fuel plant or not: We do not have any permits issued to WesDyne, and WesDyne does not have any manufacturing operation at the Westinghouse fuel facility. Do the DHEC emails reveal that WEC itself is producing waste from TPBAR manufacture? If so, why isn't such waste being reviewed in the draft EIS? (49-2-4 [Clements, Tom])

Comment: There appears to be no doubt that WEC is involved in aspects of TPBAR management, and possibly fabrication. But how can Westinghouse Government Services or WesDyne, both of which are Westinghouse subsidiaries, be doing the TPBAR fabrication without the required National Pollutant Elimination System (NPDES) permit that it must have? How can Westinghouse Government Services or WesDyne be operating under the WEC

permits that would apply to the uranium fuel fabrication part of the facility? These questions must be answered in the EIS. (49-2-5 [Clements, Tom])

Comment: If the Westinghouse Electric Company, which operates the fuel fabrication facility, also operates TPBAR fabrication under the same environmental permits as the uranium fuel fabrication part of the operation, then waste streams from TPBAR manufacture are under the control of WEC and thus must be covered in the Environmental Impact Statement being prepared on the license renewal for WEC. Those waste streams, possibly passed from the TPBAR area of work to the uranium fuel fabrication area, may become indistinguishable from fuel fabrication waste at some point and thus can't be separated out in the EIS analysis. (49-2-6 [Clements, Tom])

Comment: Though being asked by stakeholders to analyze the operation of WesDyne in the NRC's draft EIS (on extending the Westinghouse operation license), the NRC has totally ignored the matter and in the Scoping Process Summary Report and claims, without a single word of justification or explanation and with no documentation, that WesDyne is "outside of scope" of the draft EIS; (49-2-7 [Clements, Tom])

Comment: DHEC affirms that neither Westinghouse Government Services nor WesDyne have no stand-alone air permit and no National Pollutant Discharge Elimination System (NPDES) permit, both of which are required, and says that TPBAR operations are being done under the WEC permits (49-2-9 [Clements, Tom])

Comment: It appears that there is no NRC inspection of TPBAR fabrication or waste production or waste management though there may be a NRC requirement for a Quality Assurance program covering TPBAR fabrication; (49-2-10 [Clements, Tom])

Comment: There is no accounting for management and disposal of waste from TPBAR fabrication and thus no NRC reports of any kind about TPBAR activities taking place at the WEC facility and no public input of any kind has been allowed about this; (49-2-11 [Clements, Tom])

Comment: The draft EIS must clarify who regulates TPBAR operations and what wastes it produces and how that waste is managed; (49-2-12 [Clements, Tom])

Comment: The Westinghouse Columbia Fuel Fabrication Facility has inside it secretive operations connected to all U.S. nuclear weapons -the fabrication of tritium rods irradiated to produce radioactive tritium gas that goes into all weapons to boost the explosive power of them. This makes the facility a "dual use" military-commercial facility, which threatens international nuclear non-proliferation norms by crossing the imaginary line between civilian and military uses of nuclear technology and facilities. (49-2-14 [Clements, Tom])

Comment: The final Environmental Impact Statement on the license extension for the Westinghouse plant, due in early 2022, must discuss TPBAR waste streams and offer full explanation, based on regulations and law, as to why the NRC claims it does not regulate the TPBAR area of the Westinghouse fuel-fabrication facility or the waste from it. (49-2-16 [Clements, Tom])

Comment: In the swampy woodlands of eastern Richland County, a little known manufacturing operation has for years churned out material the federal government depends on to maintain the nation's atomic weapons arsenal. The operation assembles metal bars at the Westinghouse

commercial nuclear fuel plant and ships the rods to a reactor in Tennessee, where they're processed to become radioactive. (49-2-17 [Clements, Tom])

Comment: It's a process that has gained little public attention through the years, but one that lately has sparked questions among a handful of critics following Westinghouse Nuclear's effort to gain a new 40-year federal operating license for its commercial fuel factory on Bluff Road. Critics say the U.S. Nuclear Regulatory Commission should have analyzed the metal-bar assembly plant in a recent study of how the Westinghouse Nuclear fuel factory might affect the environment if it gains federal approval for the 40-year license. They say the metal-bar plant has operated in virtual secrecy through the years at the Westinghouse fuel factory, a 550,000-square-foot facility better known as a place where metal rods are made for commercial atomic power plants" not for military uses. (49-2-18 [Clements, Tom])

Comment: A key question is whether waste generated from the metal bar assembly section of Westinghouse has polluted the land or water near the plant. (49-2-21 [Clements, Tom])

Comment: The Nuclear Regulatory Commission's environmental impact statement said there would be some moderate effects in Richland County from continued operation of the commercial fuel plant, but critics say the statement did not address the defense-related section of the plant. Federal records indicate that section of the plant began operation about 20 years ago. (49-2-23 [Clements, Tom])

Comment: Regardless of what the facility is called, the National Nuclear Security Administration says the defense-related section of the plant is vital to U.S. security. Westinghouse's operation produces 1,500 metal rods, known as TPBARs, every year, according to the NNSA. Those rods are valued at about \$11,000 apiece, records show. Tritium extracted from the metal bars at SRS is needed to replenish nuclear weapons because tritium decays relatively rapidly. The operation is considered so important that the country's nuclear defense system would be jeopardized if it did not continue, as is, at the Columbia site, a federal document obtained by SRS Watch shows. Losing the Columbia operation "would cause a break in production and significantly impact the tritium readiness program's ability to be prepared to provide new tritium, thereby jeopardizing the defense mission and placing the nation's security at severe risk in the event of a national emergency," according to a proposal to continue contracting for the work at the Columbia factory. (49-2-24 [Clements, Tom])

Comment: Westinghouse says it isn't producing nuclear materials, only the metal bars that go to Tennessee for processing in a nuclear plant. Annacone, the Westinghouse Nuclear executive, told the governor's nuclear advisory panel last month that the facility does not have radioactive tritium and some of the waste it produces is handled "through our normal waste disposal processes." ' Annacone said the metal bar part of the Westinghouse plant produces zirconium scrap, as well as acetone soaked rags. Both are considered hazardous wastes. (49-3-1 [Clements, Tom])

Comment: Even with Annacone's assertions last month that Westinghouse could talk more about the defense-related part of the factory, the company referred some specific questions from The State to the Nuclear Regulatory Commission and to fact sheets the company put together. The NRC said it could not comment because it does not regulate the defense facility. According to one Westinghouse fact sheet, the bar-production facility does not release "liquid or gaseous" material and its acetone and zirconium wastes are regulated by the SC Department of Health and Environmental Control. It says the amount of hazardous waste generated is minor. Acetone is a colorless, flammable chemical used to make other chemicals, as well

plastic, drugs and fibers, and it is used to dissolve other substances, according to the U.S. Centers for Disease Control and Prevention. People who breathe even moderate amounts of acetone vapors can become dizzy and experience eye troubles. Very high exposure can cause people to pass out, the CDC says. The agency says it has been found at about 40 percent of the nation's federal Superfund sites, which are contaminated areas on a priority list for cleanups. Zirconium is a soft metal, used to coat nuclear fuel rods, that can affect people who breathe in the material. Short term exposure can irritate people's eyes and skin, according to the New Jersey Department of Health. Zirconium powder, dust or granules are highly flammable and can, in some cases, explode spontaneously. Westinghouse Nuclear's fact sheets do not provide much detail about lithium, the material inside the metal bars that are shipped to Tennessee to be made radioactive. The bars are inserted into a nuclear reactor at the Watts Bar plant in Tennessee, where they remain for about 18 months. During their time at the Tennessee plant, the bars become radioactive and the lithium changes to tritium. Tritium is a key component of nuclear weapons. It is the material that gives bombs their explosive force. The Savannah River Site later extracts the tritium once TPBARs arrive there, a process that provides material for atomic weapons. (49-3-2 [Clements, Tom])

Response: *Other products fabricated by WEC at CFFF include neutron-absorbing assemblies such as Tritium-Producing Burnable Absorbers Rods (TPBARs). As explained by the WEC in an FAQ found on its website (WEC 2021-TN7126), Westinghouse Government Services LLC (WGS), formerly known as WesDyne International LLC, is a subsidiary of the WEC and signed a contract with DOE/NNSA in 2000 to assemble TPBARs at CFFF.*

Per the WEC FAQ, TPBARs are used by the DOE Tritium Readiness Program and are designed to produce tritium when placed in a low-enriched uranium fuel assembly and irradiated in a nuclear power reactor. TPBARs are assembled at the CFFF before being sent to the Watts Bar Nuclear Reactors in Tennessee operated by the Tennessee Valley Authority (WEC 2021-TN7126). Tritium is produced when the TPBARs are irradiated in a nuclear reactor. After irradiation, the TPBARs are sent to the Savannah River Site in Aiken, SC, where the tritium is extracted. TPBARs are made of stainless steel, zirconium alloy, and a nonradioactive isotope of lithium. There is no radioactive material in TPBARs at the CFFF (WEC 2021-TN7126). Based on the WEC's Frequently Asked Questions, there are no gaseous or liquid wastes associated with the TPBAR assembly process (WEC 2021-TN7126). As for solid waste, the WEC states that the hazardous wastes from this assembly process include "acetone rags and zirconium fines" and the process does not produce nuclear waste (WEC 2021-TN7126). Additional information about TPBAR manufacturing and associated environmental impacts has been added to Section 3.19 on cumulative impacts in the EIS.

D.6 Comments Concerning Decommissioning

D.6.1 Site Decommissioning

Comment: Page: 2-8

Line: 17-20

Current Wording: "Consistent with the WEC's remediation activities procedure, the WEC will continue to monitor the area and, based on the monitoring results, will determine when the area will be remediated (WEC 2019-19 TN6546)."

Suggested Wording: "Consistent with the WEC's remediation activities procedure, the WEC will continue to monitor the area and, based on the monitoring results, will determine when the area will be remediated (WEC 2019-19 TN6546). **Additionally, removal and disposal of this material has been added to the site decommissioning plan.**"

Justification: This section of the building is covered by the Decommissioning Funding Plan (DFP) and the cost estimate includes removal and disposal of impacted soil at the time of site decommissioning. (42-4-3 [Malek, Elise])

Response: *Section 2.1.3.1 discusses the contaminated wastewater line breaches. In response to the 2011 leak, the affected buried piping under the building floor was abandoned in place and replaced with aboveground polyvinyl chloride 15 (PVC) piping. Due to the location of the affected buried piping associated with the 2011 leak, no remediation of the soil was performed at the time the leak was discovered. The WEC, however, will continue to monitor the area. Per the WEC, removal and disposal of this material has been added to the site decommissioning plan. Section 2.1.3.1 of the EIS has been revised as a result of this comment.*

D.6.2 Decommissioning Funding Plan

Comment: There was also a statement that any soil contamination would be remediated during decommissioning if that were the case, which funding is assured under NRC's decommissioning funding regulations. So, that tells me that the NRC has already looked at, if we do nothing, we take no action, the funds for decommissioning is available, so again, I'm going back to my earlier statement about economic impact, and how much it's going to cost to decommission if there is no action, and the current permit is expired. It's almost as if you're saying we've got enough money to cover it, but it's going to cost Hopkins a lot of money. (1-9-6 [Mitchum, Chief Michelle])

Comment: But my last comment is if this facility closes up, let's say the market goes down, and they decide to close for whatever reason, is there money being placed aside to say hey, here's money being held by a third party that will cover any damages we do here? So we can't just walk away from the site, and say well it's not our site anymore, you all deal with it. I would like to think that there's money put aside, financial assurance that they cannot withdraw themselves, that again, a third party would hold to make sure that any work that needs to be done on the site, closing it out, is able to be achieved. Thank you very much. (1-14-3 [Overly, David])

Comment: Based on the report (p. B 6), continued operation of the CFFF for another 40 years increases the amount of time for radioactive and nonradioactive contaminants to build up and/or spread in the environment, which could affect the WEC's plans for site decontamination and decommissioning as well as the amount of funding needed for decommissioning. The recognized environmental conditions at the site should be addressed in a timely manner. (39-6 [Ghanem, Sahar] [Plauche, Mary])

Comment: Page: 2-8

Line: 17-20

Current Wording: "Consistent with the WEC's remediation activities procedure, the WEC will continue to monitor the area and, based on the monitoring results, will determine when the area will be remediated (WEC 2019-19 TN6546)."

Suggested Wording: "Consistent with the WEC's remediation activities procedure, the WEC will continue to monitor the area and, based on the monitoring results, will determine when the area will be remediated (WEC 2019-19 TN6546). **Additionally, removal and disposal of this material has been added to the site decommissioning plan.**"

Justification: This section of the building is covered by the Decommissioning Funding Plan (DFP) and the cost estimate includes removal and disposal of impacted soil at the time of site decommissioning. (42-4-3 [Malek, Elise])

Response: *In accordance with 10 CFR 70.25, "Financial Assurance and Recordkeeping for Decommissioning," the WEC must submit a decommissioning funding plan for NRC review and approval at intervals not to exceed 3 years, with adjustments made as necessary to account for changes in costs and the extent of contamination. The WEC last submitted the decommissioning funding plan in 2019 and updated it to reflect recent environmental investigations (WEC 2019-TN6926). The NRC staff considered the current state of site contamination and expected remediation that the WEC would implement when reviewing the DFP for approval. The NRC staff approved the revised plan in August 2020 and amended the license accordingly (NRC 2020-TN7002). No changes were made to the EIS as a result of these comments.*

D.7 Comments Concerning Environmental Justice

D.7.1 Inadequacy of Environmental Justice Impact Analysis

Comment: Hopkins, I want to point out, is designated by the Health Resources and Services Administration as a medically underserved area, and medically underserved population. And as such, the Town of Hopkins in its entirety, it deserves better from Westinghouse. It deserves much more protection from health threats, and I do not feel that the environmental impact statement, while it addresses environmental justice, it gives no weight at all to health concerns that may arise, or be correlated to hazardous spills, or toxic exposure to the people of the area, and health issues. (1-3-7 [Mitchum, Chief Michelle])

Comment: [Westinghouse can't be trusted with a new 40 year license...] The NRC and Westinghouse have failed to properly assess the heightened impacts of facility pollution on subsistence hunting and fishing by members of the impoverished community in areas adjacent to the facility boundaries. (7-5 [Cothran, Penny Delaney])

Comment: On page 3-126, the NRC concludes this on Environmental Justice: "The NRC staff could not establish pathways linking these impacts locally affected population." And, further, the draft EIS says "No disproportionately high and adverse health or environmental effects on low-income or minority populations." Does this determination indicate that NRC monitoring of impacts to Lower Richland populations will be downplayed in the future? (9-5-20 [Clements, Tom])

Comment: Discussion of accident scenarios and environmental justice claims these impacts are small. These impacts should be considered at least moderate, not small, given WEC's record of concealing incidents at the plant. (11-18 [Grego, John])

Comment: VIII. EJ is poorly understood and dealt with by the NRC and by Westinghouse. The 17 EJ principles have not been implemented in the development and publication of the DEIS by the NRC. (17-17 [Greenlaw, Pamela])

Comment: [EJ is poorly understood and dealt with by the NRC and by Westinghouse...] B. Protecting the communities effectively where facilities are sited and operate. (17-19 [Greenlaw, Pamela])

Comment: 5) Environmental Justice Impacts Methodology is Unexplained
In section 3.16.3, the draft EIS states that "Further, the staff could not establish pathways linking these impacts on the local population." The draft EIS does not define or describe what steps the staff took to attempt to "establish pathways". The report then proceeds to an assumption on health or environmental effects (lines 27 & 31-32). I am concerned that this section is very

short, that it does not describe how environmental justice was evaluated, that it assumes and justifies a finding based on undescribed methods and/or analysis, and uses this finding to apparently dismiss Environmental Justice impacts from the cost-benefits analysis (based on my interpretation of Table 3-26 & Table 3-29). (33-8 [Fleming, Jory])

Comment: I would also like to note that lines 28 - 32 in this section were confusing. I took the phrase "no disproportionately high and adverse cumulative health or environmental effects are expected" to mean that no effects are expected because the word "no" followed by "effects are expected" reads as "no effects are expected", but I was able to clarify on a call with NRC staff that this is incorrect and health and environmental effects are expected. I believe it would improve the draft EIS to include an additional line at the end of section 3.16.3 clarifying that health and environmental effects are expected, and either listing them again or pointing the reader to where they can review them elsewhere in the document. (33-9 [Fleming, Jory])

Comment: The NRC and Westinghouse have failed to comply with Environmental Justice regulatory requirements. While acknowledging that the Westinghouse Nuclear Fuel Fabrication Facility is sited in a predominately African American, low income and minority residential community with numerous additional sources of environmental hazards including an adjacent Superfund Hazardous Waste Site and the nearby Wateree coal-fired power plant, NRC and Westinghouse have failed to properly address the disproportionate and harmful impacts of future facility operations on the EJ community, including the cumulative and synergistic impacts of other sources. (40-6 [Preston, Priscilla])

Response: *The NRC provides the environmental justice impact analysis in Section 3.16 of this EIS. The NRC staff identified whether there were minority or low-income populations in somewhat close proximity to the project in meaningfully greater proportion (typically by at least 20 percentage points) to those populations in the wider comparison area (e.g., State). The NRC staff evaluated impacts of the proposed action, including cumulative and indirect impacts, to determine if high and adverse health or environmental effects from the proposed action exist. Then the staff determined whether there is an environmental justice impact based on whether there is a linkage connecting the disproportionately high and adverse health or environmental effect to the minority or low-income populations identified. The NRC staff described the environmental justice populations in Section 3.16.1 of the EIS. Additionally, the NRC staff considered the environmental impacts determinations for all environmental resource areas (e.g., air quality, land use, public health and safety, surface water and groundwater resources, ecology, etc.) discussed in Sections 3.1 through 3.15 of the EIS. The NRC staff found that the proposed license renewal would result in SMALL impacts on most environmental resources except on groundwater resources. The NRC staff further considered the impacts on surface water and groundwater resources and potential pathways to local users (see Sections 3.3 and 3.4 of the EIS, respectively).*

For example, the NRC staff concluded that there is a low potential for contaminants to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources. The NRC staff also considered the impacts from CFFF planned discharges to the Congaree River from normal operations in accordance with the NRC effluent thresholds in 10 CFR Part 20 and the State's NPDES permit. The NRC staff also reviewed the additional fish tissue sampling conducted by the State in August 2019 of bluegill and redbreast sunfish around the discharge pipe and concluded that both uranium (not detected in fillets) and fluoride (<0.25 mg/kg-day limit) are not at levels that would cause fish consumption concerns.

Because no health or environmental impacts would be high and adverse and no such linkages to environmental justice populations could be identified as part of the NRC environmental review, the NRC concluded that there are would not be any disproportionately high and adverse health or environmental impacts on the identified low-income or minority populations. This discussion has been clarified in Section 3.16 of this EIS.

D.7.2 Environmental Justice - Discrimination Against Lower Richland

Comment: And I'm wondering at what point will you understand that there is incredible injustice, there's incredible injustice that's happening to this community, that's happening to the people of this community, and it was selected to be in this community. It was selected that we would have these environmental injustices in our community. And for the new administration to say that they are really harping on the administration's focus to deal with environmental justices, and for you to not listen to any things that the community has said, overwhelmingly it's incredible to me. (1-17-5 [Reese, Robert])

Comment: But in the community, alive right now, are mothers, and fathers, and grandparents, and children. This area represents a huge scar in South Carolina. It represents dehumanizing, it represents slavery, and poverty, oppression, depression, colonization, and a long history of broken hearts. This area in particular was supposed to be the Sand Hills is what they called it, you couldn't grow anything there, but one of our governors in the past, Wade Hampton, had a plantation there. (1-18-3 [Mitchum, Chief Michelle])

Comment: We would like for Westinghouse, and the NRC to be held accountable for the detrimental harms to our community, and know that we need direct communication with the community about things that are going on with the plant. The community should be at the heart of the decisions that are being made. The health, and the wealth of our community is at stake, and if we are overlooking the health, and the well being of the community, then building wealth is irrelevant. (1-20-2 [Brown, Erniko])

Comment: Individuals who run these companies are individuals who live in other communities, and for them it's about business. For us, the community, this isn't business, this is our lives. It's time to stop using our communities as dumping grounds, because lives are at stake, and these companies need to be held accountable for the lives that they're potentially endangering. (1-20-6 [Brown, Erniko])

Comment: And for me, the people who represent the NRC, and the people who are representing Westinghouse, and WesDyne, none of them know what it is like to live in these communities. This is an ongoing situation that needs to be handled, and it's time for people to stop using our communities. These are strategically placed in low income, impoverished communities that are also known as environmental justice communities. These communities are already dealing with so much, compound effects mean compound impacts, mean compound injustices on behalf of these communities. (1-20-8 [Brown, Erniko])

Comment: What is needed is a regulatory agency (NRC) stepping up to the plate and not continue allowing inadequate safety and environmental practices in mostly low-income, impoverished areas where these plants are located. There is much health and economic disparity in the LR community where Westinghouse is located. (31-8 [Woods, Felicia])

Comment: And, you know, I'm just thinking about the people around there who it's a rural low-income community that depends on, you know, wells, private wells for their water and people

fish, so they are just getting hit by it, continuously. They wake up drink water, maybe go fishing, dig in their garden. It's just unacceptable and I just say no. (48-7-2 [Johnson, Alan])

Comment: What is needed is a regulatory agency (NRC) stepping up to the plate and not continue allowing inadequate safety and environmental practices in mostly low-income, impoverished areas where these plants are located. There is much health and economic disparity in the LR community where Westinghouse is located. (50-10 [Woods, Felicia])

Response: *In Section 3.16 of the EIS, the NRC discussed the expected environmental justice impacts associated with continued operation of the CFFF. The discussion acknowledged that the population in the Lower Richland region surrounding the CFFF is identified as largely minority. In the environmental justice analysis, the NRC staff identifies whether there are disproportionately significant and adverse environmental impacts on minority and low-income populations that may be different from the impacts on the general population. The NRC's impact analysis has not established any pathways by which previous or future environmental impacts would disproportionately affect EJ populations. Therefore, when the proposed action is combined with other past, present, and reasonably foreseeable future actions in the vicinity of the CFFF site, no disproportionately high and adverse cumulative health or environmental effects are expected. No changes were made to the EIS as a result of these comments.*

D.7.3 Environmental Justice - Adequacy of Engagement Activities

Comment: [Westinghouse can't be trusted with a new 40 year license...] Over the last 50 years of facility operations the NRC and Westinghouse have failed to effectively engage the local community to facilitate effective understanding of facility operations and impacts and effective public participation in facility regulation. Hopkins is designated by Health Resources and Services Administration (HRSA) as a medically underserved area (MUA) and medically underserved population (MUP). As such, it deserves better protection from additional health threats. (7-6 [Cothran, Penny Delaney])

Comment: We note that the Nuclear Regulatory Commission is conducting a systematic review of how its programs, policies, and activities address environmental justice, as recently posted in the Federal Register: Systematic Assessment for How the NRC Addresses Environmental Justice in Its Programs, Policies, and Activities, (Federal Register /Vol. 86, No. 129 / Friday, July 9, 2021). But the draft EIS belies that fact. The draft EIS, inexplicably, contains the briefest of "discussions" about Environmental Justice despite the fact that the facility is located in a predominantly and locally well-known African-American community known as "Lower Richland." (9-5-7 [Clements, Tom])

Comment: A NRC staffer, Mr. Gregory Suber, working on the EJ review recently met with residents of Lower Richland. How will comments about Westinghouse made at the semi-public meeting with Mr. Suber and from an EJ virtual meetings on July 15, 2021 be incorporated into the EIS? (9-5-8 [Clements, Tom])

Comment: The draft EIS lists some avenues whereby WEC is supposedly engaged in some interaction with some in the Lower Richland community, something not in place until recently, and for which there is no binding agreement over a 40-year license extension. Has the NRC assessed the effectiveness and sincerity of these WEC programs or are they window dressing? The main question now before us is how the NRC is engaging the community? What person-to-person surveys or engagement in Lower Richland did the NRC engage in? Beyond the usual

avenues to the wider Columbia, SC community, that is unknown. In spite of my engagement on Westinghouse issues for many years, I would add that I have never been made aware by WEC of any community meetings held by WEC. (9-5-9 [Clements, Tom])

Comment: [EJ is poorly understood and dealt with by the NRC and by Westinghouse...] A. Communications (17-18 [Greenlaw, Pamela])

Comment: CONG considers itself to be fairly well-networked with the local community through the Congaree Biosphere Region and the Southeast Rural Community Outreach (SERCO; <http://www.sercosc.org>) but is not familiar with current outreach efforts listed in the document. The Department recommends additional engagement with these other organizations. (21-26 [Stanley, Joyce])

Comment: According to Section 3.16.1 "Minority and Low-Income Populations" the NRC identified 189 potentially affected minority and low-income populations within a 20-mile radius of the CFFF site. Section 3.16.2 "Community Engagement" identified several channels through which community engagement is occurring in the vicinity of the CFFF site, related to the CFFF activities. According to the DEIS, these channels provide several methods by which the CFFF operations information can be shared with minority and low-income communities and opportunities for the communities to inquire about the facility's impacts and have their questions addressed. However, the DEIS does not discuss any activities that were conducted to directly engage these communities in the public participation process for the proposed project. The EPA acknowledges that the NRC has concluded, based on an evaluation of the potential health and environmental impacts, that no disproportionately high and adverse health or environmental effects are expected to affect these communities with environmental justice (EJ) concerns. Nevertheless, meaningful engagement efforts for potentially affected minority and low-income populations can play an important role in leveraging an agency's ability to collect data used to inform the decision-making process.

Recommendations

The EPA recommends that the Final EIS provide information about the implementation of community engagement activities targeted to the potentially affected minority and low-income populations. This should include a discussion about efforts to meaningfully engage these populations early and often during the development of the Final EIS, and the convening of meetings that were local and convenient for the potentially affected EJ populations. The Federal Interagency Working Group on Environmental Justice report, Promising Practices for EJ Methodologies in NEPA Reviews (also known as the Promising Practices Report) serves as a reference for identifying additional activities that should be considered for the discussion, such as the application of adaptive and innovative approaches to public outreach (i.e., disseminating relevant information) and participation (i.e., receiving community input). (34-1-11 [Fite, Mark])

Comment: Furthermore, the NRC and Westinghouse have failed to properly assess the heightened impacts of facility pollution on subsistence hunting and fishing by members of the EJ community in areas adjacent to the facility boundaries. (40-7 [Preston, Priscilla])

Comment: Over the last 50 years of facility operations the NRC and Westinghouse have failed to effectively engage the local EJ community to facilitate effective understanding of facility operations and impacts and effective public participation in facility regulation and emergency preparedness and response. Only very recently has the NRC and Westinghouse embarked on public relations gestures. We appreciate these gestures but the results of such efforts are not yet clear. (40-8 [Preston, Priscilla])

Response: The NRC staff discussed environmental justice impacts in Section 3.16 of the EIS. The discussion identifies the various channels of project-related community engagement that have been used to communicate about CFFF in general and this NRC licensing action specifically. As discussed in Section 1.3 of the EIS, during the NEPA environmental review process for the WEC's license renewal application the NRC staff provided several opportunities for public comment. In October 2019, the NRC staff published for public comment a draft EA and conducted a public meeting to gather oral comments. The comments provided during the October 2019 draft EA public comment period were considered when developing the EIS. In July 2020, the NRC staff began the EIS scoping process and invited the public, Federal, state, local and Tribal government agencies, and other external stakeholders to provide input on the scope of the EIS. The Scoping Summary Report published in February 2021 summarized the comments received and described which topics raised in the comments were within scope of the EIS or out of the scope of the EIS. In July 2021, the NRC staff published the draft EIS for public comment and conducted a public webinar to gather oral comments. The comments received during the draft EIS comment period are addressed in this appendix to the EIS.

Additionally, the public was able to provide both written and oral comments on the draft EIS through different means, including via e-mail (WEC_CFFF_EIS@nrc.gov), by leaving a voicemail using a standard toll-free number, U.S. mail, and through the Federal Rulemaking website at <https://www.regulations.gov>. The NRC staff also conducted a public webinar on August 26, 2021, to gather oral comments. The draft EIS was made accessible via the NRC's ADAMS using Accession Number ML21209A213, and the NRC's public web site. The NRC staff also made hard copies of the draft EIS available to the public at the following locations: (1) Richland Public Library – Main: 1431 Assembly St., Columbia, SC 29201, (2) Richland Public Library – Lower Richland: 9019 Garners Ferry Road, Hopkins, SC 29061, and (3) Richland Public Library – Eastover: 608 Main Street, Eastover, SC 29044.

The NRC staff provided notification of and advertised the publication of the draft EIS, the public comment period for its review, and provided notice of the August 26, 2021 public webinar on the draft EIS in the Federal Register (86 FR 43236) and via NRC e-mail distribution, NRC listserv (<https://www.nrc.gov/public-involve/listserver/fuel-cycle-fac-correspondence.html>), local newspapers, and radio stations. The NRC staff also sent postcards via U.S. mail to residences in the immediate vicinity of the CFFF providing notification of the availability of the draft EIS, the public comment period, and public webinar; and issued a press release. A flyer containing information about the conclusions in the draft EIS, the public comment period, and the public webinar was distributed via email and the NRC listserv.

NRC social media were also used to advertise the draft EIS comment period. Notification about the August 26, 2021 public meeting webinar was also provided in the NRC's public meeting notice system and a copy of the informational slides the NRC staff used during the public webinar was distributed ahead of the public webinar via email, and subsequently uploaded to the NRC's ADAMS and public web site (<https://www.nrc.gov/info-finder/fc/westinghouse-fuel-fab-fac-sc-lc.html>). The transcript of the public webinar was also made available via in NRC's ADAMS and the public web site and distributed via e-mail. Additionally, the NRC published in its YouTube channel two videos related to the draft EIS. The first video provided an overview of the draft EIS (<https://youtu.be/96L91-HDXTE>) and the second video provided a summary of the potential environmental impacts on surface water and groundwater resources from the proposed action (<https://youtu.be/hBnHzYNCGTE>). The web links to these recorded presentations were distributed via email and uploaded to the NRC public web site. The NRC staff finds that all these activities have provided sufficient and meaningful opportunity for the

public to provide input throughout the NEPA environmental review process for the WEC's license renewal application.

Regarding the NRC's environmental justice efforts, the NRC staff sought input from the public via extensive outreach activities. The input gathered will inform the NRC staff's assessment of how the NRC addresses environmental justice in its programs, policies, and activities. The staff solicited comments through a Federal Register notice and offered multiple ways to provide comments (i.e., telephone, email, mail, and online via regulations.gov). The NRC staff also held several public meetings and met in-person with various community organizations, individuals, and State and local representatives. The discussion in Section 3.16 of the EIS has been updated to address these concerns.

D.7.4 Environmental Justice - President Biden Executive Orders

Comment: Of great importance, the NRC must indicate in the EIS process how it is complying with the Executive Order of President Biden on Environmental justice in relationship to WEC, how this draft EIS process complies with the current NRC review of EJ policies and outline interactions toward that end with White House Environmental Justice Interagency Council and the White House Environmental Justice Advisory Council. (9-5-10 [Clements, Tom])

Response: *As explained in the Commission's Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (69 FR 52040), the NRC currently addresses environmental justice through its NEPA process for regulatory and licensing actions. The Policy Statement also notes that, while not required to, the NRC is nonetheless committed to the general goals of Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 FR 7629). The NRC staff's review in Section 3.16 of this EIS was conducted consistent with the Commission's Policy Statement and related agency guidance.*

Separately, in response to an April 23, 2021, Staff Requirements Memorandum (SRM) M210218B (ADAMS Accession No. ML21113A070), the staff conducted a systematic review of how agency programs, policies, and activities address environmental justice. As part of this review, the staff evaluated EO 12898 and recent EOs and assessed whether environmental justice is appropriately considered and addressed in the agency's programs, policies, and activities, given the agency's mission. On March 29, 2022, the staff provided the results of its assessment to the Commission for its consideration (ADAMS Accession No. ML22031A063). No changes to the EIS were made in response to this comment.

D.7.5 Cumulative Environmental Justice Impacts

Comment: We know that Mill Creek flows under the Westinghouse plant. That flows into the Congaree River. The Congaree River, you go a few miles downstream in Lower Richland, and that flows into the Wateree River, that goes over into another county. So, not only are you polluting, and killing us here in Lower Richland, you're polluting, and killing people in other parts of the state. A lot of people, because we are an EJ community, a lot of people subsist on the fish that they catch in the Wateree River. They subsist on the fish that they catch in the Congaree River. They subsist on the -- the Wateree River flows into Lake Marion, and Lake Moultrie, and there are people who subsist on the fish that they catch there. So, by giving Westinghouse a 40-year permit, you're not only affecting the health, and welfare of the people in

Lower Richland, but you're also affecting the welfare of people in other counties, and thousands of people. (1-13-5 [Sanders, Virginia])

Comment: Ms. Virginia so graciously stated all of the things that are going on in the community, the different companies that are there already, and for NRC, an extended year license of 20 to 40 years means fewer inspections, fewer inspections means less accountability, which means the community is more expected to exposure of chemicals. We need for you guys to see that at some point the disparities that black people have been dealing with, because this is a predominantly black community, the disparities that we have been dealing with, the climate issues, the environment issues, and these are civil rights issues that we've been dealing with for so long. It's time we stopped this. It's time to stop using our communities as dumping grounds, as a means to make money. Thank you. (1-20-9 [Brown, Erniko])

Comment: [EJ is poorly understood and dealt with by the NRC and by Westinghouse...] Environmental Justice contemplates more than damages to water, air, and soil. It must take into account cumulative and synergistic effects of all environmental impacts from every industry in the area and cause. There are no recent, in-depth health surveys designed and administered by professionals conducted with the community within the 20-mile circumscribed area with residents in the zipcodes of Lower Richland. (17-20 [Greenlaw, Pamela])

Comment: Residents of poor neighborhoods often struggle with higher crime rates, limited employment opportunities and poor health outcomes. With the effect of climate change increasing temperatures globally, what negative impacts to the Lower Richland Community will result from granting Westinghouse a 40-year license? (31-9 [Woods, Felicia])

Comment: As you well know this is an Environmental Justice Community (Lower Richland) that you and others in the Federal Government have written us off as COLLATERAL DAMAGE. To give Westinghouse a 40 year permit would be condemning us to early death or major health issues if we get the virus and survive it. We are more likely to catch the virus because the organs in our body have been weakened by exposure to air, water and soil pollution that Westinghouse and other polluters located in Lower Richland have released over the years. (37-2 [Sanders, Virginia])

Comment: Residents of poor neighborhoods often struggle with higher crime rates, limited employment opportunities and poor health outcomes. With the effect of climate change increasing temperatures globally, what negative impacts to the Lower Richland Community will result from granting Westinghouse a 40-year license? (50-11 [Woods, Felicia])

Response: *Section 3.19 of the EIS lists the existing and reasonably foreseeable projects, activities, and actions considered in the cumulative impacts analysis. The cumulative impacts analysis also considered the impacts from known contamination in soil, surface water, and groundwater at the CFFF site and associated conclusions and impact determinations in Sections 3.3 and 3.4 (surface water and groundwater resources, respectively). For example, the NRC staff concluded that there is a low potential for contaminants to move offsite due to the implementation of activities and programs to minimize the effects of releases on other users of the local groundwater resources. The NRC staff also considered the impacts from CFFF planned discharges to the Congaree River from normal operations in accordance with the NRC effluent thresholds in 10 CFR Part 20 and the State's NPDES permit. The NRC staff also reviewed the additional fish tissue sampling conducted by the State in August 2019 of bluegill and redbreast sunfish around the discharge pipe and concluded that both uranium (not detected in filets) and fluoride (<0.25 mg/kg-day limit) are not at levels that would cause fish*

consumption concerns. Cumulative impacts are summarized in Sections 3.16.3 and 3.19 of the EIS, which have been updated to address these comments and provide further clarification about the scope of the EJ impact analysis.

D.8 Comments Concerning Geology

D.8.1 Geology & Soils - Affected Environment - General

Comment: Page 3-10, line 36 SCDHEC does not agree with the statement that the elevation of the top of bedrock lies at an elevation of 150 feet above Mean Sea Level (MSL) at the CFFF site. The CFFF plant building itself is at an elevation of 140 feet MSL and bedrock has not been encountered anywhere at the surface, nor in any of the lithologic borings and monitoring wells installed to date. (41-1-6 [Taylor, Ken])

Comment: Page: 3-10

Line: 24

Current Wording: "The Black Mingo Group includes the Rehms, Lang Syne, and Williamsburg formations shown in..."

Suggested Wording: "The Black Mingo Group includes the Rehms, and Lang Syne, and Williamsburg formations shown in..."

Justification: Black Mingo group consists of younger Black Mingo Confining Unit (Crouch Branch Confining Unit - Lang Syne and Rhems) and the older, deeper Black Mingo Aquifer (Crouch Branch Aquifer - Peedee/Steele Creek Formation) (42-7-3 [Malek, Elise])

Comment: Page/Line: 3-10/47; 3-11/1-2

Current Wording: "The WEC will continue to refine the characterization of geologic heterogeneities of the subsurface at the CFFF site as it continues to complete activities in the Phase II Remedial Investigation Work Plan (RIWP)."

Suggested Wording: "~~The WEC will continue to refine the characterization of geologic heterogeneities of the subsurface at the CFFF site as it continues to complete activities in the Phase II Remedial Investigation Work Plan (RIWP).~~"

Justification: The field investigation portion of the remedial investigation was completed in August 2021. (42-7-4 [Malek, Elise])

Response: *Section 3.2.2 of the EIS has been revised to read, "The Black Mingo aquifer system is associated with the Lang Syne, Rehms, and Sawdust Landing formations shown in..." consistent with the cited reference (Colquhoun 1983). The subsequent sentence was also revised to indicate that Graham (2014) shows the Lang Syne and Sawdust Landing formations to be exposed in the southern bluffs but absent in the floodplain. Further, because the field activities of the Phase II Remedial Investigation were completed in August 2021, the sentence is no longer applicable and was deleted from the EIS. The top of bedrock near the CFFF site is about -150 ft MSL (150 ft below mean sea level). Section 3.2.2 of the EIS has been revised to correct this error.*

D.8.2 Geology & Soils - Affected Environment - Geologic Hazards

Comment: V. The lack of full geologic hazards discussions are minimal and the NRC does not state whether the operational system and its structural support systems in the building and in exterior areas (tanks, piping, wastewater units, etc.) meet any seismic standard. The seismic classification standard in this part of South Carolina is Class C. Westinghouse should provide a seismic structural evaluation consistent with that classification. This further supports SCDHEC's

request to consider infrastructure longevity. (get direct quote from source material on DHEC's site.) (17-14 [Greenlaw, Pamela])

Comment: Page: 3-12

Line: 26

Current Wording:

Suggested Wording: **CFFF completed assessments and modifications as instructed by Temporary Instruction (TI) 2600/16, Inspection of Activities Associated with Nuclear Regulatory Commission (NRC) Generic Letter 2015-01, Treatment of Natural Phenomena Hazards in Fuel Cycle Facilities. NRC independently verified that CFFF was in compliance with regulatory requirements and applicable license conditions regarding the treatment of natural phenomena hazards (NPH) events as described in the Integrated Safety Analysis (ISA) (ML16225A386).**

Justification: Include statement regarding of the prior Natural Phenomena Hazards assessment and NRC inspection completed at CFFF in August 2016. (42-7-5 [Malek, Elise])

Response: *Section 3.15 of the EIS describes the regulatory requirements that the WEC's CFFF is subject to, including the evaluation of accident sequences from credible man-made and natural phenomena hazards (e.g., flooding) on the CFFF (as part of its ISA). The NRC staff conducts a separate safety review that will evaluate compliance with all applicable NRC safety regulations and document the results of that review in a Safety Evaluation Report. As part of the safety review, the NRC staff evaluates WEC's safety program, including WEC's ISA methodology (e.g., accident sequences considered, consequences, likelihood of occurrence, and identification of IROFS) and management measures. No changes were made to the EIS as a result of these comments.*

D.8.3 Geology & Soils - Affected Environment - Seismic Activity in the Geographic Region

Comment: Recently I became informed about the "swarm" of earthquakes affecting South Carolina. There seems to be little information available to the public locally. While here in Conway there seems to be reduced threat, it is concerning that areas near the Westinghouse campus and our other nuclear facilities have seen ongoing quake activity. An SC DNR map is attached. (32-3 [Gifford, Grace])

Response: *The NRC staff describes the history and potential for seismic activity in the region of the CFFF in Section 3.2.3 of the EIS. To address the commenter's question, the only recent swarm, which occurred near Lugoff, South Carolina, is reported on the USGS earthquake site (earthquake.usgs.gov). It consisted of five earthquakes occurring between December 27, 2021 and January 5, 2022. The earthquake magnitudes ranged between 2.5 and 3.3, and were reported at depths shallower than 3.1 km. Earthquakes of this magnitude, while potentially perceptible by human beings, do not cause damage to structures. No changes were made to the EIS as a result of this comment.*

D.8.4 Geology & Soils - Affected Environment - Seismic Description

Comment: The search area or search radius used for the USGS earthquake catalog is not listed or defined (Lat/Long boxes or similar), nor does the included location map include a scale bar (Fig 3-4). The USGS peak acceleration map cited in the text could be helpful, especially if it was cropped to the region in question and the CFFF site located. The current map could be combined with the earthquake epicenters plotted. The earthquake magnitude distribution has

the potential to be misleading. The output data from the USGS catalog is not typically listed in Richter Magnitude (ML) as is asserted in the text, rather, most seem to be given as Duration Magnitude (MD). At such low magnitudes, the difference between earthquake magnitude scales is minimal, but the scales used should not be misrepresented. Perhaps simply reporting "magnitude 4" would be the best approach. We recommend that the Seismology Section 3.2.3 "Seismology" provide a more in-depth discussion in the Final EIS. (34-2-17 [Fite, Mark])

Response: *The NRC staff will revise Section 3.2.3 of the EIS to provide additional clarity and detail as requested by the commenter, including the revision of Figure 3-4.*

D.9 Comments Concerning Groundwater Hydrology

D.9.1 Groundwater Resources - Affected Environment - Impacts

Comment: While NRC acknowledges that groundwater beneath the site is classified as Class GB in SC (R.61-68), it does not equate that this resource potential has been diminished by exceedances of MCL concentrations onsite. Under SC Regulations, groundwater quality is treated no differently if located within the source property, or, if outside a property line. Groundwater quality beneath the site has been impacted by past operations. DHEC continues to work with WEC to define the scope of these impacts and to develop appropriate remedies through the Consent Agreement. Future monitoring should be far more robust than in years past to detect future issues before they become a larger problem. The known groundwater contamination at the site is confined to interior portions of the WEC property and there is no evidence of contaminants migrating any where beyond the property lines. (41-1-4 [Taylor, Ken])

Response: *In EIS Section 3.4.1, the NRC staff do not imply that exceedances of the MCL at the CFFF site diminish the resource potential, but state explicitly that the groundwater classification as Class GB means that the groundwater at the CFFF site must meet the MCLs set forth in the State's drinking water regulations. In EIS Section 3.4.2, the NRC staff acknowledges that the State's goal in remediating the site is for the groundwater to meet the applicable water quality standards. No changes to the EIS were made in response to this comment.*

D.9.2 Groundwater - Inadvertent Releases and Impact Determinations

Comment: The draft EIS has described the groundwater contamination, as David mentioned previously, as moderate. And moderate is defined as environmental effects are sufficient to alter noticeably, but not to destabilize important attributes of the resource. So, that's a serious problem, and then I think later in the draft EIS it talks about that there's a statement that it's not going off site, but then later it says -- I don't know where it's going, let me see if I can get the exact wording on that. It said current ground water contamination is not likely to travel beyond the property boundary, and there's remediation with the state. But then later, it said uncertainties remain about the ultimate fate in transport of ground water contamination at the site. So, that alone is a sufficient reason not to allow the renewal of the license for any amount of time. (1-8-2 [Preston, Priscilla])

Comment: Also there was a statement in the draft that the existing ground water samples data indicate that the contaminant plumes resulting from the past activities at the site currently remain on site, and occur only in surficial aquifers, while actions taken by Westinghouse in response to past contaminations, releases have been reduced, the license in the future inadvertent releases with continued operation, it seems to be expected. Future inadvertent

releases of contaminants to the subsurface area are reasonably foreseeable considering the uncertainties about past leaks, and the potential for the risk of leaks to increase as the plant ages. So, again I go back to what I said earlier, is we're trying to foresee something where we have evidence from the past, and also there's the aging component of the plant itself, and what's already there. How can we be certain, even bridges have to be updated, how can we be certain that these current components are going to hold up over the next 20, or 40 years? (1-9-7 [Mitchum, Chief Michelle])

Comment: Additionally the current ground water contamination is not likely to travel beyond the site, but obviously it is, because somewhere else in the statement it says that it is. Has the NRC considered past flooding problems in the area that do exacerbate the inadvertent release of contaminants beyond Westinghouse site? It's a 52 year old plant. What factual evidence does the NRC rely on to conclude that the continued aging of the plant, and the significant uncertainties that affect the evaluation of rates would only propose small to moderate ground water impact? If the ground water impact measure is being small to moderate, and predicted to have little change over the next 20 to 40 years, why has Westinghouse, AECOM, and DHEC agreed to install these additional, I think I said 32 new wells, or whatever they are, monitoring wells? The summary requested in January basically adds these new components, which raises the question, if this is supposedly small, to moderate in safety, why do we need 32 new wells to monitor everything? (1-9-8 [Mitchum, Chief Michelle])

Comment: Yes, thank you very much. My name is Tom Clements, and I'm the director of the Savannah River Site Watch nonprofit organization based here in Columbia, South Carolina. And I haven't prepared any oral comments, but I'll make a few comments. I do have about 20 pages of comments that I'm going to submit before the end of the comment period, but first let me make a few points. The unplanned releases to air, and ground water, and ongoing ground water contamination are the biggest concern to the local area, and beyond. And I want to make a comment on that as related to the ground water slide that was presented. It basically concludes, as does the draft EIS, that future inadvertent releases to the subsurface are reasonably foreseeable. But then it's been said before, the NRC staff found that impacts to ground water would be small, to moderate. There is absolutely no way to predict the impact of future releases, whether they be through regulatory operations that had some failure, or a larger accident. So, I don't see how any conclusion could be made about the impact of future inadvertent releases. Also in that slide, it said there's a potential for risk of leaks that increase with the age of plant components. I have looked through the draft EIS, and basically that's repeated, but there is absolutely no discussion in the document about how aging components would increase the risk of some type of inadvertent release. That has to be discussed in the environmental impact statement process. (1-10-1 [Clements, Tom])

Comment: So, those pods of uranium that have been sitting, I moved here 20 plus years ago, and I heard about pods of uranium sitting under that Westinghouse plant, and Westinghouse says they were not going to tear a building down to find out, or to get information on that uranium that was located under that building. And in the last years they've had spills where the pollutants ate through the concrete floors, and into the ground, and they told us that this did not get into the ground water. (1-13-2 [Sanders, Virginia])

Comment: MR. OVERLY: Yes, I asked questions before, and when I went back to listening to it, I put it back on speaker, I couldn't hear anything for awhile, and then all I heard was, I'm sorry I was muted, and then you went to the next caller, so I don't know if you addressed my concerns, but I had questions about how you collect the sampling, and everything like that. I get that Westinghouse is a good neighbor, they employ a lot of people, and pay good money, and

everything, but using terms like moderate to describe ground water contamination, to me just, you don't do that. You give numbers, you don't use such a subjective term, you state that ground water contamination is only in the superficial aquifer, well do you have wells into the next confining unit to see if there is contamination at a site greater down there? (1-14-1 [Overly, David])

Comment: The draft EIS states (on page xiv) that "Future discharges to the Congaree River would continue in accordance with the NRC license and National Pollutant Discharge Elimination System (NPDES) permit and, thus, would have minor effects on water quality." This claim of "minor impacts" is totally speculative and has no basis in fact as it is possible that harmful levels of discharges could occur into on-site water resources and into the Congaree River. The draft EIS analysis must be bound by large, unplanned releases of contaminants. What is the basis for the determination of "minor" impacts? What does this mean? Is the term "minor" based in law or regulation? The document seems to use a small-moderate-large scale of impacts but on page iv the term "minor" is used. Where did this come from and what is the basis of its use? What is the relationship of the use of "minor" to the "small-moderate-large" scale? (9-2-7 [Clements, Tom])

Comment: On page xiv it is stated that "Additionally, the current groundwater contamination is not likely to travel beyond the CFFF site boundary during the period of the proposed action. However, there are significant uncertainties that affect the evaluation of fate and transport of contaminants in groundwater. Based on these findings, the NRC staff concluded that impacts on groundwater from the proposed action would be SMALL to MODERATE." Given that the NRC admits "significant uncertainties" concerning groundwater contaminants, it is unknown how a "small to moderate" impact can be determined. The impact could as well be large. (9-2-8 [Clements, Tom])

Comment: Again on page xv, it is stated "the NRC staff concluded that the cumulative impacts to groundwater and surface water from past and current CFFF operations are MODERATE. Although the proposed continued operation of the CFFF for an additional 40 years could noticeably alter onsite groundwater quality, the continued operation would not destabilize or significantly affect the groundwater resource because there is a low potential for contaminants to move offsite." While admitting that groundwater resources could be significantly impacted no reason is given as to why the claim is made that "there is a low potential for contaminants to move offsite." What models were used to support this claim? We have already been surprised by significant movement of groundwater contaminants onsite and discharge plumes are spreading. And, the NRC's "moderate" may be large for others or to impacted aquatic life. What is the scientific, quantifiable definition of "moderate?" (9-2-10 [Clements, Tom])

Comment: As I commented in the EIS scoping, dated August 20, 2020, the NRC said more leaks and spill were "likely." Now, it appears the NRC is saying that "future inadvertent releases" could occur. What's the difference between a release and a spill or accident? Is this still the opinion of the NRC that future leaks and spill are likely? My scoping comment for the draft EIS record: NRC admits it is "likely" that accidents will occur in the future. (9-4-16 [Clements, Tom])

Comment: On "page ii" of the draft EA the NRC says that "Due to past releases, the uncertainty of the migration pathways for contamination, and because it is likely that there will be leaks and spills in the future, the NRC determined that there could be noticeable impacts to the soil, surface water, and groundwater, however the impacts will be adequately monitored and mitigated." The NRC's initial evaluation preliminarily concluded that continued operations for an additional 40 years would not have a significant impact on the environment. This is absurd as

the NRC has no idea about the magnitude of future incidents and has no clue if future impacts will be significant or not or if they can be mitigated. The draft EIS cannot take this same approach. While the NRC must state that it has no idea what the size of future leaks and spills might be or if they can be "adequately mitigated" -please present proof of that claim -it must present bounding options for the size of accidents and releases, including those of a grave or "significant" nature. Likewise, the NRC must explain that it cannot accurately predict anything about the magnitude or impact of any accidents (including criticalities) that might occur and that it has no ability to predict anything about extent of any "mitigation" that might be attempted after an accident, spill or leak. (9-4-17 [Clements, Tom])

Comment: The NRC admits (on page 3-27) that "The proposed continued operation of CFFF could result in additional inadvertent releases of contaminants. For example, future episodes of significant rainfall, such as the rain event in October 2015, could again cause the lagoons to overflow, possibly resulting in an uncontrolled release of their contents into groundwater or into nearby surface water bodies." What could be the impact of future "inadvertent releases" of large magnitude (as large as the October 2015 rain event or larger)?

And, on page 3-28: "The proposed continued operation of the CFFF for an additional 40 years could result in future inadvertent releases that may contribute additional contaminants to the onsite surface water bodies." Why would such "inadvertent release" occur and could they come from the plant itself? The above statements are of concern as they confirm that the magnitude of future inadvertent releases and contamination is unpredictable and could be LARGE or VERY LARGE. (9-5-1 [Clements, Tom])

Comment: The draft EIS says this on page xiv: "While actions taken by the WEC in response to past contaminant releases have reduced the likelihood of future inadvertent releases with continued operation of the CFFF, future inadvertent releases of contaminants to the subsurface are reasonably foreseeable considering the uncertainties about past leaks and the potential for the risk of leaks to increase with the age of plant components." It is of concern that the NRC admits that "future inadvertent releases" will take place. How large could they be? It is impossible to predict the magnitude of any such events or their impact? (9-5-12 [Clements, Tom])

Comment: Impacts could be sizable, yet the NRC concludes that "The NRC staff found that impacts to groundwater would be small to moderate." How is such a conclusion possible? What was the scientific method used to determine that no future impacts would be "large" or of greater magnitude? It's as if the NRC can gaze into the future and know that impacts will not be large. I challenge that conclusion and request this be addressed further in the EIS.

The draft EIS says this about the "small-moderate-large" impact scale, used for groundwater impacts and all predicted environmental impacts: The NRC's Environmental Review Guidance for Licensing Actions Associated with Office of Nuclear Materials Safety and Safeguards (NMSS) Programs (NUREG-1748) categorizes the significance of potential environmental impacts as follows:

SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: The environmental effects are sufficient to alter noticeably but not destabilize important attributes of the resource.

LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

What is the scientific basis of this scale? Is this "guidance" incorporated in law or regulation? Is the scale applied in a way so as to be interpreted in the same manner concerning past, present and future impacts? (9-5-13 [Clements, Tom])

Comment: Off-site migration is an arbitrary standard. We are greatly concerned by the extent to which an arbitrary standard of "off-site" migration has been used to judge whether impacts of groundwater and surface water pollution are judged small, moderate or severe. "Off-site" would be a very strict standard for a facility located on a small parcel of land, or a facility that is not centrally located on a large parcel. On the other hand, it is an unduly permissive standard for a facility such as WEC located on a substantial parcel of land. Further, if off-site migration appeared imminent, WEC could simply acquire adjacent land and hence forestall scrutiny under this standard. NRC should instead be studying whether groundwater pollution is substantial and whether migration is active. Under both criteria, several pollutant problems at WEC are worse than NRC indicates. Further, NRC does not require sufficient measures to prevent off-site migration, it notes, for instance, that onsite water body contamination is possible, but suggests that it has low potential to move offsite because of "implementation of activities and programs". But these activities include only spill prevention controls, environmental sampling and monitoring, and Federal and State permitting requirements. Since none of these controls have precluded pollution problems at the site, nor the potential for off-site migration, more active approaches should be used to ensure pollution is under control. (11-10 [Grego, John])

Comment: Assessment of impacts ignores recent history. The burgeoning groundwater monitoring network confirms a large impact, not a small to moderate (or moderate) impact from CVOC (Chlorinated Volatile Organic Compounds) groundwater pollution. Regulators likely anticipated that surface water sources at the edge of the floodplain could provide some impediment to the advancing groundwater plume, but the installation of a monitoring network downgradient of the surface water features (Mill Creek, Upper Sunset Lake and Lower Sunset Lake) suggest that the contaminant plume is advancing in unanticipated ways. Surely the persistence of the plumes, their continued advance, and their intrusion into sensitive floodplain soils constitute a serious groundwater pollution problem, and not one that can be set aside as small to moderate or moderate. A recent passive soil gas survey identified a couple legacy sites as likely sources for one of the plumes. Given migration of the contaminant plumes, it was a mistake to end remediation efforts in 2011. Under the circumstances, NRC should require WEC to resume air sparging and soil vapor extraction for groundwater pollutant remediation as a license condition. (11-11 [Grego, John])

Comment: A risk of contamination through underground water seepage caused by the possibility of careless handling of nuclear material is unacceptable for a 40 year period. (23-5 [Harrison, James])

Comment: 4) Environmental Impacts are not Treated Seriously. A key reason that I am writing this letter is my concern for the environment, particularly groundwater and the local river, based in part on my knowledge of the facility in the local community (see attached articles from The State for background). It is my understanding that prior documents found no significant impact and this draft EIS is a revision of those earlier incorrect findings, but in this draft most impacts are now just listed as "SMALL" and I have serious concerns that these are not what I would consider to be small. These impacts and their costs are difficult to evaluate without numerical information as I noted in my earlier comment. I value water resources highly and over a long time-horizon because I live here and consider potential impacts to public health that could occur or develop over a long time period to be concerning. (33-5 [Fleming, Jory])

Comment: "No porosity data for the surficial aquifer have been reported" Section 3.4 "Ground Water Resources", page 3-31. Given the significant lack of data, we recommend that NRC

provide a more in-depth discussion on the justification of the conclusion that there will be Small to Moderate environmental impacts to groundwater. (34-2-7 [Fite, Mark])

Comment: NRC acknowledges that WEC actions have reduced the likelihood of future inadvertent releases but also claims that future inadvertent releases are reasonably foreseeable in Section 3.4.2.1, "Future Releases" page 3-43. We recommend that the Final EIS provide a discussion as to how WEC and NRC determined the reasonably foreseeable releases and discuss what cumulative impact such releases could have on downstream users and the surrounding communities. (34-2-15 [Fite, Mark])

Comment: 1) p. xiv -The NRC writes: "future inadvertent releases of contaminants to the subsurface are reasonably foreseeable considering the uncertainties about past leaks and the potential for the risk of leaks to increase with the age of plant components." However, no systematic upgrades to prevent the foreseeable releases are presented as requirements for the license renewal in this document; please add a systematic facility upgrade component as a requirement for the license renewal. (39-1 [Ghanem, Sahar] [Plauche, Mary])

Comment: Page: 3-50

Line: 33-40

Current Wording: All

Suggested Wording: N/A - see Justification.

Justification: The NRC has determined that there is a low potential for contaminants to move offsite, and has further determined that there are no groundwater withdrawals or consumptive uses onsite. Westinghouse agrees with these determinations. Nevertheless, the staff goes on to conclude that impacts to groundwater resources from continued operation will be SMALL to MODERATE, rather than SMALL, apparently based on the assumption that future inadvertent releases of contaminants will lead to onsite impacts. This broad-brush conclusion could leave stakeholders, including decisionmakers within the agency, with the misimpression that offsite impacts to groundwater resources might be something other than SMALL. To correct this potential misimpression, support informed decision-making, and ensure the final EIS is clear to all stakeholders, Westinghouse recommends that the NRC staff specifically clarify that offsite groundwater impacts from the proposed action are expected to be SMALL, and separate this conclusion from any final conclusion regarding onsite groundwater impacts. (42-2-4 [Malek, Elise])

Response: *The categories used by the NRC staff to evaluate the significance of potential environmental impacts (SMALL, MODERATE, or LARGE) are described in EIS Section 2.5. The NRC staff established these standards of significance using the CEQ's terminology and definition for "significantly" (40 CFR 1508.27; TN428). Because the significance and severity of an impact can vary with the setting of a proposed action, the NRC staff considers both "context" and "intensity" as defined in the CEQ's regulations (40 CFR 1508.27). These established three levels of significance for potential impacts provide a common framework for each of the resource areas assessed in the EIS. Application of these categories to the evaluation of water resources impacts is discussed in EIS Sections 3.3.2.3 and 3.4.2.4 for surface water and groundwater, respectively. At the CFFF site, water resource impacts were based on the effects of CFFF operations on water quality and the potential impacts on other water uses and users. Water quality impacts are small when they are undetectable or so minor that their extent is limited (e.g., a mixing zone or a controlled access area) and water quality standards are not violated. Groundwater impacts from past operations of CFFF were determined to be moderate because CFFF contaminants are detectable in the groundwater at levels exceeding water*

quality standards, but the contamination has not moved offsite, does not currently affect other water users, and has therefore not destabilized the resource.

Potential impacts under the proposed license renewal would be SMALL if the CFFF operated without any future contaminant releases or if future releases were quickly detected and remediated without violations of water quality standards. In EIS Section 3.4.2.1, however, the NRC staff concluded that future inadvertent releases are reasonably foreseeable. Future releases may result in groundwater contamination that exceeds water quality standards but is unlikely to move offsite. Because the occurrence and magnitude of future releases is uncertain, and because there are unresolved uncertainties associated with the fate and transport of the existing contamination at the CFFF site, the staff concluded that an impact range (SMALL to MODERATE) best represents the potential impact determination for groundwater resources under license renewal.

The NRC has established limits for planned effluent releases during normal operations in 10 CFR Part 20 (TN283), and regulations that apply to the control and management of radiological and nonradiological risks from accidents in 10 CFR Part 70 (TN4883). Inadvertent releases can be defined as unplanned releases and spills. The WEC has taken actions in response to past contaminant inadvertent releases, which the NRC staff acknowledges have reduced the likelihood of future inadvertent releases with continued operation of the CFFF. For example, the WEC is removing systems that were likely sources of contamination, including the closure of the East Lagoon and removal of the southern storage containers, and planned closure of Sanitary Lagoon. Additionally, as discussed in Sections 3.3, and 3.4 of the EIS, the NRC staff determined that there is a low potential for contaminants to move offsite because of the implementation of activities and programs to minimize the effects of releases on other users of the local surface water and groundwater resources. The WEC has established spill prevention controls, and established tools and procedures such as a conceptual site model, environmental data management procedure, and the environmental remediation procedure for timely identification and response to future inadvertent releases (SCDHEC/WEC 2019-TN6554). The NRC staff is also reviewing the WEC's proposed environmental sampling and monitoring program as part of its safety review of the LRA. And, the WEC has agreed to three new license conditions. The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2 and 2.4.2 of this EIS. No changes to the EIS were made in response to these comments.

D.9.3 Groundwater Resources - Affected Environment - Nomenclature Used

Comment: NRC's discussion on the differing (old vs. new) geologic naming conventions used between WEC's descriptions and newer naming conventions is largely an academic difference and does not change how groundwater contaminants move through these geologic units or how effective a groundwater investigation is or isn't. It would be helpful, however, if NRC would

amend Figure 3-2 to include where the Black Mingo and the Middendorf Units in this correlation figure are positioned. By not including them, the reader can't visually follow NRC's discussion regarding the newer naming conventions. DHEC does not recommend changing the terms WEC uses at this time but could be looked at in the future. DHEC also considers what has been called the Black Mingo is likely an older unit such as the McQueen Branch confining unit. The Crouch Branch Confining Unit (preferred by NRC) would be age-equivalent to the Black Mingo. However, at the CFFF location, these Tertiary units have likely been eroded away. (41-1-5 [Taylor, Ken])

Response: *The SCDNR uses the newer nomenclature in its descriptions of groundwater conditions in the state. The NRC staff discussed the correlations between the geologic naming conventions so that the WEC's nomenclature can be understood in the context of the larger regional groundwater conditions and groundwater use provided in other references. A note was added to the caption of EIS Figure 3-2 to make clear the position of the Black Mingo and Middendorf aquifers in the stratigraphy used with the newer nomenclature.*

D.9.4 Groundwater - Offsite Movement of Contaminants

Comment: On page 2-21 of the draft EIS there is a discussion of monitoring wells, including plumes that are moving toward the site boundary. Is it possible that such plumes will move beyond the plant boundary? At current plume movement rates, when could this happen? Can the plumes be remediated? Please describe details of "Environmental Remediation" of groundwater plumes, a LRA matter mentioned on page 2-24. Would there be such remediation while the plant is still operating or only on decommissioning? (9-4-12 [Clements, Tom])

Comment: Of concern is the threat to wells in Lower Richland near to the facility. On page 3-48, it is confirmed that such a threat exists: "The offsite, private wells that were identified by the WEC (see Figure 3-13) are located in the general direction of groundwater flow from the CFFF site and could be affected by the existing and any potential future contamination from CFFF activities during the proposed license renewal period if contaminants were transported to these wells." Granting a license beyond 10 years of time will mean a much longer period of potential additional releases and groundwater movement to private wells. This concern is amplified as WEC is currently only in an investigative phase of the Consent Agreement. (9-5-3 [Clements, Tom])

Comment: [In many respects, the relicensing decision feels premature...] Groundwater sampling. The groundwater sampling system now comprises over 100 wells, with many added as part of the consent agreement, including several placed in the floodplain for the first time. Groundwater contamination by fluoride, nitrates, Chlorinated Volatile Organic Compounds (CVOCs), and radionuclides has been well-documented for years. Three different contaminant plumes have been identified for CVOCs: a western groundwater "area of concern", a main contaminant plume, and an eastern plume. Alarming, some of the floodplain wells detected CVOCs including a couple that were placed on the opposite side of Mill Creek and the Sunset Lakes from the plant. Westinghouse argued that there was evidence that floodplain soils were degrading the CVOCs, but SCDHEC and NRC have been skeptical of this mechanism. SCDHEC is particularly troubled by the presence of any CVOCs at all at wells downgradient of Mill Creek and the Sunset lakes, since there was no obvious explanation of how a contaminant plume could pass under the lakes. Though groundwater models have been refined at part of a conceptual site plan, more needs to be learned about the surficial aquifers at the site and groundwater transport. (11-4 [Grego, John])

Comment: The Department is concerned that an existing subsurface contamination plume from the CFFF could have potential impacts to Congaree National Park (CONG) and the Congaree River as it migrates through a highly interconnected hydrogeologic system within the park. The CFFF is located approximately four miles upstream of CONG, and the CFFF discharge point is located approximately seven river miles upstream from the CONG West Boundary Road boat ramp. We recommend several strategies to address this concern as part of any renewal decision by Nuclear Regulatory Commission (NRC) for a WEC operating license. (21-1 [Stanley, Joyce])

Comment: Among her many concerns is an existing sub-surface contamination plume from CFFF that could have potential impacts to the Congaree National Park and the Congaree River. The Congaree River is an NRI river and "all federal agencies must seek to avoid or mitigate actions that would adversely affect NRI rivers". She further states that "there needs to be a monitoring protocol to detect and understand contaminant behavior in a dynamic flood plain ecosystem". (28-2 [Weems, Elizabeth])

Comment: As I understand it, the Environmental Impact Study stated that the contamination has not affected water and soil off of the Westinghouse campus. The notion that contaminants of any sort, let alone radioactive or carcinogenic agents, would respect the bounds of private property lines and thereby stay contained within the Westinghouse facility is absurd. (29-3 [May, Stephen])

Comment: Claims that the contaminants have not encroached upon surrounding property and homes, or affected the local water supply, are simply too farcical to believe. (29-8 [May, Stephen])

Comment: In addition to concerns expressed by the DOI, the LWVSC is concerned that historical and possibly ongoing releases of hazardous materials from the CFFF will compromise groundwater quality in South Carolina's Coastal Plain aquifer system. The CFFF is located southeast of the "fall line" (see attachment). The fall line separates the crystalline rocks of the piedmont from the sedimentary formations of the Coastal Plain. Groundwaters southeast and in close proximity of the SC fall line recharge groundwater in the Lower Coastal Plain aquifer system (Aucott). The SC Upper and Lower Coastal Plain aquifer systems are the source of potable water for millions of South Carolinians. (30-3 [Volskay, Ted])

Comment: * The EPA recommends that uncertainties and issues associated with the migration pathways of radioactive materials be resolved prior to the issuance of any new license and that SCDHEC concur on the findings. The EPA also recommends that concurrence with any groundwater monitoring data collected pursuant to the CA, along with a detailed discussion on the monitoring uncertainties and migration issues be included in the Final EIS and Safety Evaluation Report. (34-1-4 [Fite, Mark])

Comment: 13. Based on the characterizations of gross alpha gross beta, nitrate, and fluoride concentrations, there seems to be a plume of contamination under CFFF possibly heading toward the Congaree River. We recommend that the Final EIS provide a more in-depth discussion on the potential plume and what steps are being taken to ensure that the plume is not discharged into the river between monitoring schedules. (34-2-4 [Fite, Mark])

Comment: Contamination has been detected at several private wells that appear to be downgradient from the facility, as described in 3-31. We recommend that the NRC and the CFFF provide a discussion in the Final EIS that addresses what measures are being taken to

make sure domestic wells are being protected before concentrations end up increasing in and around the private wells. (34-2-8 [Fite, Mark])

Comment: Section 3.4.1.2 "Radiological Contaminants" states that the removal of solids from the bottom of the lagoons may have damaged the liner, leading to leaks. Later in the DEIS, it is mentioned that over the course of the 40-year license renewal the lagoons will likely need to have solids removed again and liners will need to be replaced. We recommend that the Final EIS discuss what measures were taken and what measures will be taken to prevent contaminant leakage in the future, as well as the cumulative effect that leakage from a damaged liner will have on the surrounding communities and downstream users. (34-2-11 [Fite, Mark])

Response: *The NRC staff reviewed an extensive set of CFFF monitoring and site characterization data as part of the NEPA environmental review of the CFFF license renewal application. The NRC staff also reviewed the hydrogeology of the site, existing groundwater use in the region, and available studies of groundwater movement in the aquifers of Richland County and the surrounding region. The information reviewed by the staff is described in EIS Sections 3.2 and 3.4. The existing groundwater data indicate that contamination from past CFFF activities currently remains within the site boundaries. The WEC is engaged in a process under a CA with SCDHEC that is expected to result in adequate management (including remediation) of known contamination and, thus, prevention of significant offsite effects on other groundwater users. The WEC is also required under 10 CFR 20.1406, "Minimization of Contamination," to minimize contamination and radioactive waste, conduct appropriate radiological surveys including of the subsurface, maintain records of residual radioactivity, and provide adequate funding to complete decommissioning.*

In EIS Section 3.4.2, the NRC staff evaluated the potential impacts on offsite groundwater users from the continued operation of the CFFF under license renewal (including effects on the Congaree River and the Congaree National Park). The staff considered the likelihood of future releases of contaminants to the environment, the extent of ongoing monitoring to detect releases, and the procedures put in place by the WEC to respond to future releases. The staff used the existing data and information to evaluate the potential fate and transport of contaminants and the likelihood that future contamination from CFFF operations would move in groundwater beyond the site boundary. Although there is uncertainty in the fate and transport of contaminant, the NRC staff concluded that there is a low likelihood for contaminants to be released during the license renewal period and move offsite. The staff's conclusion relied on the groundwater monitoring conditions included in the license renewal application, continued groundwater monitoring under the NPDES permit, and tools and procedures put in place by the WEC to detect and respond to contaminant releases (including the conceptual site model, environmental data management procedure, and environmental remediation procedure). Additionally, the proposed environmental sampling and monitoring program described in WEC's LRA includes the new monitoring wells that have been added as part of the WEC's execution of the CA with SCDHEC (WEC 2020-TN6844, WEC 2021-TN7042). The WEC's proposed environmental sampling and monitoring program is also being reviewed for approval by the NRC staff as part of its safety review. The WEC has also agreed to three new license conditions. The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the

NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2 and 2.4.2 of this EIS.

Regarding the private wells located in the immediate vicinity of the CFFF, Section 3.4.1 of the EIS describes the results of the survey completed by the WEC under the CA with SCDHEC in 2019. The four active downgradient wells (as groundwater generally flows south, southwest from the CFFF) were sampled by the WEC as part of its survey (WEC 2020-TN6526). Low levels of alpha particles were detected in two wells and low-level beta particles were detected in one well. Uranium-238 was detected at low levels (<1 µg/L) in three of the four wells. Fluoride, nitrate, ammonia, and antimony were detected in one or more wells at low levels. Additionally, SCDHEC sampled the Hopkins Community Water System and 13 private drinking water wells in the Hopkins and Lower Richland area in 2018. Well water samples were tested for uranium, radium, gross alpha, gross beta, fluoride, nitrate, metals, and VOCs, and all contaminants of potential concern were found to be below the MCLs or minimum detection limits (SCDHEC 2018-TN6713). Richland County sampled 62 wells in the same area (SCDHEC 2018-TN6713) and all results were reported in February 2019 to be below the EPA's drinking water standard for uranium. No changes to the EIS were made in response to these comments.

D.9.5 Groundwater - WEC Commitments

Comment: In addition to the many new environmental media sampling requirements in the license renewal application, Westinghouse is required to submit copies of groundwater reports to both DHEC and NRC and notify NRC of any National Pollutant Discharge Elimination System (NPDES) Notice of Violations. (42-1-3 [Malek, Elise])

Comment: Westinghouse has completed the remedial investigation fieldwork to fully characterize the site. This has significantly reduced uncertainties regarding the impact of existing contaminants. Westinghouse has been given authorization from DHEC to begin writing the Remedial Investigation report. Fieldwork data was submitted to DHEC through monthly progress reports, and the current data is publicly available on Westinghouse and DHEC websites. (42-1-4 [Malek, Elise])

Response: *These comments address commitments from the WEC that are currently described in the EIS in Sections 3.3 and 3.4. No changes to the EIS were made in response to these comments.*

D.9.6 Groundwater - Sampling and Monitoring

Comment: Also, and I'm doing this by phone, I don't have access to a computer right now to actually watch the slides, and I've been trying to find any kind of data on the site as far as ground water, and see how much has been reviewed by geologists, where for example the wells are located. Were they located just randomly, or was there any thought as far as any flow nets used to show ground water movement, those kind of things. The placing of wells can be very vital, if you don't have wells in the right spots you're not going to catch the things that you're looking for. So, those are just some of my general comments that I just, the main thing is when I heard moderate, I couldn't imagine someone saying well contamination at the site is moderate. No, I need a number. Tell me what number you got, what value you got, not just some generic term like moderate, or slight, or anything like that. And I'm not sure if any geologist reviewed the

ground water data from this, how often it's done, and everything, because again, I have not been able to see those documents. (1-4-2 [Overly, David])

Comment: So, my question would be how often are the wells sampled, and what are they sampled for, and who reviews such data? I think that's pretty much all I got for that, but yeah, I just would like to be able to review all this data to have a better understanding of what's truly going on here because hearing that there's ground water contamination, and ground water contamination doesn't recognize, well here's our property boundary, I'm going to stay here. Just because you say it's on site, it's still there, it's not something that's naturally occurring, so I would want to make sure that this stuff is definitely not migrating off site, and so we have a better idea of what's going on at the site. But thank you very much for your time, thank you. (1-4-3 [Overly, David])

Comment: What monitoring program is in place or will be put in place by the NRC or under its direction to monitor potential off-site impacts to private wells in Lower Richland? Given this admission (on page 3-50), off-site groundwater impacts are of concern despite claims that steps will be taken to prevent them: "Based on the existing data and history of the site, the NRC staff expects future inadvertent releases of contaminants to the subsurface to be reasonably foreseeable, and that any future releases may result in groundwater contamination that exceeds the MCLs. With the exception of uranium, all of the contaminants currently present in groundwater at levels above their MCLs are expected to be mobile in groundwater." This is of great concern. (9-5-4 [Clements, Tom])

Comment: [The Department [DOI] is concerned that an existing subsurface contamination plume from the CFFF could have potential impacts to Congaree National Park (CONG) and the Congaree River as it migrates through a highly interconnected hydrogeologic system within the park...We recommend several strategies to address this concern as part of any renewal decision by Nuclear Regulatory Commission (NRC) for a WEC operating license...] *Monitoring Design:* The current monitoring program needs more specificity to detect and understand contaminant behavior in a dynamic, heterogeneous floodplain ecosystem. This is especially true given that the WEC and NRC acknowledge lingering uncertainties in contaminant source, transport, and fate from the CFFF. Long-term average rates of aquifer flow and transport, for example, may overlook the impact from rarer - but significant - events like the 2015 flood that can significantly flush and alter the system. The Department requests that NRC include a monitoring protocol that follows event-based sampling. (21-3 [Stanley, Joyce])

Comment: While it may be true that "groundwater generally flows southwestward from the site, toward the Congaree River," (page 3-48, line 20), Mill Creek at that point is flowing SE, so wells further to the SW may fail to detect contaminants deflected SE in the surficial system. (21-11 [Stanley, Joyce])

Comment: We are particularly concerned about these conclusions in the draft EIS, that: (a) "there are significant uncertainties that affect the evaluation of fate and transport of contaminants in groundwater" (page xiv, line 39-40); (b) "Investigations of subsurface contamination from past events have not been definitive in identifying the sources of contaminants, the initiation of contaminant releases, and the total amounts of contaminants released to the environment." (page 3-43, line 29); and (c) "the methods by which the groundwater quality objectives of the consent agreement will be met are unknown." (page 3-49, line 14). With this uncertainty, we request clarification of the goals, methods, and thresholds for monitoring - beyond the consent agreement - prior to issuing a new license. (21-15 [Stanley, Joyce])

Comment: The minimum requirement for three wells per plume is inappropriate for characterizing the site hydrogeology at a meaningful scale and monitoring vertical flow during flood events. A suite of four, widely spaced, nested piezometers is proposed as a minimum requirement. (21-16 [Stanley, Joyce])

Comment: The current distribution of wells is insufficient to detect plume dispersal to the SE of the plant via hyporheic exchange (and subsequent SE flow) with Mill Creek. In Figure 3-16, for example, there are two Tc-99 plume lobes to the ESE (and WSW) that are not well bounded by monitoring sites; this same area is lacking wells in Figure 2-10 (see the area above the number "8"). This is important because, while groundwater pressure gradients may suggest SW flow, hyporheic exchange and flood transport likely deflect contaminant transport to the SE in surface and very near surface environments. In addition to this general area, we recommend inclusion of additional monitoring wells allowing for a longer distance perimeter around the site (perhaps including sampling wells at CONG) to ensure a zero-detection radius. (21-17 [Stanley, Joyce])

Comment: The Lower Richland community is very concerned about the discharge released into the Congaree River from Westinghouse. We want DHEC to continue taking weekly samples from the Congaree River (notifying the public of any pollutants released that are harmful to the community, environment and/or wildlife.) We're also asking DHEC to double the number of ground water monitoring wells ~ as a precaution for potential leaks. The community has been told from DHEC that data shows that contaminants from the Westinghouse plant operations do not extend beyond Westinghouse property boundaries. (31-3 [Woods, Felicia])

Comment: I would like to note one example that I thought is emblematic of how environmental concerns are not being treated seriously from section 2.2.2 and the NRC overview video. I noticed that minimum sampling frequency is often collected very sporadically for everything other than air pollution monitoring, with many only sampled annually (Table 2-4). On page 2-20, I noticed that a single fish per year is analyzed for uranium and Tc-99. This sampling is mentioned again in section 3.5.2.2, but I did not find in the report a justification for this sampling frequency and quantity. (33-6 [Fleming, Jory])

Comment: 1. The Draft Environmental Impact Statement (DEIS) section (2.2.2.1.2) "Environmental Monitoring Program" mentions the monitoring frequency of well water and river water sites. Such monitoring is generally performed quarterly and/or annually. We are concerned particles or contaminants may move faster and may not be clearly represented in the sampling/monitoring of the site. We recommend that the Final EIS re-evaluate the monitoring frequency to ensure that the sampling intervals are appropriate and are more representative for the fate transport of contamination. (34-1-12 [Fite, Mark])

Comment: 2. The closest down-gradient public works system (PWS) well is at the Congaree National Park. While this is 6.5 miles away from CFFF and it is unlikely that any contaminants would reach this well, the U.S. Environmental Protection Agency (EPA) recommends that Columbia Fuel Fabrication Facility (CFFF) consider monitoring this well for radionuclides (uranium). It is unknown if the small PWS has regular radionuclide monitoring in its regular schedule. (34-1-13 [Fite, Mark])

Comment: 3. Section 3.4.1 "Groundwater and Quality" state that there are four downgradient private water wells that are close to the site. We suggest that the CFFF continue regular monitoring of these wells. The EPA recommends ensuring that there is no confusion regarding potentially naturally occurring uranium in groundwater with the uranium that would be originating from the CFFF site. As a result, we suggest adding lines to the graphs with radionuclide

concentrations and activities indicating regulatory limits (i.e., Maximum Contaminant Levels (MCLs)) in Figures. 3-9, 3-10, 3-11, 3-14, 3-17. (34-1-14 [Fite, Mark])

Comment: 8. Section 2.2.2 "Facility Monitoring Program" describes the facility monitoring programs. It is unclear whether the wells used for groundwater sampling were characterized for the complete suite of water chemistry constituents (e.g., pH, cations, anions, etc.), and whether they have been or will be used as part of the conceptual site model to characterize migration of contaminants. If the wells have not been characterized with the complete suite of water chemistry, we recommend that the CFFF characterize the well using the full suite of water chemistry to provide more accurate model results. (34-1-19 [Fite, Mark])

Comment: The DEIS states that "Only one well, W-18 with a uranium activity of 101 picocurie per liter (pCi/L), was above the WEC-derived criterion of 84 pCi/L in 2007, and it had a relatively high gross alpha activity of 115 pCi/L (WEC 2019-TN6546)" (Page 3-39). We recommend that the Final EIS discuss the WEC-derived criterion in more detail and state what the criterion was based to determine how the limits were determined. (34-2-10 [Fite, Mark])

Comment: The DEIS states in Section 3.4.1.2.1 "Gross Alpha and Uranium", p 3-40, that "isotopic uranium activities" but doesn't explain which isotopes are involved. We recommend that the Final EIS and the Safety Evaluation Report provide a more in-depth discussion as to isotope speciation. (34-2-12 [Fite, Mark])

Comment: pp. 2-22, lines 13-15: Due to the many uncertainties that the report identified, quarterly monitoring should continue. The basis for a less frequent schedule for semiannual sampling is inadequate. The quarterly schedule will allow for more robust evaluations of contaminant trends and seasonal fluctuations. (39-11 [Ghanem, Sahar] [Plauche, Mary])

Comment: Also we need more frequent groundwater testing. (46-2 [Gossett, Charles])

Comment: The Lower Richland community is very concerned about the discharge released into the Congaree River from Westinghouse. We want DHEC to continue taking weekly samples from the Congaree River (notifying the public of any pollutants released that are harmful to the community, environment and/or wildlife.) We're also asking DHEC to double the number of ground water monitoring wells ~ as a precaution for potential leaks. The community has been told from DHEC that data shows that contaminants from the Westinghouse plant operations do not extend beyond Westinghouse property boundaries. (50-3 [Woods, Felicia])

Response: *The NRC staff reviewed an extensive set of CFFF monitoring data as part of the NEPA environmental review of the CFFF license renewal application. The data included historical data as well as data from the current CFFF monitoring programs described in EIS Section 2.2.2. A summary of water quality screening criteria used in the EIS was added to Section 2.2.2.1.2 in response to these comments. Groundwater at the CFFF site is monitored at more than 100 wells in the surficial aquifer and at four wells completed in the confined aquifer. Concentration/activity values for contaminants of potential concern are summarized in EIS Section 3.4 and available in the reports cited in the EIS. Annual groundwater monitoring reports completed under the Consent Agreement (CA) are publicly available on the SCDHEC website at <https://scdhec.gov/environment/environmental-sites-projects-permits-interest/westinghouse/westinghouse-bureau-land-waste-management>. These reports contain the full analytical results, which include field measurements of pH and lab results for a complete suite of water chemistry constituents and specific radionuclide isotopic analyses.*

Locations of groundwater monitoring wells completed as part of the CA were jointly determined by the WEC with SCDHEC to establish the likely sources and extent of contamination at the site. As described in EIS Section 2.2.2.1.2, wells were selected for monitoring under the NRC license to detect any new release from CFFF facilities, to monitor changes in the existing groundwater contaminant plumes, and to detect whether contaminants are migrating toward the site boundary and in danger of moving offsite. The NRC staff finds the current semi-annual groundwater sampling frequency to be consistent based on historical data and observed changes in groundwater concentrations. In the event that a new or historical release of contaminants is detected, additional sampling to assess the extent of contamination and evaluate remediation will be completed per WEC's environmental remediation procedure RA-433 (a version of RA-433 can be found at ADAMS Accession Number ML20353A288).

As discussed in EIS Section 3.4.2.3, the existing groundwater data indicate that contamination from past CFFF activities currently remains within the site boundaries and current mitigation activities under the CA with SCDHEC are expected to prevent any significant offsite effects on other groundwater users. The NRC staff considered the potential effects of groundwater flow and transport uncertainties in reaching this conclusion. The WEC has established tools and procedures for timely identification and detection of contaminant releases through groundwater monitoring, including the use of a conceptual site model, environmental data management procedure, and environmental remediation procedures. Additionally, the proposed groundwater monitoring program described in WEC's LRA includes the new wells installed as part of the execution of the CA between the WEC and SCDHEC. The WEC's proposed environmental sampling and monitoring program is also being reviewed for approval by the NRC staff as part of its safety review. The WEC has also agreed to three new license conditions. The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2 and 2.4.2 of this EIS.. Continued groundwater monitoring under the NPDES permit is anticipated.

Regarding the private wells located in the immediate vicinity of the CFFF, Section 3.4.1 of the EIS describes the results of the survey completed by the WEC under the CA with SCDHEC in 2019. The four active downgradient wells (as groundwater generally flows south, southwest from the CFFF) were sampled by the WEC as part of its survey (WEC 2020-TN6526). Low levels of alpha particles were detected in two wells and low-level beta particles were detected in one well. Uranium-238 was detected at low levels (<1 µg/L) in three of the four wells. Fluoride, nitrate, ammonia, and antimony were detected in one or more wells at low levels. Additionally, SCDHEC sampled the Hopkins Community Water System and 13 private drinking water wells in the Hopkins and Lower Richland area in 2018. Well water samples were tested for uranium, radium, gross alpha, gross beta, fluoride, nitrate, metals, and VOCs, and all contaminants of potential concern were found to be below the MCLs or minimum detection limits (SCDHEC 2018-TN6713). Richland County sampled 62 wells in the same area (SCDHEC 2018-TN6713) and all results were reported in February 2019 to be below the EPA's drinking water standard for uranium.

Additional investigation of the dynamic interactions between the onsite surface water bodies and the shallow groundwater occurred as part of the remedial investigation Phase II activities under the CA with SCDHEC, but the results were unavailable during preparation of this EIS. The remedial investigation Phase II investigations also included installation and monitoring of additional wells to define the extent of contamination in a southeasterly direction from the area of the CFFF wastewater lagoons. The NRC staff met with EPA, WEC, and SCDHEC on February 4, 2022 to discuss comments the EPA submitted during the draft EIS public comment period. The NRC staff, SCDHEC and WEC provided clarity regarding any misunderstandings concerning movement of contamination, and therefore those comments are not specifically addressed here. The WEC provided a summary of the clarifications discussed during that meeting (WEC 2022-TN7361). Text of EIS Sections 2.2 and 3.4 was revised to include information from the remedial investigation Phase II investigations that was made publicly available prior to the publication of the EIS.

D.9.7 Groundwater - Tc-99 Contamination

Comment: And let me comment on two other issues, one is technetium. It wasn't encouraging to see on page 3-45 of the draft EIS about unknowns related to technetium 99. It says with little information about the timing, location, duration, volume, and inventory of past technetium releases, it is difficult to draw conclusions about the processes that have resulted in observed TC99 behavior at the site. Yet, the conclusion is the impact is, I think it was small, to moderate. We don't even know where the material came from off site.

It says it was released, probably from the cylinder recertification building on site, but the NRC has still dodged putting into a document like this where the technetium came from. It probably came from a fuel fabrication facility in Ohio, or Kentucky. Anyway, that has to be addressed in the EIS. (1-10-4 [Clements, Tom])

Comment: Concerning groundwater sampling, the draft EIS says on page 2-21: "Going forward, the WEC will sample these groundwater wells and analyze for uranium and Tc-99 to determine (1) whether the source of the current shallow groundwater contamination is leaks from plant operation and/or (2) if existing contamination of uranium or Tc-99, from a known or unknown source, is moving offsite." Is it unknown if Tc-99 is still leaking? What is the original source of Tc-99, a by-product of the fission reaction? Is the Tc-99 from experiments of "Reprocessed Uranium" that was imported, perhaps from Russia, and fed into the enrichment plants in Paducah and Piketon, contaminating the facilities as well as the enriched uranium product? (9-4-6 [Clements, Tom])

Comment: I reiterate an EIS scoping comment that SRS Watch submitted in August 2020: Source of technetium-99 must be definitively identified and how Tc-99 got in groundwater must be further identified and remediated must be addressed. The Westinghouse-DHEC Consent Agreement document Technetium (Tc-99) Source Investigation Work Plan must be made part of the EIS record. The analysis of that document on the source of the technetium must be assessed in the draft EIS. (9-4-7 [Clements, Tom])

Comment: On "page i" of the draft Environmental Assessment it is stated: "Nonradiological and radiological contamination exists in the groundwater in the shallow aquifer and in the surface water onsite. In December 2018, WEC sampled all groundwater wells and found uranium and technetium-99 in the groundwater, onsite, above drinking water standards. The source of the uranium is believed to be from operations in the main facility, whereas the source of the technetium-99 is still being investigated." The source of the uranium and the associated

contamination must be determined. On page 4-5 of the draft EA it is stated: "There is also a plume of Tc-99 in the lower portion of the shallow groundwater aquifer based on recent groundwater sampling results. The source and extent of the Tc-99 plume has not been fully delineated. The likely source of the Tc-99 is the recertification building and/or the WWTP lagoons, but the remedial investigation Work Plan identifies additional investigations to determine the source of the Tc-99 contamination." I note that on page 3-40 it says this about the source of the Tc-99 contamination: "The WEC evaluated potential sources and mechanisms for Tc-99 releases to the environment and determined that a liquid release from the cylinder recertification building was the most likely source of the Tc-99 releases (WEC 2019-TN6510)." How did the Tc-99 leave the named building? Is the building contaminated with Tc-99? Where did the Tc-99 originally come from and why did it end up at WEC? (9-4-8 [Clements, Tom])

Comment: It is not encouraging to read (on page 3-45) about unknowns related to Tc-99: "With little information about the timing, location, duration, volume, and inventory of past Tc-99 releases, it is difficult to draw conclusions about the processes that have resulted in the observed Tc-99 behavior at the site." How will these unknowns be addressed by WEC and the NRC? (9-4-9 [Clements, Tom])

Comment: The Columbia Fuel Fabrication Facility Tc-99 Source Investigation Report, by Westinghouse and dated July 30, 2020, should be made part of the EIS record. The report, unfortunately, does not clarify where the Tc-99 at the WEC site came from and leaves the reader thinking it might be from reprocessed uranium (RepU) solely from U.S. Government material that inexplicably ended up in the "nuclear fuel cycle." The report states: Tc-99 was introduced into the commercial nuclear fuel cycle beginning in 1956, when high enriched U from U.S. Government military reactors was reprocessed (e.g.x, down-blended) into low enriched U fuel. Reprocessed U was used in the commercial nuclear fuel cycle until 1977; however due to residual impacts, Tc-99 remains in the nuclear fuel cycle to this day.

This explanation is incomplete and misleading. RepU, including from foreign sources, was evidently also introduced into DOE's enrichment plants. This material contained fission products that contaminated the process lines, exposed workers and made its way into enriched uranium product. That enriched material containing fission products including Tc-99 evidently contaminated shipping containers. Likewise, internal equipment at WEC that processed this material could have been contaminated. The draft EIS must discuss where the RepU containing Tc-99 came from, if Tc-99 contaminated equipment at the WEC facility and if other contaminants from RepU, such as uranium isotopes, are present in equipment at WEC. (9-4-10 [Clements, Tom])

Comment: [In many respects, the relicensing decision feels premature...] -Technetium Source Investigation Work Plan. Technetium-99 (Tc-99), a man-made radionuclide, is present in groundwater and the East Lagoon, a wastewater storage site with an aging, 1980's era liner that is being retired. The East Lagoon was initially believed to be the source of Technetium-99 contamination, but a work plan was set up to identify alternative sources, as well as the extent of Tc-99 contamination. Tc-99 was tested at a variety of potential sources in two different phases, and neither phase has conclusively established a source. The Phase I study identified Tc-99 in the sediments of the East Lagoon and Alligator Pond and in groundwater, but not in soil or surface water samples, and could not identify a source for the contamination. Additional process sites were sampled in Phase II to understand the extent of contamination and identify its source. Results in the Final Interim Remedial Investigation Summary Report were inconclusive, though contour plots of Tc-99 concentration strongly suggest the East Lagoon as

a source. The Draft EIS suggests there are no active sources, and concludes that the presence of Tc-99 must be due to past surface releases. The Draft EIS acknowledges that Technetium-99 pollution appears chronic rather than acute, suggesting the source of Technetium-99 pollution is an ongoing problem, rather than a single legacy event. With the source yet unidentified, it is absolutely critical that the Tc-99 source investigation continue. (11-3 [Grego, John])

Comment: VI. Presence and Movement of hazardous and radiological elements Technetium-99 is highly mobile and is also taken up by plants. There have been no regular samplings and testing for the presence of Tc-99 in plant studies on or off site. The DEIS states that the source of Technetium-99 has STILL not been determined. As a radiological hazard without known source the potential for any change in the amounts released to the environment over time, the statement that the impact to the environment will remain small over time could be premature. Where is the study which shows the amount of Tech-99 is and has been static over the past 14 years of the current license period? (17-15 [Greenlaw, Pamela])

Comment: The DEIS states that "...current site operations do not have the potential for significant Tc-99 releases (WEC 2020-TN6538)" (Page 3-42). Given all the uncertainties already described in the groundwater-surface water interactions section, the extent of contamination, and a conceptual site model (CSM) that still contains data gaps. We recommend that the Final EIS and the Safety Evaluation Report provide a more in-depth discussion that determines the source of Tc-99. Based on the characterizations of gross alpha gross beta, nitrate, and fluoride concentrations, there seems to be a plume of contamination under CFFF possibly heading toward the Congaree River. Please explain the steps that WEC is taking to ensure this does not discharge into the river in appreciable quantities. (34-2-14 [Fite, Mark])

Response: *As discussed in EIS Sections 3.3 and 3.4, the NRC staff reviewed the available data on the occurrence and extent of Tc-99 contamination and evaluated the publicly available Tc-99 source investigation report prepared by WEC under the CA with SCDHEC (WEC-2020-TN6538). Potential sources for Tc-99 releases to the environment are described in EIS Section 3.4.1.2.2, which also summarizes the available gross beta and Tc-99 data at the CFFF site and explains that the continuing gross beta activity in Gator Pond is due to the discharge to the pond of groundwater contaminated with Tc-99 (also stated in Section 3.4.2.2). Text in EIS Sections 3.4.1.2.2 and 3.4.2.1 was revised to include discussion of the SCDHEC and NRC staff evaluations of WEC's Tc-99 source investigation report. As described in EIS Section 3.4.2, WEC's commitments for remediation efforts under the CA with SCDHEC, ongoing ground monitoring, and implementation of procedures to detect and respond to potential future releases were all factors considered by the NRC staff in reaching its impact determination on groundwater resources.*

D.9.8 Nitrate Denitrification

Comment: 14. Much of the nitrate is still in the groundwater while a lot of ammonia is in surface waters (Section 3.3.1.2, "On-site Surface Water and Floodplain", page 3-24). We recommend that the Final EIS provide a discussion on denitrification and soil partitioning and the potential cumulative impacts. (34-2-5 [Fite, Mark])

Comment: Section 3.4.1.1.3, "Ammonia", p 3-38, does not discuss potential links between ammonia and nitrate concentration to determine if denitrification is occurring. We recommend

that the Final EIS provide a discussion about the potential links between the ammonia and nitrate concentration that would demonstrate denitrification is occurring. (34-2-9 [Fite, Mark])

Response: *Baseline conditions of surface water and groundwater quality at the CFFF, described in EIS Sections 3.3.1 and 3.4.1, incorporate the effects of past CFFF operations, including releases that have resulted in ammonia and nitrate contamination at the site. In evaluating the impacts of the proposed license renewal, as described in EIS Section 3.4.2, the NRC staff expects nitrate to be largely transported in groundwater as a conservative (nonreactive) contaminant. As described in EIS Chapter 2 (and elsewhere in the EIS), the WEC is engaged in a process under a CA with SCDHEC to address the known onsite contamination in soils, surface water, and groundwater (radiological and nonradiological), and take appropriate remediation actions (in coordination and consultation with SCDHEC) to address the existing contamination at the site. In determining an appropriate remedy for restoring water quality, SCDHEC may consider natural processes such as denitrification. As part of the CA, changes in operation of the wastewater treatment plant to reduce releases from the lagoons have been made (e.g., closure of the East Lagoon) and further changes are planned, including the planned removal and replacement of the Sanitary Lagoon, as described in EIS Section 2.1.3.3. The NRC staff considered these changes, WEC's commitments for continued monitoring of water quality, and implementation of procedures for timely detecting and responding to future inadvertent releases in its evaluation of the impact of the proposed license renewal. No changes to the EIS were made in response to this comment.*

D.9.9 Southern Storage Area - Intermodal Containers

Comment: Page: 3-39

Line: 28-32

Current Wording: "As described in Section 2.1.3.1, the WEC has removed 62 intermodal containers as of November 2020 (WEC 2020-TN6844), and has removed contaminated soil in accordance with its site remediation procedure. No groundwater contamination has been attributed to releases from the Southern Storage Area Operable Unit."

Suggested Wording: "As described in Section 2.1.3.1, the WEC has removed 62 intermodal containers as of November 2020 (WEC 2020-TN6844), and has removed contaminated soil in accordance with its site remediation procedure. **The WEC has emptied all the intermodal storage containers in the southern storage area containing accountable uranium and uranium contaminated materials.** No groundwater contamination has been attributed to releases from the Southern Storage Area Operable Unit."

Justification: Clarification on completed work with the SSAOU. (42-10-10 [Malek, Elise])

Response: *EIS Chapter 2 was revised to describe the remedial investigation Phase II completed activities per the comment.*

D.9.10 Uranium Transport

Comment: The DEIS states that "The isolated extent of uranium contamination in groundwater may arise from the size of the releases, which are unquantified, but is more likely due to the relatively low mobility of uranium in the subsurface. Uranium tends to adsorb to natural sediments under near-neutral pH conditions" (Page 3-44). Alternatively, uranium could also be immobilized by being reduced from U(VI), which is the likely form when it is released, to U(IV). We recommend that further input about the geochemistry of the wells be provide in Section 3.12.1 "Sources and Pathways of Radiation and Chemical Exposure". The neighboring Superfund site is mentioned as a source of contaminated groundwater (VOCs), but it is not clear

how this contamination is distinguished from that at CFFF. The Final EIS and Safety Evaluation Report should provide a more in-depth discussion on source pathways along with, the redox conditions of the soils that could support uranium reduction or even denitrification. (34-2-16 [Fite, Mark])

Comment: Many uncertainties are listed in the report which are significant and warrant that further investigations should be conducted. Those uncertainties include:

- a. The source and extent of contamination onsite and the potential future migration pathways offsite (pp. 1-3)
- b. The data gaps and uncertainties identified in the assessments of the CFFF site (pp. 1-10)
- c. The outcome of the ongoing remedial investigations per the Consent Agreement (CA) process is unknown. (pp. 2-25)
- d. The degree of interchange between site surface water bodies and groundwater (pp. 3-27)
- e. The actual extent of volatile organic compounds (VOCs) contamination due to the relative sparsity of wells in the floodplain sediments. (pp. 3-44)
- f. Uranium concentrations may increase in the future because there could be uranium in the unsaturated sediments above the surficial aquifer (pp. 3-44)
- g. Fate and transport of contaminants during the period of the proposed 40 years. (pp. 3-45).

Regarding this topic, colloidal transport of contaminants should be evaluated. This transport mechanism may be significant due to the high toxicity of the contaminants which may sorb onto small mineral or organic particles (e.g., <2 microns) which may move freely in the aquifer matrix. (39-7 [Ghanem, Sahar] [Plauche, Mary])

Response: *The NRC staff reviewed an extensive set of CFFF monitoring data as part of the NEPA environmental review of the CFFF LRA. The data included historical data as well as data from the current CFFF monitoring programs described in EIS Section 2.2.2. Groundwater at the CFFF site is currently monitored at more than 100 wells in the surficial aquifer for the presence of uranium. Section 3.2.4 of the EIS describes the soil properties at the CFFF site, and no information regarding properties for redox potential has been available. The NRC staff assume that conditions in the subsurface are oxidizing where soils and sediments are unsaturated. Results from field measurements of pH and oxidation-reduction potential on groundwater samples have shown pH values generally between 5 and 7 and some areas with potential reducing conditions, particularly in the floodplain samples from the lower surficial aquifer. As described in EIS Section 3.4.2.2, concentrations of uranium above the water quality standard have only been observed in relatively isolated locations close to the plant buildings. There is no significant pattern in the occurrence of uranium and the groundwater pH and oxidation-reduction potential. The existing data do not provide evidence of significant transport of uranium as either a dissolved species or as a colloid. Section 3.4.2.2 of the EIS was revised in response to this comment.*

D.9.11 WEC Updates from Remedial Investigations under a CA with SCDHEC

Comment: Page: 3-37

Line: 7-12

Current Wording: "VOC contamination south of the WWTP, north and east of Gator Pond, occurs at concentrations above the MCL in the shallow surficial aquifer. This portion of the PCE plume may be the result of the spreading of the main plume or may have arisen from an independent, unidentified source. A second plume is identified in the CSM as occurring west of the main plume; this area is the subject of additional investigation as part of the Phase II remedial investigation activities."

Suggested Wording: "VOC contamination south of the WWTP, north and east of Gator Pond, occurs at concentrations above the MCL in the shallow surficial aquifer. **This portion of the PCE plume may be the result of the spreading of the main plume.** ~~or may have arisen from an independent, unidentified source.~~ A second plume is identified in the CSM as occurring west of the main plume; this area is the subject of additional investigation as part of the Phase II remedial investigation activities."

Justification: Through extensive assessment with the remedial investigation, there is no reason to believe there is an independent or unidentified source of PCE in this area. Suggest deleting. Empirical data from remedial investigation soil gas surveys indicate two likely source areas alongside the main manufacturing building.

The use of tetrachloroethylene was discontinued by the site in April of 2020. (42-1-14 [Malek, Elise])

Comment: Page: 3-40

Line: 22-24

Current Wording: "Therefore, it is not immediately clear whether the recent sampling results in 2018 and 2019 indicate that either or both of the CWW line leaks are the only sources of gross alpha and uranium levels."

Suggested Wording: ~~"Therefore, it is not immediately clear whether the recent sampling results in 2018 and 2019 indicate that either or both of the CWW line leaks are the only sources of gross alpha and uranium levels."~~

Justification: Suggest deleting as speculation.

All known historical leaks and potential sources have been entered into the site CSM and evaluated as part of the remedial investigation. Three Chemical Area Operating Unit sentinel wells (W-55, W-56, and W-77) are currently impacted with U results above the drinking water MCL. The impacted wells are located in very close proximity to the manufacturing building. Sentinel wells are located on the western side (includes W-56 and W-57) and southern side (includes W-77) of the main manufacturing building. Monitoring wells side gradient and downgradient of the previous three impacted sentinel wells do not contain U above the MCL, which indicates the limited extent of U in groundwater. The site's groundwater monitoring network is comprised of four types of wells:

1. perimeter wells: to detect a potential release before it could migrate off-site;
2. sentinel wells: to detect a potential source or contaminant migration in an Operable Unit;
3. NPDES permit required wells: to detect a leak in and potential contaminant migration from the site wastewater treatment system; and
4. area of impact wells: to monitor known areas impacted by uranium and Tc-99. At a minimum, three wells are designated to monitor for each area impacted by uranium and Tc-99. One well is located to detect maximum concentration and two are located downgradient of the impacted area.

The pending Feasibility Study (FS) (as part of the Consent Agreement) will determine remedial actions needed for uranium impacts. (42-1-15 [Malek, Elise])

Comment: Page: 3-43

Line: 31-33

Current Wording: "For example, the source of VOC contamination in the Western Groundwater AOC is uncertain, as is the source of the Tc-99 contamination south of the plant."

Suggested Wording: ~~"For example, the source of VOC contamination in the Western Groundwater AOC is uncertain, as is the source of the Tc-99 contamination south of the plant is uncertain."~~

Justification: The source of VOC contamination in the Western Groundwater AOC is no longer uncertain. A preferential flow path was discovered during Remedial Investigation Work Plan (RIWP) Phase II investigative activities that connect the Western GW AOC plume to the main plume. (42-2-1 [Malek, Elise])

Comment: Page: 3-45

Line: 23-36

Current Wording: "However, the CSM is currently mainly qualitative, and is currently limited to a hydrogeologic description of the site, the potential sources of contamination, and the extent of existing contamination. The NRC staff acknowledges that the CSM is currently investigatory and is intended to evolve as site investigation and remediation proceed and as new data are collected (WEC 2020-TN6526). The WEC intends to use the CSM as a decision-making tool throughout the life of the facility. However, there are currently a number of uncertainties associated with the fate and transport of contaminants during the period of the proposed action (40 years). For example, the degradation rate of VOCs, the role of the unsaturated zone as a reservoir of contaminants, and the effects of lithologic heterogeneities on groundwater flow and contaminant transport are currently undefined but may be needed to properly interpret existing observations and make inferences about future groundwater quality effects. The NRC staff finds that the current CSM is insufficient for evaluating the future movement and ultimate fate of contaminants in groundwater at the CFFF site that may occur as the result of future inadvertent releases. The WEC plans to enhance the CSM as the remedial investigation..."

Suggested Wording: "~~However, the CSM is currently mainly qualitative, and is currently limited to a hydrogeologic description of the site, the potential sources of contamination, and the extent of existing contamination. The NRC staff acknowledges that the CSM is currently investigatory and is intended to evolve as site investigation and remediation proceed and as new data are collected (WEC 2020-TN6526). The WEC intends to use the CSM as a decision-making tool throughout the life of the facility. However, there are currently a number of uncertainties associated with the fate and transport of contaminants during the period of the proposed action (40 years). For example, the degradation rate of VOCs, the role of the unsaturated zone as a reservoir of contaminants, and the effects of lithologic heterogeneities on groundwater flow and contaminant transport are currently undefined but may be needed to properly interpret existing observations and make inferences about future groundwater quality effects. The NRC staff finds that the current CSM is insufficient for evaluating the future movement and ultimate fate of contaminants in groundwater at the CFFF site that may occur as the result of future inadvertent releases.~~ **The CSM is data driven and is primarily qualitative in all aspects. The CSM is a snapshot in time that illustrates the analytical distribution of contaminants in the subsurface to scale. The CSM is not serving in a predictive capacity in the same way that a numerical groundwater fate and transport model would do, however, it does show the most recent data and the spatial interpolation of that data in the same way that a snapshot within the numerical model would, to scale. The WEC CSM is driven from analytical data to help evaluate data gaps and future remedial design to generate the conclusions, and necessary next steps. The CSM is not intended to replace a numerical groundwater model, it is meant to be the warehouse that integrates all data over time (including the results of a future numerical fate and transport groundwater model, and the human health and ecological risks) to support comprehensive decision making.** The WEC plans to enhance the CSM as the remedial investigation..."

Justification: WEC considers the CSM as a snapshot in time that illustrates to scale the analytical distribution of contaminants in the subsurface. The CSM is not serving in a predictive capacity in the same way that a numerical groundwater fate and transport model would do. However, it does show the most recent data and the spatial interpolation of that data in the

same way that a snapshot within the numerical model would, to scale. The WEC CSM is based on analytical data to help evaluate data gaps and future remedial design to generate the conclusions, and necessary next steps. The CSM is not intended to replace a numerical groundwater model. It is meant to be the warehouse that integrates all data over time (including the results of any future fate and transport groundwater model, and the human health and ecological risks) to support comprehensive decision making. These distinctions between groundwater analysis tools (CSM, plume analytics and numerical groundwater model) were incorporated into revision 1 of site procedure RA-434, Environmental Data Management. (42-2-2 [Malek, Elise])

Comment: Page: 3-48

Line: 41-45

Current Wording: "These conservative estimates may be appropriate if the contaminants travel preferentially along higher-velocity flow paths within deposits of more permeable (sand, gravel) sediments. This could result in contaminants traveling offsite more quickly (e.g., with a travel time less than 20 years over a distance of 600 m) than suggested by the average groundwater velocity."

Suggested Wording: "These conservative estimates may be appropriate if the contaminants travel preferentially along higher-velocity flow paths within deposits of more permeable (sand, gravel) sediments. This could result in contaminants traveling offsite more quickly (e.g., with a travel time less than 20 years over a distance of 600 m) than suggested by the average groundwater velocity. **The installed groundwater monitoring well network is designed to identify the potential movement of each plume, and data is available to demonstrate that the current movement is significantly slower than the most conservative estimates.**"

Justification: Fate and transport analysis will be included in the FS required by the Consent Agreement. Models are useful tools for projecting potential outcomes; however existing data about current site conditions and plume velocities is also considered and evaluated.

(42-2-3 [Malek, Elise])

Comment: Page: 1-11

Line: 36-37

Current Wording: "Implementation of the Phase II RIWP began in November 2020 and is ongoing."

Suggested Wording: "Implementation of the Phase II RIWP began in November 2020 and ~~is ongoing~~ **was completed in August 2021.**"

Justification: The field investigation portion of the remedial investigation was completed in August 2021. (42-3-8 [Malek, Elise])

Comment: Page: 2-12

Line: 14

Current Wording: N/A

Suggested Wording:

Justification: Additional work was performed as part of the RIWP Phase II and completed as of August 2021.

- Installed 14 new permanent groundwater monitoring wells
- Completed 43 lithologic soil borings (43 groundwater screening locations, 1-4 discrete intervals at each location)
- Installed 3 additional staff gauges (7 total for all remedial investigation work)
- Installed 17 pressure transducers

- 6 at surface water locations
- 10 in monitoring wells and 1 in piezometer PZ-1
- Sediment sampling
 - 111 Total Phase II Sediment Samples
 - 20 new discrete locations (2-3 samples @ each location)
 - 15 samples from Gator Pond
 - 2 new sediment transects in Mill Creek (17 samples)
 - 6 new samples to bound areas around SED-44
- Conducted PCE soil gas surveys (SGS) - 53 total samples
 - (25 samples were collected in the primary SGS area; later, 28 additional samples were collected by selecting closer sample intervals within the impacted area)
- Collected soil samples from 26 locations within the former East Lagoon footprint (3-4 samples @ each location)
- Collected 10 soil samples for grain size analysis
- Collected 28 Sanitary Lagoon sludge samples
- Slug tested 13 wells (aquifer hydraulic characterization)
- Completed civil survey of well installations and drainage ditches. (42-4-9 [Malek, Elise])

Comment: Page: 2-12

Line: 15-25

Current Wording: "The WEC has decided to decommission the East Lagoon (NRC 2020-TN6935). Closure of the East Lagoon is planned for 2021. The WEC's plan to characterize the sludge in the East Lagoon, submitted in accordance with the CA, was approved by SCDHEC via letter dated October 2, 2019 (WEC 2019-TN6555, WEC 2019-TN6555). The WEC submitted the results of the characterization in the East Lagoon Characterization Summary Report on December 6, 2019 (WEC 2020-TN7021) and subsequently submitted a closure plan (WEC 2020- TN7020). SCDHEC approved the closure plan on October 14, 2020 (SCDHEC 2020-TN7012). The WEC intends to remove and evaluate the East Lagoon liner, to the extent practicable, to inform sampling locations. After removal of the liner, the WEC will collect and analyze soil samples for constituents of potential concern (COPCs) (WEC 2020- TN6844), and remediate the soil, if needed (SCDHEC 2020-TN7003; WEC 2020-TN7011).

Suggested Wording: "The WEC ~~has decided to decommissioned~~ the East Lagoon (NRC 2020-TN6935). Closure of the East Lagoon ~~is planned for~~**was completed in** 2021. The WEC's plan to characterize the sludge in the East Lagoon, ~~was~~ **was and** approved by SCDHEC via letter dated October 2, 2019 (WEC 2019-TN6555, WEC 2019-TN6555). The WEC submitted the results of the characterization in the East Lagoon Characterization Summary Report on December 6, 2019 (WEC 2020-TN7021) and subsequently submitted a closure plan (WEC 2020-TN7020). SCDHEC approved the closure plan on October 14, 2020 (SCDHEC 2020-TN7012). The WEC ~~intends to remove and~~ **removed contaminated sludge according to the plan. Sixteen systematic sub-liner soil sampling locations were selected according to a grid and also ten bias locations were** evaluated the East Lagoon liner, to the extent practicable, to inform sampling locations.**based on observed liner conditions after sludge was removed. After removal of the liner, the WEC will collect and analyze s**Soil samples ~~were analyzed for~~

constituents of potential concern (COPCs) **included in the plan** (WEC 2020-TN6844), ~~and remediate the soil, if needed (SCDHEC 2020-TN7003; WEC 2020-TN7011).~~ **No residual elevated concentrations of either any non- radiological constituents of concern or radiological constituents above the Industrial Screening Level were left in place. Limited areas of soil containing radiological concentrations above Residential Soil Screening Levels were left in place either because removing them would undermine existing structures or they are located below the water table. Areas of soil containing radiological concentrations above Residential Soil Screening Levels will addressed at decommissioning and that information has been added to the decommissioning files.**
Justification: East Lagoon was decommissioned in 2021 and contaminated sludge was removed per the plan. (42-4-10 [Malek, Elise])

Comment: Page: 2-16

Line: 17-20

Current Wording: "The WEC is also installing an upper and lower surficial and a lower surficial zone well west of the Sanitary Lagoon to collect groundwater quality data downgradient from the lagoon and anticipates evaluating the sediment quality downgradient of the lagoon (WEC 2020-TN6844)."

Suggested Wording: "The ~~WEC CFFF~~ is also installing **installed an upper and lower two new groundwater wells in the surficial aquifer upper and lower zones (W-100 and W-99, respectively)** and a lower surficial zone well **off the southwest of the corner of the** Sanitary Lagoon. **These wells will** to collect groundwater quality data downgradient from the lagoon and anticipates evaluating the sediment quality downgradient of the lagoon **near sediment sample SED-16** (WEC 2020-TN6844)."

Justification: Well W-100 (surficial-upper zone) was installed on Jan 28, 2021 and well W-99 (surficial-lower zone) was installed on Jan 27, 2021. Prior to installation, the well names were unintentionally reversed in RAI correspondence sent to NRC on December 18, 2020. The information, which was included in the response to RAI 11, identified W-99 as the upper zone well and W-100 as lower zone. "near sediment sample SED-16" was added for clarification. (42-5-10 [Malek, Elise])

Comment: Page: 2-21

Line: 10-11

Current Wording: "As part of the implementation of the Phase II RIWP, the WEC plans to install additional monitoring wells."

Suggested Wording: "As part of the implementation of the Phase II RIWP, the ~~WEC CFFF~~ **plans to installed 28 additional new monitoring wells and replaced W-4 with W-4R.**"

Justification: The site has installed 28 additional new groundwater monitoring wells as a result of RIWP Phase II activities. Well W-4 was replaced with W-4R when transducer field data indicated that much of the water entering W-4 was surface water infiltration and not representative of groundwater. (42-6-1 [Malek, Elise])

Comment: Page: 2-21

Line: 29-34

Current Wording: "Based on previous groundwater assessment activities, COPCs in groundwater are chlorinated volatile organic compound (CVOCs), nitrate, fluoride, uranium, and Tc-99 (WEC 2020-TN6875). Four types of CVOCs were detected in the upper and lower zones of the surficial aquifer: PCE, trichloroethylene (TCE), cis-1,2-dichloroethene, and vinyl chloride [VC] (WEC 2020-TN6875)."

Suggested Wording: "Based on previous groundwater assessment activities, COPCs in groundwater are chlorinated volatile organic compound (CVOCs), nitrate, fluoride, uranium, and

Tc-99 (WEC 2020- TN6875). **Tetrachloroethylene (PCE) is the COPC that was previously used by the facility for the solvent extraction process and the source of the CVOC plumes at the site.** Four types of CVOCs were detected in the upper and lower zones of the surficial aquifer: PCE, trichloroethylene (TCE), cis-1,2-dichloroethene, and vinyl chloride [VC] (WEC 2020-TN6875). **TCE, cis-1,2-dichloroethene, and VC are natural degradation/daughter products of PCE. The site discontinued use of PCE in April of 2020."**

Justification: To clarify the source (PCE used in solvent extraction) of CVOC contamination at the site and to communicate that PCE is no longer used by the facility. (42-6-9 [Malek, Elise])

Comment: Page: 2-22

Line: Figure 2-9

Current Wording:

Suggested Wording: Suggest replacing Figure 2-9 with Enclosure 4.

Justification: This figure was updated to included current well installations and lithologic borings. (42-6-10 [Malek, Elise])

Comment: Page: 2-22

Line: 9-10

Current Wording: "As a result, groundwater monitoring requirements were added to the NPDES permit."

Suggested Wording: ~~"As a result, groundwater monitoring requirements were added to the NPDES permit."~~

Justification: In the context of this paragraph, this statement is not true. There were no new groundwater monitoring requirements associated with the referenced SCDHEC notification. The site's most recent NPDES permit was last issued in May of 2015 and is in timely renewal. There are new groundwater monitoring requirements in the draft NPDES permit that has been noticed but not issued to the site. (42-6-11 [Malek, Elise])

Comment: Page: 2-22

Line: 13-15

Current Wording: "The current NPDES permit requires semi- annual sampling, instead the WEC takes groundwater samples quarterly, typically in October, January, April, and July."

Suggested Wording: "The current NPDES permit requires semi-annual sampling, ~~instead the WEC takes groundwater samples quarterly, typically in October, January, April, and July."~~

Justification: The site monitors semi-annually as required by the permit. (42-6-12 [Malek, Elise])

Comment: Page: 2-23

Line: 16

Current Wording: "Under the CA, the WEC is also developing a CSM (see Section 1.5.2.2.1 of this EIS)."

Suggested Wording: "Under the CA, ~~CFFF the WEC is also developing~~ **developed and maintains** a CSM (see Section 1.5.2.2.1 of this EIS)."

Justification: The CSM is developed and is updated at minimum with each groundwater sampling event. (42-6-13 [Malek, Elise])

Comment: Page: 2-24

Line: 1-3

Current Wording: "The WEC has installed permanent monitoring wells consistent with the implementation of the Phase I RIWP (WEC 2019-TN6553), and installation of new monitoring wells continues under the implementation of the Phase II RIWP."

Suggested Wording: "The WEC has installed **29 new** permanent monitoring wells consistent with the implementation of the Phase I RIWP (WEC 2019- TN6553), and ~~installation of new monitoring wells continues under the implementation of the Phase II RIWP.~~ **28 new permanent monitoring wells consistent with the implementation of the Phase II RIWP.**"

Justification: All planned well installations associated with the RIWP are complete. (42-6-14 [Malek, Elise])

Comment: Page: 3-30

Line: 9-10

Current Wording: "The Tertiary-age Gordon aquifer (correlated to the Black Mingo aquifer) is reported..."

Suggested Wording: "The Tertiary-age Gordon **Crouch Branch** aquifer (correlated to the Black Mingo aquifer) is reported..."

Justification: On page 3-10, lines 38-46, the geologic correlations are correct. On page 3-30, lines 9-10, the text incorrectly correlates Black Mingo Aquifer to early Tertiary aged Gordon Aquifer. The correlation should state Crouch Branch Aquifer. (42-9-2 [Malek, Elise])

Comment: Page: 3-30

Line: 40-42

Current Wording: "The elevation of the groundwater table generally is a subdued replica of the topography, except for locations below the plant buildings and facilities."

Suggested Wording: "The elevation of the **shallow** groundwater ~~table~~ **surface onsite** generally is a subdued replica **reflection** of the topographic ~~ity~~ **surface**, except for locations below the plant buildings and facilities."

Justification: The amount of variation that happens under the building footprints on site does not cause sufficient change in the rate or direction of flow to deem it relevant. (42-9-3 [Malek, Elise])

Comment: Page: 3-33

Line: 5

Current Wording: 3.4.1 Groundwater Use and Quality

Suggested Wording: N/A

Justification: Please note that the most recent groundwater data (through April 2021) was submitted in an annual report to SCDHEC on September 28, 2021. The report is available to the public by accessing the DHEC website. (42-9-4 [Malek, Elise])

Comment: Page: 3-33

Line: 23-24

Current Wording: "the private water supply wells to the north of the site are upgradient so that groundwater would not normally flow from the site to these water supply..."

Suggested Wording: "the private water supply wells to the north of the site are upgradient so that groundwater would not ~~normally~~ flow from the site to these water supply..."

Justification: Groundwater does not flow upgradient off the WEC site property. This statement is supported by potentiometric maps generated from the site's extensive groundwater monitoring network. (42-9-5 [Malek, Elise])

Comment: Page: 3-35

Line: 35-38

Current Wording: "The East Lagoon, which receives various waste streams (including radioactive elements) has been in service for almost years and is currently being closed and cleaned (WEC 2020- TN6844). Sludge in the East lagoon contains elevated levels of fluoride and ammonia;..."

Suggested Wording: "The **former** East Lagoon, ~~which received~~ various waste streams (including radioactive elements) **and had** ~~has~~ been in service for almost 51 years. **The East Lagoon was decommissioned in 2021, including contaminated soil beneath the lagoon's liner.** ~~and is currently being closed and cleaned (WEC 2020-TN6844).~~ **The lagoon's function within the wastewater treatment system was replaced with an above-ground tank.** Sludge ~~is~~ **from within** the **former** East lagoon contained elevated levels of fluoride and ammonia;..."

Justification: The former East Lagoon area is now green space, and its closure has been approved by SCDHEC. (42-9-6 [Malek, Elise])

Comment: Page: 3-36

Line: 8

Current Wording: Figure 3-14 PCE Concentrations in the Surficial Aquifer

Suggested Wording: **Include data for W-26**

Change the label in the figure from W-41 to "W- 41R."

Justification: Since 2004, CFFF has consistently monitoring VOCs in four site wells (W-26, W-41R, W-48, and W-RW2) as required by the site's NPDES permit issued by SCDHEC. Figure 3-14 excludes data for W-26. The correct well designation is W-41R.

(42-9-7 [Malek, Elise])

Comment: Page: 3-36

Line: 14-15

Current Wording: "The WEC installed additional shallow and intermediate-depth wells as part of the Phase I remedial investigation process."

Suggested Wording: "The ~~WEC~~ **CFFF** installed additional ~~shallow and intermediate-depth wells in the upper and lower zones of the surficial aquifer~~ as part of the Phase I remedial investigation process."

Justification: This request is for consistency of terminology. AECOM documents refer to the "upper" and "lower" zones of the surficial aquifer. (42-9-9 [Malek, Elise])

Comment: Page: 3-37

Line: 23-24

Current Wording: "...highest nitrate concentrations were often higher than 150 mg/L at wells W-18, W-30, W-32, W-23 29, and W-7 between 2004 and 2019 (AECOM 2013-TN5508;..."

Suggested Wording: "...highest nitrate concentrations were often higher than 150 mg/L at wells W-18**R**, W-30, W- 32, W-23 29, and W-7**A** between 2004 and 2019 (AECOM 2013-TN5508;..."

Justification: The correct well designation is W-18R. The correct well designation is W-7A. (42-9-10 [Malek, Elise])

Comment: Page: 3-37

Line: 28-30

Current Wording: "Nitrate concentrations in well water from these two wells have decreased significantly from the peak values; recent values have been below the MCL (WEC 2020-TN6526)."

Suggested Wording: "Nitrate concentrations in well water from these two wells have decreased significantly from the peak values; ~~recent values have been below the MCL~~ (WEC 2020-TN6526)."

Justification: The reference for this data is the WEC 2020 -TN6526. Table 3 of this document contains data from October 2019 and reports nitrate for W-29 and W-30 as 11 mg/L and 120 mg/L, respectively. These reported values are above the drinking water MCL for nitrate, not below. (42-9-11 [Malek, Elise])

Comment: Page: 3-37

Line: 31

Current Wording: "...18 and W-7 have been trending up; recent observed values have been 770 mg/L and 390 mg/L,..."

Suggested Wording: "...18**R** and W-7**A** have been trending up; ~~recent observed~~ **October 2019** values ~~have been~~ **were** 770 mg/L and 390 mg/L,..."

Justification: The correct well designations are W-18R and W-7. Define "recent" as October 2019. (42-9-12 [Malek, Elise])

Comment: Page: 3-37

Line: 34-35

Current Wording: "...2011 at wells W-39 and W-41 located west of the lagoons (AECOM 2013-TN5508); recent values have been 73 and 65 mg/L, respectively (WEC 2020-TN6526)."

Suggested Wording: "...2011 at wells W-39 and W-41**R** located west of the lagoons (AECOM 2013-TN5508); ~~recent~~ **October 2019** values ~~have been~~ were 73 and 65 mg/L, respectively (WEC 2020-TN6526)."

Justification: The correct well designation is W-41R. Define "recent" as October 2019. (42-9-13 [Malek, Elise])

Comment: Page: 3-38

Line: 3-4

Current Wording: "...concentrations were mostly below the MCL except at wells W-58 and W-59 (WEC 2020-TN6875)."

Suggested Wording: "...concentrations were ~~mostly~~ below the MCL except at wells W-58 and ~~W-59~~ (WEC 2020-TN6875)."

Justification: W-59 concentration was 9.7 in October 2019, which is less than MCL of 10 mg/L. (42-9-15 [Malek, Elise])

Comment: Page: 3-38

Line: 8-9

Current Wording: "During the response to the 2018 HFSS leak, the WEC obtained fluoride concentrations up to 1,180 mg/kg from soil samples around and beneath the facility."

Suggested Wording: "During the response to the 2018 HFSS leak, the WEC obtained fluoride concentrations up to 1,180 mg/kg from soil samples ~~around and~~ beneath the facility."

Justification: No samples were taken around the facility. All samples were collected underneath the concrete floor of the manufacturing footprint. (42-10-1 [Malek, Elise])

Comment: Page: 3-39

Line: 8-11

Current Wording: "...the WEC intends to complete closure of the East Lagoon in 2021, including removing the East Lagoon and its liner and remediating the soil, if needed (WEC 2019-TN6555, WEC 2020-TN6707). The WEC intends to complete sampling of Sanitary Lagoon sludge, remove the sludge from the lagoon, and close the lagoon (WEC 2020-TN6707)."

Suggested Wording: "...the WEC ~~intends to complete closure of~~ **decommissioned** the East Lagoon in 2021, ~~including removing the East Lagoon and its liner and remediating the soil, if needed~~ (WEC 2019- TN6555, WEC 2020-TN6707). The WEC ~~intends to completed~~ **a** sampling of Sanitary Lagoon sludge.; **The WEC intends to** remove the sludge from the **Sanitary** Lagoon, and close the lagoon (WEC 2020-TN6707)."

Justification: The former East Lagoon area is now green space, and its closure has been approved by SCDHEC. Sludge Sampling within the Sanitary Lagoon was completed in June

2021. The sampling results were submitted with the August 2021 CA Monthly Progress Report. (42-10-6 [Malek, Elise])

Comment: Page: 3-39

Line: 21-23

Current Wording: "Gross alpha and gross beta activities were both above screening levels in groundwater samples recently obtained from a well (W-77) downgradient from the HFSS release (WEC 2020-TN6526)."

Suggested Wording: "~~Gross alpha and gross beta activities were both above screening levels in groundwater samples recently obtained from a well (Well-77) in October 2019, which is downgradient from the HFSS release~~ **exceeded the MCL for U of 30 µg /L** (WEC 2020-TN6526). **Monitoring wells side gradient and downgradient of W-77 do not contain U above the MCL indicating the limited extent of U in groundwater.**"

Justification: Suggest comparing the U results from W-77 to the drinking water MCL versus using the surrogates gross alpha and gross beta. The references to "screening levels" and "recently obtained" are also unclear. (42-10-7 [Malek, Elise])

Comment: Page: 3-39

Line: 34-37

Current Wording: "Groundwater well sampling results from the WEC's ongoing environmental monitoring program show gross alpha activities have exceeded the 15 pCi/L screening level in a number of wells around the WWTP lagoons since 2004 (AECOM 2013-TN5508; NRC 2018-TN6549; WEC 2016-TN5723, WEC 2018- TN5722)."

Suggested Wording: "Groundwater well sampling results from the WEC's ongoing environmental monitoring program show gross alpha activities have exceeded the 15 pCi/L ~~screening~~ **internal investigation** level in a number of wells around the WWTP lagoons since 2004 (AECOM 2013-TN5508; NRC 2018- TN6549; WEC 2016-TN5723, WEC 2018- TN5722). **Exceeding the WEC internal investigation level for gross alpha in groundwater prompts isotopic speciation of U per CFFF procedures.**"

Justification: Per CFFF procedure RA-434, *Environmental Data Management*, the 15 pCi/L is an **internal investigation level** that if exceeded, prompts additional actions. The value is not a "screening" level. Using correct terminology is recommended to avoid confusion. (42-10-11 [Malek, Elise])

Comment: Page: 3-39

Line: 41-46

Current Wording: "Of those samples for which the WEC completed isotopic analysis, the results showed uranium below the MCL/derived limit. Only one well, W-18 with a uranium activity of 101 pCi/L, was above the WEC- derived criterion of 84 pCi/L in 2007, and it had a relatively high gross alpha activity of 115 pCi/L (WEC 2019-TN6546). Gross alpha activities in wells located in the lagoon area and those located away from plant buildings have not exceeded 60 pCi/L since 2010."

Suggested Wording: "Of those samples for which the ~~WEC~~ **CFFF** completed isotopic analysis, the results showed uranium below the MCL. ~~In 2007, Only one well, W-18R with a uranium activity of 101 pCi/L, was above the activity-based limit of the WEC-derived criterion of 84 pCi/L (equivalent to drinking water MCL of 30 µg/L) in 2007,~~ and it had a relatively high gross alpha activity of 115 pCi/L (WEC 2019-TN6546). Gross alpha activities in wells located in the lagoon area and those located away from plant buildings have not exceeded 60 pCi/L since 2010."

Justification: The correct well designation is W-18R. For samples where isotopic analysis was performed, the MCL should be the standard of comparison. There is no need to reference the

activity-based limit obtained by mathematically converting the EPA drinking water MCL (30 µg/L) to activity by using the CFFF specific activity. (42-10-12 [Malek, Elise])

Comment: Page: 3-40

Line: 7-8

Current Wording: "...from beneath the Uranium Recycling and Recovery Services area had a total..."

Suggested Wording: "...from **a subsurface process pipe** beneath the Uranium Recycling and Recovery Services area had a total..."

Justification: The sample was collected from a breached process pipe. (42-10-13 [Malek, Elise])

Comment: Page: 3-40

Line: 20-22

Current Wording: "Isotopic uranium activities were above the derived level (84 pCi/L) and total uranium concentration was above the 30 µg/L MCL in three of the wells (W-55, W-56, and W-59) during 2018 (WEC 2019-TN6876).

Suggested Wording: "Isotopic uranium activities were above the derived level (84 pCi/L) and total uranium concentration was above the 30 µg/L MCL in three of the wells (W-55, W-56, and W-59) during 2018. **However, W-59 did not exceed the derived level or MCL values in January 2019 (WEC 2019- TN6876). W-59 remained below the MCL for total U in both the October 2019 and April 2020 sampling events. W-77, which was installed in Sept 2019 and sampled for the first time in October of 2019 exceeded the MCL for Total U with a result of 247 µg/L.**

Justification: To provide the most current data on wells impacted by U. (42-10-14 [Malek, Elise])

Comment: Page/Line: 3-40/42-45; 3-42/1-3

Current Wording: "Residual Tc-99 present in the enriched uranium received for processing at the CFFF has been postulated to be the source of the Tc- 99 on the site (WEC 2020-TN6538). The WEC evaluated potential sources and mechanisms for Tc-99 releases to the environment and determined that a liquid release from the cylinder recertification building was the most likely source of the Tc- 99 releases (WEC 2019-TN6510). The CSM identifies three mechanisms for releases from the recertification building as potential sources for Tc-99 groundwater contamination (WEC 2020-TN6707)."

Suggested Wording: "**Initially, CFFF evaluated potential sources and mechanisms for Tc-99 releases to the environment and determined that a liquid release from the cylinder recertification building was the most likely source of the Tc-99 releases (WEC 2019-TN6510). The CSM identifies three mechanisms for releases from the recertification building as potential sources for Tc-99 groundwater contamination (WEC 2020-TN6707). In 2020, CFFF completed a source investigation report for Tc-99.** Residual Tc-99 present in the enriched uranium received for processing at the CFFF has been postulated to be the source of the Tc-99 on the site (WEC 2020-TN6538). ~~The WEC evaluated potential sources and mechanisms for Tc-99 releases to the environment and determined that a liquid release from the cylinder recertification building was the most likely source of the Tc-99 releases (WEC 2019-TN6510). The CSM identifies three mechanisms for releases from the recertification building as potential sources for Tc-99 groundwater contamination (WEC 2020-TN6707)."~~

Justification: Suggest reorganizing content to be in chronological order. The Tc-99 source investigation report concluded that current site operations do not have the potential to introduce Tc-99 levels above the MCL into the environment. (42-11-1 [Malek, Elise])

Comment: Page: 3-42, Line: 25-26

Current Wording: "The WEC continues to assess the source of the Tc-99 contamination (WEC

2020-25 TN6707)."

Suggested Wording: ~~The WEC continues to assess the source of the Tc-99 contamination (WEC 2020-25 TN6707).~~

Justification: Suggest deleting this sentence. The source investigation for Tc-99 is complete. (42-11-2 [Malek, Elise])

Comment: Page: 3-43

Line: 15

Current Wording: "...source of contamination as long as it remains in operation."

Suggested Wording: "...source of contamination as long as ~~it~~**the lagoons** remains in operation."

Justification: The greatest risks to the environment are process vessels and piping located within the subsurface. The majority of the WWTP is above ground, with the exception of the lagoons themselves. For those appurtenances that are in the subsurface, CFFF has an underground piping inspection program to mitigate risk. (42-11-3 [Malek, Elise])

Comment: Page: 3-43

Line: 26-28

Current Wording: "...removal of potential contaminant sources (e.g., the former oil house and southern storage area containers), and improved procedures (e.g., for materials handling, spill prevention, and inspection)."

Suggested Wording: "...removal of potential contaminant sources (e.g., the former oil house, ~~and southern storage area containers,~~ **legacy equipment on the roof, elimination of the nickel plating operations, and elimination of PCE use in the SOLX process**), and improved procedures (e.g., for materials handling, spill prevention, and inspection)."

Justification: Suggest adding other significant source reduction activities. (42-11-4 [Malek, Elise])

Comment: Page: 3-43

Line: 38-40

Current Wording: "Furthermore, the NRC staff expects that any future releases may result in groundwater contamination that exceeds MCLs, as has happened on multiple occasions in the past."

Suggested Wording: "Furthermore, the NRC staff expects that any future releases may result in groundwater contamination that exceeds MCLs, as has happened on multiple occasions in the past. **However, an extensive groundwater monitoring network exists and is sampled semiannually to identify any such releases so that additional investigative measures can be implemented according to CFFF procedures RA-434, *Environmental Data Management* and RA-433, *Environmental Remediation*.**"

Justification: Suggest adding the sentence to indicate the extensive nature of the site's 118 groundwater monitoring wells and the new procedures for responding to low-level events and events requiring remediation. (42-11-5 [Malek, Elise])

Comment: Page: 3-49

Line: 36

Current Wording: "...obtained semiannually from 59 wells to monitor known contamination,...)"

Suggested Wording: "...obtained semiannually from ~~59~~**up to 118** wells to monitor known contamination,...)"

Justification: The site's groundwater monitoring network has increased to 118 wells. (42-11-8 [Malek, Elise])

Response: *These comments address specific changes in the text of the EIS proposed by the WEC in consideration of the remedial investigations under a CA with SCDHEC. The NRC staff reviewed the suggested revisions and justification provided by the WEC and revised the text of the EIS to address these comments.*

D.10 Comments Concerning Historic and Cultural Resources

D.10.1 Area of Potential Effects

Comment: The Pine Hill Indian Tribe being from the area, we also recognize that the Green Hill Mound is near Westinghouse. This is a historic cemetery important to Native Americans, not just my people, although it's thought to be ancestral to my tribe. And it is presently not protected under the Native American Graves Protection Act. So we would request that the area of potential effect be expanded to include the Green Hill Mound, and the new license should be increased to include the archaeological site in this cultural, and historical piece of the environmental impact statement. (1-3-4 [Mitchum, Chief Michelle])

Comment: Again, I stress that the area of impact needs to be expanded. I'm very concerned about Green Hill Mound, I'm concerned about the family cemetery, the historic canal that's referenced in the report, I'm concerned of that. (1-3-10 [Mitchum, Chief Michelle])

Comment: My concerns are archaeological, and historical. I agree with Chief Mitchum, we need to expand the area of potential impact to include Green Hill Mound. (1-12-2 [Judge, Christopher])

Comment: [Westinghouse can't be trusted with a new 40 year license...] The Pine Hill Indian Tribe is originally from the area. An important Native American cemetery site (Green Hill Mound), thought to be ancestral to the Pine Hill, that is presently not protected under the federal Native American Grave Protections and Repatriation Act (NAGPRA) law is in close proximity to WFFF. It is an Ancestral, generational heirloom to the Pine Hill Tribe. As such, its significance is priceless. The Area of Potential Effect of the new license should be increased to include this archaeological site. No new license should be approved without the results of the SHPO approved Intensive Archaeological Survey incorporated into the EIS. (7-8 [Cothran, Penny Delaney])

Comment: The South Carolina State Historic Preservation Office (SHPO) has asserted that the WFFF site has high likelihood for the presence of significant archaeological properties (see page 3-35 of the EA). COSCAPA endorses this position and recommends that Nuclear Regulatory Commission (NRC) delay the Environmental Impact Statement (EIS) until the Area of Potential Effect (APE) is correctly defined and intensively surveyed for cultural resources. (10-2 [Martin, Tracy] [Shepherd, Rebecca] [Stewart, James])

Comment: We believe that the APE should be expanded to include archaeological site 38RD4 (Green Hill Mound). This site is an important archaeological resource, Native American cemetery, and has traditional significance for local Native American groups, including the Pine Hill Tribe. The EIS cannot move forward until cultural resources within the APE have been evaluated for National Register of Historic Places (NRHP) eligibility. Only then, can the NRC assess the effects of re-licensing upon cultural resources within the WFFF APE. (10-3 [Martin, Tracy] [Shepherd, Rebecca] [Stewart, James])

Comment: Expand the Area of Potential Effect (APE) to include Green Hill Mound (38RD4), an important archaeological resource, Native American cemetery, and a significant ancestral site to local Native American populations including the Pine Hill Tribe. (12-2 [Judge, Christopher])

Comment: [The Catawba Indian Nation's Tribal Historic Preservation Office (CIN-THPO) on behalf of the Catawba Indian Nation would like to go on record with requested changes that we would like to see put into the 40-year re-license plan....] We would also like to see the Area of Potential Effect include the Green Hill Mound (38RD4). This is a very important archaeological site. (13-2 [Haire, Wenonah G.]

Comment: [The Catawba Indian Nation's Tribal Historic Preservation Office (CIN-THPO) on behalf of the Catawba Indian Nation would like to go on record with requested changes that we would like to see put into the 40-year re-license plan....] As a Federal Agency that must conduct due diligence before making a decision that might affect important archaeological sites, there must be an intensive survey of the APE. As referenced in #2, we would like to see the APE include 38RD4 [green hill mound]. Therefore, we have requested in #1 that the comment period be extended until this intensive survey has been carried out and reviewed by all parties concerned. (13-5 [Haire, Wenonah G.]

Comment: 40 year License Comments Regards Archaeological and Historical Resources: 2) Expand the Area of Potential Effect (APE) to include Green Hill Mound (38RD4), an important archaeological resource, Native American cemetery, and a significant ancestral site to local Native American populations including the Pine Hill Tribe. (16-3 [Mitchum, Chief Michelle])

Comment: A more in-depth archeological survey needs to be conducted to include the Green Hill Mound Cemetery as well as other cemeteries of historical importance to affected tribes. The EPA recommends that these issues be addressed in the Final EIS. (34-1-10 [Fite, Mark])

Comment: The local community believes that the Area of Potential Effect (APE) should be expanded to include archaeological site 38RD4 (Green Hill Mound). This site is an important archaeological resource, Native American cemetery, and has traditional significance for local Native American groups, including the Pine Hill Tribe. (35-12 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: We support the comments made by others concerning the cultural and archaeological resources. We request an extension of the comment period deadline until after the Intensive Archaeological Survey of Westinghouse Fuel Fabrication Facility (WFFF) is completed and reviewed by the State Historic Preservation Office (SHPO) and made available to the public for review. We request an expansion of the Area of Potential Effect (APE) to include significant ancestral sites of the local Native American populations including the Pine Hill Tribe. We ask that WFFF discontinue the installation of test wells in proximity to Denley Cemetery, a historic African American (and possibly Native American) cemetery. We request that all ground disturbances at WFFF should be monitored by a professional archaeologist. (40-3 [Preston, Priscilla])

Comment: Page: 3-75

Line: Figure 3-20

Current Wording:

Suggested Wording:

Justification: Suggest adding an orange shaded box to the figure legend that would represent the "Area of Potential Effect". (42-13-2 [Malek, Elise])

Response: *The area of potential effects (APE) is discussed in Section 3.9 of the EIS and is defined as the CFFF's license area boundary. The APE was informed by the scope and nature of the undertaking, including the licensed activities anticipated to occur during the proposed license renewal term, which would occur within the CFFF's license boundary. As discussed in Section 3.9 of the EIS, while Green Hill Mound is located outside of the CFFF's license boundary and therefore outside the APE, the NRC staff recognizes the cultural importance of the Green Hill Mound. The NRC staff reviewed indirect impacts (e.g., visual, auditory, atmospheric) on cultural resources located in areas adjacent to the CFFF and concluded that impacts would not be significant or adverse. For example, as discussed in Sections 3.3 and 3.4, the NRC staff determined that there is a low potential for contaminants to move offsite because of the implementation of activities and programs (e.g., the environmental sampling and monitoring program) to minimize the effects of releases on other users of the local surface water and groundwater resources. Section 3.9 of the EIS was revised to include information regarding the concurrence of the South Carolina SHPO with the WEC's determination that archeological and architectural resources identified in WEC's cultural resources survey (Brockington 2022-TN7251) are not eligible for listing (SCDAH 2022-TN7368). The NRC staff will submit the final EIS to all consulting parties (South Carolina SHPO, the Catawba Indian Nation, the Muscogee Nation, the Cherokee Nation, and the Eastern Band of Cherokee Indians) and its finding that no historic properties will be affected by issuance of the license renewal to WEC. The NRC staff sent a letter, dated May 26, 2022, to the South Carolina SHPO summarizing the consultation activity and concluding NHPA Section 106 consultation (NRC 2022-TN7460).*

D.10.2 Consulting Parties for NHPA Section 106

Comment: Were scoping comments or comments on the draft EIS solicited from the Pine Hill Indian Tribe, as promised? If not, comments from them must be solicited and the comment period extended. (9-3-2 [Clements, Tom])

Comment: Were scoping comments or comments on the draft EIS solicited from the Native American Studies Center at University of South Carolina Lancaster or from any other institute of higher learning in South Carolina? If not, comments from them must be solicited and the comment period extended. (9-3-3 [Clements, Tom])

Comment: In the slide show presented by NRC during the Webinar on August 26, 2021 under the following heading: Historic and Cultural Resources Information Gathering, Consultation, and Outreach- An agency called the South Carolina Department of Archaeology and Historic Preservation was listed as being consulted by NRC along with the South Carolina Institute of Archaeology and Anthropology and the State Historic Preservation Office. No such agency exists to my knowledge. I have worked as a professional archaeologist in SC for over 35 years. At this point in the process this seems like an avoidable mistake. (12-9 [Judge, Christopher])

Comment: The Draft EIS issued in July 2021 indicates our Tribe being consulted by NRC along with the South Carolina Institute of Archaeology and Anthropology and the State Historic Preservation Office. This Tribe has not been consulted by NRC and we question the existence of the other agencies and/or inclusion of the other agencies alleged to be contacted. (16-10 [Mitchum, Chief Michelle])

Comment: Thank you for your letter of August 6, 2021 which we received via email on August 6, regarding the subject-referenced undertaking. The State Historic Preservation Office (SHPO) is providing comments to the U.S. Nuclear Regulatory Commission (NRC) pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR 800. Consultation with the SHPO is not a substitution for consultation with Tribal Historic Preservation Offices, other Native American tribes including those with state recognition, local governments, or the public. We understand that the NRC is coordinating Section 106 review with the National Environmental Policy Act (NEPA) environmental review. (20-1 [Johnson, Elizabeth M])

Comment: While the tribal consultation (i.e., page 1-6, line 1) process appears to have included the Catawba, it does appear incomplete. The following federally recognized tribes also consider Richland County, SC, within their ancestral lands or Area of Interest, and thus should be additionally consulted per Section 106 of the National Historic Preservation Act:

1. Absentee Shawnee Tribe
 2. Alabama-Quassarte Tribal Town
 3. Catawba Indian Nation
 4. Cherokee Nation
 5. Eastern Band of Cherokee Indians
 6. Eastern Shawnee Tribe of Oklahoma
 7. Kialegee Tribal Town
 8. Muscogee Creek Nation
 9. Poarch Band of Creek Indians
 10. Shawnee Tribe
 11. Seminole Tribe of Florida
 12. Thlopthlocco Tribal Town
 13. Tuscarora Nation
 14. United Keetoowah Band of Cherokee Indians of Oklahoma
- (21-23 [Stanley, Joyce])

Comment: In addition to the Tribal consultation concerns, the descendants of those buried in the Denley Cemetery and the local African American community should also be consulted per Section 106. (21-24 [Stanley, Joyce])

Response: *An overview of NRC's NHPA Section 106 consultation activities is provided in Section 1.5.1.1 and Appendix A, Section A.3. A list of consulting parties is also provided in Section 1.5.1.1 and Appendix A. As part of its Section 106 process, the NRC staff consulted with the SC SHPO and Federally recognized Tribes, including the Catawba Indian Nation, Eastern Band of Cherokee Indians, Muscogee Nation, and the Cherokee Nation. The NRC staff's consultation with the SC SHPO and Catawba Indian Nation began in 2015 and has concluded through the development of the EIS. In response to the comments from the U.S. Department of Interior on the draft EIS, the NRC staff used the U.S. Department of Housing and Urban Development's Tribal Directory Assessment Tool to identify additional Tribes with ancestral ties or interests in Richland County, South Carolina, and coordinated internally with NRC's Division of Materials Safety, Security, State, and Tribal Programs. Based on these activities, in December 2021, the NRC staff reached out via letter to the Eastern Band of Cherokee Indians, Muscogee Nation, and the Cherokee Nation (NRC 2021-TN7123, NRC 2021-TN7125, and NRC 2021-TN7124, respectively) and provided a copy of the draft EIS. In its letter to these three additional Tribes, the NRC staff described the undertaking (i.e., proposed license renewal of the CFFF for an additional 40 years), cultural resources identification efforts,*

and determination of effects on historic properties. As of April 2022, the NRC staff had not received a response from these Tribes.

Additionally, during the preparation of this EIS, the NRC staff reached out to the Pine Hill Indian Tribe and interested members of the public to discuss the proposed action, the NRC's regulatory role, and consideration of direct and indirect effects on cultural resources. The NRC staff also sought comments from the Pine Hill Indian Tribe and other members of the public and interested groups during the EIS scoping process and draft EIS comment period. Comments provided during the EIS scoping process and on the draft EIS have come from multiple interested parties including the SC SHPO, the Catawba Indian Nation, the Pine Hill Indian Tribe, the Council of South Carolina Professional Archaeologists (COSCAPA), Friends of Congaree Swamp, Savannah River Site Watch, a professor at the Native American Studies Center at University of South Carolina Lancaster, and professional archaeologists familiar with regional archaeology. Section 3.9 and Section A.3 in Appendix A to the final EIS have been updated to describe the Section 106 consultation process and outreach activities. Additionally, Section 3.9 was revised to clarify that the NRC staff consulted cultural resource reports and historic context information available through the SC SHPO, which is a program of the South Carolina Department of Archives and History (<https://scdah.sc.gov/historic-preservation/programs/review-compliance>), and the South Carolina Institute of Archaeology and Anthropology (https://sc.edu/study/colleges_schools/artsandsciences/sc_institute_archeology_and_anthropology/divisions/state_archaeologist/index.php). Information consulted through the South Carolina Department of Archives and History included information about the Denley Cemetery and is discussed in Section 3.9 of the EIS. The NRC staff will submit the final EIS to all consulting parties (South Carolina SHPO, the Catawba Indian Nation, the Muscogee Nation, the Cherokee Nation, and the Eastern Band of Cherokee Indians) and its finding that no historic properties will be affected by issuance of the license renewal to WEC. The NRC staff sent a letter, dated May 26, 2022, to the South Carolina SHPO summarizing the consultation activity and concluding NHPA Section 106 consultation (NRC 2022-TN7460).

D.10.3 Historic and Cultural Resources at the CFFF Site

Comment: [People don't feel like they are being heard...] I'm hearing it, and Mr. Reese did bring up Congaree National Park is right there, and I wanted to speak on that for a moment. This particular area is so significant historically. The Congaree National Park is a significant place to the area, because it records the earliest history of that area, back to the colonial period.

And that's where, going back to the earliest records, this whole thing kind of doesn't make sense to me, because hearing all of this fear, and feeling muted, that is a generational problem to the area. These cemeteries, the mound, the national park, these are, to my people, these are remnants, these are heirlooms left to us to take care of in these cemeteries our mothers, and fathers, grandparents, and children. (1-18-2 [Mitchum, Chief Michelle])

Comment: The WFFF property is in a setting that has significant potential for precontact and historic occupations. The area was home to the Congaree Indian Tribe, of which very little historic information remains. Their villages are thought to be in the area and our knowledge of them could be greatly augmented by archaeological research. Hernando De Soto also journeyed through the region in A.D. 1540 before visiting the Native American towns of Aymay (at the junction of the Congaree and Wateree Rivers) and Cofitachequi (near Camden on the Wateree River). Any sites with preserved Spanish components would be greatly beneficial to our understanding of European exploration of the area. (10-1 [Martin, Tracy] [Shepherd, Rebecca] [Stewart, James])

Comment: Page: 3-73

Line: 18

Current Wording: Historic and Cultural Resources

Suggested Wording: **Westinghouse has contracted with a Brockington Cultural Resources Consulting to complete a cultural resource survey at Columbia Fuel Fabrication Facility (CFFF) in Richland County, South Carolina. The South Carolina State Historic Preservation Office (SHPO) has reviewed and approved the survey plan. The contractor completed the survey of the CFFF property in September 2021, including additional GPR assessment of the Denley Cemetery. Submittal of the Draft Survey Report to the SHPO is expected by December 31, 2021.**

The final report will include details presenting the setting of the CFFF, the results of the background research and field survey, descriptions of individual resources with recommendations concerning their eligibility for the Nation Register of Historic Places (NRHP), an assessment of the potential for the undertaking to affect any NRHP- eligible cultural resources with recommendations for actions to prevent or limit any adverse effects to these resources. A draft report will be provided to NRC and SHPO for their review and comment. Once the final report is accepted any recovered artifacts from the field investigation will be forwarded to the University of South Carolina Institute of Archaeology and Anthropology (SCIAA) for permanent curation.

Justification: Fieldwork and GPR for the site-wide cultural resources survey was completed in September 2021. Additional GPR assessment of the Denley cemetery utilizing the latest technology was also completed to update the previous GPR work performed in 2007. (42-12-14 [Malek, Elise])

Response: *Section 3.9 of the EIS describes the historic context information and identifies the sources of information. Section 3.9.1 of the EIS discusses the cultural resource investigations conducted at or near the site and the historic and cultural resources at and adjacent to the CFFF site. Section 3.9.1 was revised to describe the results of the WEC's cultural resource survey in 2021 to identify historic properties within the CFFF license boundary (or APE).*

D.10.4 Impacts on Historic and Cultural Resources

Comment: But to move on, first, and foremost, I am the chief of Pine Hill Indian Tribe, we are indigenous to the area. Our position is that we are requesting no action on this permit for a number of reasons. Going through the draft environmental impact statement, there seem to be a number of contradictory statements, and it's very confusing, but to try, and narrow this down a bit, I discovered some additional information over the past 24 hours. One, the environmental impact statement does not mention the installation of it looks like 32 more wells that are done under the agreement between Westinghouse, and DHEC, and I'm curious if an archaeologist is supervising the installation of these wells while we're saying that there's no impact on the ground, obviously there is. That was one thing I wanted to point out. (1-3-2 [Mitchum, Chief Michelle])

Comment: Also there is the historic African American, and I argue Native American cemetery, because we cannot say with certainty that every person in the cemetery, whether known, or unknown is actually only African American. I do believe there are people who are free people of color, and Native American in the cemetery. The draft environmental impact statement reads as if there is no impact on the cemetery at all. But it also reads as if the impact area is one inch beyond the front door of the facility. So, I take issue with that, I do not think any wells, of any type should be installed anywhere near the proximity of the cemetery because of the potential

impact it will have on the cemetery, and those bodies in the cemetery. (1-3-6 [Mitchum, Chief Michelle])

Comment: I'm concerned for the people the in the area that live there. I would not be doing my duty to my tribe if I were not trying to protect our original indigenous location. I do appreciate your time in allowing me to speak, and again, thank you for putting this together, and getting all of us the opportunity to speak, thank you. (1-3-11 [Mitchum, Chief Michelle])

Comment: Also as Chief Mitchum mentioned, an intensive archaeological survey has been scheduled, and they have already started, but it's not likely that that survey will be completed before the NRC makes a decision about the licensing. So, that is again, I think Chief Mitchum explained that in detail, that's another strong reason for not -- for either extending the decision, well extending the decision date, and also the Green Hill Mound, and the Denely Cemetery (Phonetic.) are a major source of concern that should be considered in more detail, and given more consideration. So that the area of potential effect of a new license should be increased to include the Green Hill Mound, which is a priceless archaeological site. Then there's the issue again, that it's already been mentioned about the test wells that are installed in close proximity to significant archaeological resources such as the Denely Cemetery (1-8-5 [Preston, Priscilla])

Comment: You all are testing soil, and water off site, we need to consider archaeological, and historical resources off site. The Denely Cemetery is an important resource to both African, and Native Americans. There is a well installed within the fence portion, I understand it's not in the cemetery, but that consideration needs to be made. (1-12-3 [Judge, Christopher])

Comment: I think any ground disturbances need to be monitored by a professional archaeologist. I think the importance of cultural resources underneath the built, and maintained grounds at Westinghouse have been seriously under considered. I realize that that's probably not a place you want to dig, it perhaps is contaminated, but creative mitigation could be applied elsewhere. (1-12-4 [Judge, Christopher])

Comment: [Westinghouse can't be trusted with a new 40 year license...] A historic African American cemetery, Denley Cemetery, thought to be potentially eligible to the National Register of Historic Places is located on the WFFF property. A test well has been installed in close proximity to the cemetery. Test wells should not be installed in such close proximity to significant archaeological resources. (7-9 [Cothran, Penny Delaney])

Comment: Concerning the Denley Cemetery, located near to the main processing building: please discuss above-ground and groundwater contaminants at this site and how measurement of such contaminants might impact identified and as-of-now-unidentified graves. Please explain how unmarked graves at or near the defined cemetery boundaries will be identified. Will ground-penetrating radar or other such techniques be used to identify graves? Are any monitoring wells inside the area of burials? If so, why, and what is the impact of them to the cemetery? (9-5-6 [Clements, Tom])

Comment: The APE includes the Denley Cemetery. This cemetery contains the remains of African American and, potentially, Native American interments. In rural South Carolina historic cemeteries, lower status individuals were buried in unmarked graves around the margins of a core family plot. Considering this pattern, the Denley Cemetery likely includes unmarked interments outside of the area set aside for the cemetery. It is our recommendation that the installation of test wells or any other ground disturbance (including the use of heavy machinery

or vehicles) stop until the actual boundaries of the cemetery are determined. (10-4 [Martin, Tracy] [Shepherd, Rebecca] [Stewart, James])

Comment: We also note that it is a felony under South Carolina law (SC Code of Laws, Section 16-17-600) to destroy or desecrate human remains. Consequently, we encourage the NRC to use remote-sensing and/or penetrometer testing to identify the actual boundaries of the resource before ground disturbance re-commences. (10-5 [Martin, Tracy] [Shepherd, Rebecca] [Stewart, James])

Comment: Finally, the late discovery plan does not adequately define the procedures needed to protect sensitive cultural resources from unintended damage. We recommend that this document be revised to include monitoring by a qualified professional archaeologist. (10-6 [Martin, Tracy] [Shepherd, Rebecca] [Stewart, James])

Comment: Discontinue the installation of test wells in proximity to Denley Cemetery. Consider that as yet unidentified unmarked graves are likely to exist at the cemetery. Consider that the ground is disturbed not only by the drilled hole, but the machinery needed to drill the holes. (12-3 [Judge, Christopher])

Comment: All ground disturbances at WFFF should be monitored by a professional archaeologist. (12-4 [Judge, Christopher])

Comment: Consider the effect of actions by WFFF on cultural resources in the built area and maintained grounds area of WFFF. Spanish explorer Hernando DeSoto trekked through and camped in this area in Late April of A.D. 1540, just prior to visiting Native towns known as Aymay (at junction of Congaree and Wateree Rivers) and Cofitachequi (centered near Camden on Wateree River). The history of the Spanish in South Carolina has been marginalized by a greater emphasis on British Colonization that occurred over 100 years later in time. The area was also home to the Congaree Indian Tribe whose scant historical documentation could be greatly augmented by archaeological research. Their villages are thought to be located in this vicinity. If these areas at WFFF cannot be accessed safely for archaeology, creative mitigation measures should be considered in consultation with SHPO. (12-5 [Judge, Christopher])

Comment: Finally, the late discovery plan does not adequately define the procedures needed to protect sensitive cultural resources from unintended damage. We recommend that this document be revised to include monitoring by a qualified professional archaeologist. (12-6 [Judge, Christopher])

Comment: [Comments on the Webinar for draft EIS for the WFFF held on August 26, 2021...] In another slide it stated impacts to Cultural Resources would be small to moderate at WFFF during the 40 year license. Small and moderate impacts are still impacts. (12-10 [Judge, Christopher])

Comment: [The Catawba Indian Nation's Tribal Historic Preservation Office (CIN-THPO) on behalf of the Catawba Indian Nation would like to go on record with requested changes that we would like to see put into the 40-year re-license plan....] 3) Also, test wells should not be continued in the proximity of the Denley Cemetery until that site has been delineated for unmarked graves. (13-3 [Haire, Wenonah G.])

Comment: [The Catawba Indian Nation's Tribal Historic Preservation Office (CIN-THPO) on behalf of the Catawba Indian Nation would like to go on record with requested changes that we would like to see put into the 40-year re-license plan....] Due to the probable inadvertent

discoveries at this site, we request monitoring by a professional archaeologist any time that there will be ground disturbing activities. We feel that the late discovery plan does not presently adequately define the procedures needed to protect sensitive cultural resources from unintended damage. (13-4 [Haire, Wenonah G.]

Comment: Discontinue the installation of test wells in proximity to Denley Cemetery. Consider that as yet unidentified unmarked graves are likely to exist at the cemetery. Consider that the ground is disturbed not only by the drilled hole, but the machinery needed to drill the holes. (16-4 [Mitchum, Chief Michelle])

Comment: All ground disturbances at WFFF should be monitored by a professional archaeologist. (16-5 [Mitchum, Chief Michelle])

Comment: Consider the effect of actions by WFFF on cultural resources in the built area and maintained grounds area of WFFF. Spanish explorer Hernando DeSoto trekked through and camped in this area in Late April of A.D. 1540, just prior to visiting Native towns known as Aymay (at junction of Congaree and Wateree Rivers) and Cofitachequi (centered near Camden on Wateree River). The history of the Spanish in South Carolina has been marginalized by a greater emphasis on British Colonization that occurred over 100 years later in time. The area was also home to the Congaree Indian Tribe whose scant historical documentation could be greatly augmented by archaeological research. Their villages are thought to be located in this vicinity. If these areas at WFFF cannot be accessed safely for archaeology, creative mitigation measures should be considered in consultation with SHPO. (16-6 [Mitchum, Chief Michelle])

Comment: Finally, the late discovery plan does not adequately define the procedures needed to protect sensitive cultural resources from unintended damage. I join archaeologist Chris Judge in recommending that this document be revised to include monitoring by a qualified professional archaeologist. (16-7 [Mitchum, Chief Michelle])

Comment: In a slide presented during the August 26, 2021 webinar, NRC restated that impacts to Cultural Resources would be small to moderate at WFFF during the 40 year license. Small and moderate impacts are still impacts. I trust you will consider the significance of all issues raised herein as you prepare an EIS for this dangerous facility (16-11 [Mitchum, Chief Michelle])

Comment: VIII. The Historical and Cultural data study has not even been completed and will be added AFTER the comment period of the DEIS is over. This is completely wrong and violates NRC's own standards. (17-21 [Greenlaw, Pamela])

Comment: The proposed undertaking is defined as a 40-year license renewal request. The Area of Potential Effect (APE) for the undertaking is defined as the Columbia Fuel Fabrication Facility (CFFF) license area boundary in Richland County, South Carolina. The NRC notes that some activities on the CFFF are not licensed by the NRC and are considered outside the scope of the undertaking. These include forested areas used for timber production, hay fields that are harvested, and an electrical substation near Bluff Road on seven acres. In previous correspondence of December 14, 2006 and May 28, 2015 our office noted that the Westinghouse CFFF site as a whole has a very high probability of significant archaeological properties and that any future proposed expansion or ground disturbance in previously undisturbed areas should be submitted to our office for review and comment. (20-2 [Johnson, Elizabeth M])

Comment: In November 2019 our office concurred with a finding of no historic properties affected for the installation of groundwater wells in previously undisturbed areas, as required by SCDHEC. The contractor for the project was to follow established procedures for inadvertent discoveries of cultural resources and use ground-penetrating radar (GPR) prior to ground disturbing activities. Since that time, members of the public and the Pine Hill Indian Tribe have raised concerns about the potential for impacts to unidentified archaeological sites within the CFFF boundary, as well as indirect effects of the operation of the CFFF to sites located beyond the site boundary. We note that a cultural resources survey is currently underway at the CFFF by a cultural resources management firm, and appreciate this effort to identify cultural resources. The survey will also formally evaluate the previously identified Denley Cemetery for National Register of Historic Places eligibility. If available, it will be helpful to include the findings and recommendations of the cultural resources survey in the final Environmental Impact Statement. (20-3 [Johnson, Elizabeth M])

Comment: Public comments have also raised concerns about the potential for future ground-disturbing activities that do not rise to the level of "significant land disturbance." Please provide a definition of "significant land disturbance" and examples of actions are characterized to have significant land disturbance or not. It would also be helpful to provide information about the types of actions that would require license amendments and additional consultation. We continue to recommend that our office be consulted in any future expansion or additional ground-disturbance in previously undisturbed areas. (20-4 [Johnson, Elizabeth M])

Comment: Public comments have also provided additional recommendations for Denley Cemetery, including the potential for additional unmarked graves outside the cemetery boundaries, removal of monitoring wells in the vicinity of the Denley Cemetery, and monitoring of all ground disturbances at CFFF by a professional archaeologist. (20-5 [Johnson, Elizabeth M])

Comment: Given the length of the undertaking, the potential for unknown historic properties, and unanticipated effects, please consider the development of a Programmatic Agreement (PA) to lay out the process for conducting future Section 106 consultation. A PA is appropriate given the time frame of the undertaking (40 year license renewal) and the potential for the project to change, as evidenced by the modification in the undertaking from 2015 to 2019 to install groundwater monitoring wells. Please refer to SHPO Project Number 15-EJ0022 in any future correspondence regarding this project. If you have any questions, please contact me at (803) 896-6168 or ejohnson@scdah.sc.gov. (20-6 [Johnson, Elizabeth M])

Comment: Also discussed during the webinar are concerns about the historic African American Denley cemetery on the grounds at Westinghouse. An archeological study should be completed before approval of an environmental license extension. How can there be a finding of no significant impact if Westinghouse is installing wells in the area near the cemetery? (31-7 [Woods, Felicia])

Comment: The WEC property was home to the Congaree Indian Tribe, of which very little historic information remains. Their villages are thought to be in the area and our knowledge of them could be greatly augmented by archaeological research. Hernando De Soto also journeyed through the region in A.D. 1540 before visiting the Native American towns of Aymay (at the junction of the Congaree and Wateree Rivers) and Cofitachequi (near Camden on the Wateree River). Any sites with preserved Spanish components would be greatly beneficial to our understanding of European exploration of the area. The South Carolina State Historic Preservation Office (SHPO) has asserted that the WEC site has high likelihood for the presence

of significant archaeological properties. (35-11 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: The APE includes the Denley Cemetery. This cemetery contains the remains of African American and, potentially, Native American interments. In rural South Carolina historic cemeteries, lower status individuals were buried in unmarked graves around the margins of a core family plot. Considering this pattern, the Denley Cemetery likely includes unmarked interments outside of the area set aside for the cemetery. Consequently, we encourage the NRC to use remote-sensing and/or penetrometer testing to identify the actual boundaries of the resource before ground disturbance re-commences. (35-13 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Response: *The NRC staff recognizes that there are concerns about impacts on known cultural resources located on the CFFF site, including impacts of well installations near the Denley Cemetery as well as indirect impacts on the nearby Green Hill Mound, and requests have been made that the EIS include the results of the cultural resources survey. Section 3.9.2 of the EIS discusses the impacts on historic and cultural resources, including direct and indirect impacts (e.g., visual, auditory, and atmospheric) from the proposed license renewal of the WEC's CFFF's for an additional 40 years (i.e., undertaking). The WEC is authorized to conduct NRC licensed fuel fabrication operations within the license area boundary. Additionally, the WEC has not proposed changes to its NRC licensed fuel fabrication operations that would result in land disturbances in areas within the CFFF site that have not been previously disturbed by the construction and operation of the WEC. The WEC can make changes to its facility, including the site, structures, processes, systems, equipment, components, computer programs, and activities or personnel in accordance with NRC regulations and its license application (TN4883; WEC 2021-TN7106). If the change sought by the WEC would reduce the effectiveness of the WEC facility item or process being changed, the WEC must submit a license amendment request to the NRC.*

Land disturbances have occurred and can occur as a result of the remedial investigations that the WEC is conducting under a Consent Agreement with the SCDHEC to address known onsite contamination (e.g., installation of monitoring wells and remediation activities). As discussed in Section 3.9.2, while current and future ground-disturbing activities under the CA would occur within disturbed areas of the CFFF site, soils in these areas have been extensively disturbed by past construction and operation of the CFFF. Potential impacts on historic and cultural resources are unlikely given the low potential for previously unidentified intact archaeological resources to be present in these areas. Notwithstanding, the WEC updated its cultural resource management procedures to incorporate the management recommendation identified in the cultural resource survey report addressing future ground-disturbing activities in the disturbed areas inside the security fence that will extend more than 4 ft below the present ground surface to determine if there is a possibility of archaeological deposits.

Regarding impacts on the Denley Cemetery, as discussed in Section 3.9.2 of the EIS, the WEC fenced off the cemetery and has maintained and will continue its upkeep. The WEC must follow State laws regarding burial sites and cemeteries. With respect to the installation of a groundwater monitoring well, the WEC installed permanent monitoring well (well 98) near but outside the boundary of the original cemetery. As discussed in the cultural resource survey report, the monitoring well has been separated from the cemetery by fencing, and the well can now be accessed without entering the defined limits of the cemetery. As part of the cultural resources survey that the WEC conducted, ground penetrating RADAR (GPR) was performed to survey and map the Denley Cemetery. After assessing the Denley Cemetery relative to the

NRHP-eligibility criteria specific to cemeteries, the licensee determined that Denley Cemetery would not be eligible for listing in the NRHP. The South Carolina SHPO concurred with this finding that no NRHP-eligible properties are present (SCDAH 2022-TN7368).

Because no cultural resources eligible for listing in the NRHP were found on the CFFF site, the NRC staff has found that the no adverse effects on historic properties are anticipated. The staff will notify all consulting parties of its finding in accordance with 36 CFR 800.4(d)(1) (TN513). As discussed above, the WEC updated its cultural resource management procedures to incorporate the management recommendation identified in the cultural resource survey report addressing future ground-disturbing activities in the disturbed areas inside the security fence that will extend more than 4 ft below the present ground surface to determine if there is a possibility of archaeological deposits. These cultural resource management procedures also address the discovery of previously unrecorded cultural resources or human remains during ground-disturbing activities and require, in part, that a qualified professional archaeologist investigate any finds to determine the potential significance and consult with the South Carolina SHPO about additional actions, which may include further archaeological investigations or consultation with Indian Tribes. Additionally, the WEC will continue the upkeep of the Denley Cemetery and avoid potential impacts consistent with South Carolina laws.

As discussed in Section 3.9 of the EIS, while Green Hill Mound is located outside of the CFFF's license boundary and therefore outside the APE, the NRC staff recognizes the cultural importance of Green Hill Mound. The NRC staff reviewed indirect impacts (e.g., visual, auditory, atmospheric) on cultural resources located in areas adjacent to the CFFF and concluded that impacts would not be significant or adverse. For example, as discussed in Sections 3.3 and 3.4, the NRC staff determined that there is a low potential for contaminants to move offsite because of the implementation of activities and programs (e.g., the environmental sampling and monitoring program) to minimize the effects of releases on other users of the local surface water and groundwater resources. The NRC staff recognizes that there are concerns about impacts on known cultural resources located on the CFFF site, including impacts of well installations near the Denley Cemetery as well as indirect impacts on the nearby Green Hill Mound, and the WEC has protective measures in place to protect Denley Cemetery and sensitive areas on the WEC site (Brockington 2022-TN7251 and WEC 2022-TN7358).

D.10.5 Tribal Treaty Rights

Comment: The DEIS states that the CFFF site has a high probability of significant archaeological resources. The DEIS also notes that scoping comments about archaeological resources were received from the Catawba Indian Nation; Waccamaw Indian People; Pine Hill Indian Tribe; Friends of Congaree Swamp; and Hayden. The DEIS indicates that the area where the CFFF site is located and the nearby surrounding area, particularly along the nearby Congaree River and Congaree National Park, is important historically and archaeologically. The EPA acknowledges that archeological resources are of great importance to tribal and indigenous populations surrounding the facility. Executive Order 13175 of November 6, 2000 (Consultation and Coordination with Indian Tribal Governments), charges all executive departments and agencies with engaging in regular, meaningful, and robust consultation with Tribal Officials, from federally recognized tribes, in the development of federal policies that have Tribal implications. There also may be tribal governments that are not currently recognized by the federal government that might have archeological resources that could be relevant to the discussion regarding archeological resources.

Recommendations: The EPA recommends that the Final EIS include a discussion related to "How treaty rights may be affected by the proposed action." The Final EIS should explain how

the proposed action may impact archeological resources, provide any appropriate technical information that is available, and solicit input about any resource-based treaty rights from tribal agencies. It is also appropriate to request the tribe provide recommendations for the lead agency to consider, to ensure a treaty right is protected. (34-1-9 [Fite, Mark])

Response: *As an independent regulatory agency, the NRC discharges its obligations under its trust responsibility by complying with regulations and statutes—in this case, the AEA, NEPA, and the National Historic Preservation Act (NHPA) of 1966, as amended—and by implementing any fiduciary responsibility by assuring that tribal members receive protections under NRC's implementing regulations. The NRC is aware that land ownership disputes related to past treaties and laws exist between Indian Tribes and the U.S. Government. In its role as an independent regulatory agency, the NRC lacks the authority to resolve these issues. As required by 36 CFR Part 800, the NRC staff consults with affected federally recognized Indian Tribes to determine whether the proposed Federal action will have an impact on historic and cultural properties. No changes were made to the EIS as a result of this comment.*

D.10.6 WEC's Cultural Resource Survey

Comment: There is a -- in year five you put that in its license renewal application Westinghouse did not request changes to its licensed activities, or construction of new buildings, and obviously they are. And it seems to me that installing wells would disturb the land. Westinghouse, my understanding, has agreed to an intensive archaeological survey being conducted, I believe it's supposed to start this month, with the final being approved by the State Historic Preservation Office in South Carolina around February of next year. Which is the same time frame that these final drafts will be -- the impact statement will be ready, and potentially the decision made by the NRC. The assessment about the license just cannot be made without the results of this archaeological survey. We can't make intelligent decisions, or comments in response to these statements that are being published without all of the information in front of us. And I feel that we are being short changed, because this cultural piece is not in place. (1-3-3 [Mitchum, Chief Michelle])

Comment: No new license should be approved without the results of this archaeological study. (1-3-5 [Mitchum, Chief Michelle])

Comment: I agree with Chief Mitchum, that if we don't have the archaeological survey that is either about to start, or is going to start soon, if we don't have that in our hands, we can't really evaluate the effect on cultural resources under the current plan. (1-12-5 [Judge, Christopher])

Comment: [Westinghouse can't be trusted with a new 40 year license...] WFFF agreed to an Intensive Archaeological Survey, conducted late summer/early fall 2021, with final SHPO approval anticipated circa February 2022. The NRC staff anticipates publishing the final EIS in January 2022, and the Record of Decision in February 2022. An assessment about the license cannot be made without the results of the Intensive Archaeological Survey. (7-7 [Cothran, Penny Delaney])

Comment: The draft EIS states (on page 3-82) that: "The WEC has proposed to conduct a cultural resource survey within the CFFF site to identify historic properties in a manner that would further avoid or minimize potential future impacts (WEC 2021-TN7077). The cultural resource survey would be developed in coordination with the South Carolina SHPO." Please provide the "cultural resource survey" as part of the draft EIS record and keep the comment period open on the draft EIS until the survey is finalized and released and the public has had a

chance to review and comment on it. Will professional archaeologists be involved in any cultural resource surveys? If not, why not? (9-5-5 [Clements, Tom])

Comment: The WFFF re-licensing has skipped a vital step in their assessment of effects. The NRC has applied too many assumptions into the decision-making process. The federal agency cannot assess effects without an intensive survey of the APE. It cannot equate the absence of previously recorded resources with evidence that there are significant resources within the APE. It is our recommendation that the EIS comment period should be extended until after an intensive cultural resource investigation of the WFFF APE is completed, reviewed by SHPO, and made available for the public to review. Planning of this survey could include a professional examination of the Denley Cemetery and the development of a comprehensive late discovery plan. (10-7 [Martin, Tracy] [Shepherd, Rebecca] [Stewart, James])

Comment: We provided comments on possible cultural resources in our EIS Scoping letter in August 2020, focusing on mills on Mill Creek. We strongly support the Cultural Resource Survey WEC has proposed to SHPO (State Historic Preservation Office) and request that the survey be made a license condition. (11-12 [Grego, John])

Comment: Also discussed during the webinar are concerns about the historic African American Denley cemetery located on the grounds at Westinghouse. An archeological study should be completed before approval of an environmental license extension. How can there be a finding of no significant impact if Westinghouse installs wells close to the area where the cemetery is located...possible soil contamination? (50-8 [Woods, Felicia])

Response: *The WEC contracted with Brockington Cultural Resources Consulting to complete a cultural resource survey at CFFF site in Richland County, South Carolina. The site survey was completed in 2021 by an archaeological field crew following the survey plan approved by the South Carolina SHPO (Brockington 2022-TN7251). The final cultural resource survey report describes the setting of the CFFF site, the results of the background research and field survey, identified cultural resources with recommendations concerning their eligibility for the Nation Register of Historic Places (NRHP), and an assessment of the potential for the undertaking to affect any NRHP-eligible cultural resources with recommendations for actions to prevent or limit any adverse effects to these resources. The South Carolina SHPO has reviewed the report and concurred with the recommendation that none of the architectural and archaeological resources identified on the CFFF site are NRHP-eligible (SCDAH 2022-TN7368). The results of this survey have been included in Sections 3.9.1 and 3.9.2 of the EIS.*

D.10.7 Editorial Comments

Comment: 3-74 (line 43) incorrectly identifies the Congaree Indians in the context of the 1541 De Soto (and 1566-1567 Juan Pardo, not mentioned) expeditions. The Spanish expeditions encountered the Paramount Chiefdom of Cofitachequi. The first use of the term "Congaree" is dated to John Lawson's 1709 publication detailing his 1701 expedition. (21-28 [Stanley, Joyce])

Comment: Page: 3-76

Line: 44

Current Wording: "While not listed in ArchSite, the Denley Cemetery was discovered on the CFFF site in 2003 and..."

Suggested Wording: "While not listed in ArchSite, the Denley Cemetery was re-discovered on the CFFF site in 2003 and..."

Justification: The cemetery footprint is designated on some drawings when the plant was constructed. (42-13-3 [Malek, Elise])

Comment: Page: 3-79

Line: 19-21

Current Wording: "The WEC has proposed installation of a permanent monitoring well (W-98) "near but outside the southern edge of the Denley Cemetery," but no investigations are planned to occur within the fenced area (WEC 2020-TN6871)."

Suggested Wording: "The ~~WEC~~ **CFFF** has proposed installation of a permanent monitoring well (W-98) "near but outside the southern edge of the **original** Denley Cemetery." ~~but no investigations are planned to occur within the fenced area (WEC 2020-TN6871).~~"

Justification: The field investigation portion of the remedial investigation was completed in August 2021.

The Remedial Investigation Report will be submitted to DHEC upon completion in 2022 for subsequent review, comment, and final approval. (42-13-4 [Malek, Elise])

Comment: Page: 3-79

Line: 45

Current Wording: "...resources or human remains during the implementation of ground-disturbing activities..."

Suggested Wording: "...resources or human remains during the implementation of ground-disturbing activities **was**..."

Justification: Word is missing from the sentence. (42-13-6 [Malek, Elise])

Response: *Several editorial comments were provided regarding the historic and cultural resources in Section 3.9 of the EIS. Section 3.9 of the EIS has been updated to address these comments.*

D.11 Comments Concerning Issues Outside Scope

D.11.1 Regulatory Oversight by the State or Others

Comment: I'm concerned, and I guess my question for you all are, I got two questions, one is what has the EPA done, or what is the EPA doing to ensure that the administration's focus, or urgency on working with communities such as ours, how is that matter being sort of layered on this issue? And then I just wanted to want you all to know that the community does not, it doesn't go unnoticed that when we have these types of licensure issues that now miraculously we have this Westinghouse advisory committee that's convened, it's been really convenient that this convening of this advisory committee has happened when this environmental impact statement was announced. We haven't heard from the Westinghouse plant before this, we're hopeful that this continues, but nobody seems to believe that it will. And so we're concerned that this process has not taken into consideration the vastly majority, vastly low income residents, and I want to know, the second question that I have is what's the precedent for these comments changing the outcome of a license agreement? I mean is there any precedent where a community's input has had any impact on the process? And I'll wait to hear a response, thanks. (1-2-3 [Reese, Robert])

Comment: Thank you. I wanted to follow up with a couple of more things that came to mind, and this is just, you may not be able to answer these questions, but really quick, the DHEC conducted a public meeting in Hopkins for Lower Richland County, and counseled county

residents in 2019 I believe, has that happened again? Has DHEC, to your knowledge, has DHEC conducted a new public meeting based on the new draft? (1-9-1 [Mitchum, Chief Michelle])

Comment: Even if it could DHEC has not enforced state and EPA regulations well and consistently over time. Industries are routinely allowed to continue operating without renewal of NPDES and air permits which expire. Westinghouse has continued to operate already with an expired air permit for several years. (17-7 [Greenlaw, Pamela])

Comment: Wateree Coal Fired Power Plant. The Sierra Club has sued DHEC to allow Dominion Energy to continue polluting the water and air under a long-expired NPDES permit for the Wateree Coal-fired Power Plant which is within 20 miles of WEC-CFFF and WesDyne facilities. Forty years of a track record of non-enforcement actions at the hands of an unreliable state agency would not be acceptable. (17-8 [Greenlaw, Pamela])

Comment: The Lower Richland community wants better oversight (safety & environmental) of the air and water quality level around Westinghouse. We ask that the NRC not cut back on the number of inspections and monitoring of air, ground water resources and soil levels. We want SCDHEC to continue to test for uranium levels released into the atmosphere (within limits/standards for federal and state air quality regulations). The soil samples collected around the sea land containers should continue to be analyzed. We also ask for the NRC to be notified as soon as possible of any malfunction of equipment or system at the plant that releases hazardous chemicals and/or gases (VOC's). Our community wants the NRC to protect employee and public health while promoting safe practices at Westinghouse. The community advocates for the NRC to continue with annual inspections. (31-2 [Woods, Felicia])

Comment: The LR community wants better oversight of the wastewater discharge - continue to test for high levels of nitrate-nitrogen, uranium and terchnetium-99 in the treatment system. There have been liner issues in the past. We continue to ask for transparency and accountability of environmental investigations at the Westinghouse facility. We advocate for the NRC's regulatory agency to protect the Community from waste emissions coming from the Westinghouse plant. (31-4 [Woods, Felicia])

Comment: The Lower Richland community wants better oversight (safety & environmental) of the air and water quality level around Westinghouse. We ask that the NRC not cut back on the number of inspections and monitoring of air, ground water resources and soil levels. We want SCDHEC to continue to test for uranium levels released into the atmosphere (within limits/standards for federal and state air quality regulations). The soil samples collected around the sea land containers should continue to be analyzed. We also ask for the NRC to be notified as soon as possible of any malfunction of equipment or system at the plant that releases hazardous chemicals and/or gases (VOC's). (50-2 [Woods, Felicia])

Response: *These comments refer to other agency or the WEC's activities or processes, and are therefore out of scope with regard to the NRC's review in this EIS. The SCDHEC maintains authority for water and air quality standards, and is responsible for the issuance of National Pollutant Discharge Elimination System (NPDES) permits and air operating permits in the State. The State issued a permit to the WEC for discharges to the Congaree River from the CFFF under the National Pollutant Discharge Elimination System (NPDES). These releases are controlled and monitored to meet conservative regulatory limits to protect public health, safety, and the environment (including radiological—gross alpha, gross beta). The WEC is required to submit an annual groundwater report to the State. The WEC also has an operating air permit*

from SCDHEC under which the WEC monitors for nonradiological air pollutants. While both the NRC and SCDHEC regulations promote safe operations of the facility and are intended to be protective of public health and the environment, the State's regulatory oversight is outside the scope of the EIS. The NRC staff's impact analysis was, however, informed by the State's regulatory process, including consideration of the State's permit and the results of the WEC's remedial investigations under the Consent Agreement with the State. No changes were made to the EIS as a result of these comments.

D.11.2 Outside Scope - General Concerns

Comment: So, let's now look at human nature, when industry loses a sense of accountability to the public because, well they don't have to listen to us, they're not obligated by law, or regulation to communicate with, meet with, or request comment. For example, here's a glaring example, last month, all these are recent, but just to put this in context, NRC had a predecisional, you all like to make predecisions, predecisional enforcement conference with Interseas Riverbend Nuclear Station concerning upper personnel's three willful, not my words, NRC's word in their letter, willful violations named in an inspection report. And human nature under pressure at Westinghouse itself, with COVID they've had to reduce, and spread out staff. That's fine, it's what you have to do for the safety. (1-7-6 [Greenlaw, Pamela])

Comment: And I'm going to get off, and I may come back on later, because I have some other concerns, but I just wanted to ask you to respond to those things, because I didn't make this up, these are from NRC. And it seems that NRC is not in sync with itself, or with the public. The prior hearings that were held, everybody who was commenting on looking at developing guidance documents for extended licenses, that process hasn't been completed, and here we are jumping the gun. Thank you very much, please respond, I'd appreciate it. (1-7-8 [Greenlaw, Pamela])

Comment: Here's something else from your own organization, NRC, the Office of the Inspector General published an audit of the NRC's material control, and accounting inspection program for special materials in March of this year. Recommendations included a need for qualifications to be strengthened, material control, and accounting training needs to be updated. And yet the end, that program will reduce the frequency of inspections from annually to once every two years. And according to that report, the headquarters staff are not always made aware of the inspection reports. (1-7-10 [Greenlaw, Pamela])

Comment: Also with regard to the length of the -- the 40 year length, the NRC is also trying to extend reactor licenses 40 years, so that they would actually have licenses for 100 years, when they were originally designed for 20, 30, or 40, and so this is a trend nationally also that we're seeing happening with this EIS, and with license extensions for reactors themselves. Like the NRC wants to not have to review on a regular basis, or -- so the length of extension, the minimization of the concerns, and the environmental justice violations really. (1-16-2 [D'Arrigo, Diane])

Comment: What happened to fuel designated to replace MOX fuel in the event that the U.S. Department of Energy's plutonium fuel (MOX) program faltered after it started and was not able to provide MOX to any utility that had signed up to use MOX? (Note: no utilities signed up to use MOX before the bungled NRC-regulated project was terminated.) (9-2-14 [Clements, Tom])

Comment: Do other agencies, such as DOE's National Nuclear Security Administration, have a role with any materials or equipment stored, handled or operated at the facility?

On August 11, the USA Department of Energy published a Federal Register notice entitled "Request for Information Regarding Establishment of the Department of Energy Uranium Reserve Program." It states that "The Department is considering options to acquire natural uranium and convert this uranium into uranium hexafluoride that would be stored at commercial facilities in the United States." Could WEC have a role in this program? If so, what could be the environmental and health risks and impacts? (9-2-15 [Clements, Tom])

Comment: What is the "insider threat" to public health, safety and the environment? As there could be a host of impacts, this is clearly inside the scope of things analyzed in the EIS. The NRC has not attempted to explain why it determined that the "insider threat" is outside the scope of the draft EIS. Why and what is the basis for that determination? (9-2-16 [Clements, Tom])

Comment: Could the facility handle or process High Assay Low Enriched Uranium (HALEU)? What if that is proposed in the future? Would that require a license amendment? Given the current promotion of HALEU for use as fuel in "advanced reactors" this should not be beyond the scope of the EIS. (9-2-18 [Clements, Tom])

Comment: What is the role of Brookfield Business Partners in relation to WEC and any WEC subsidiaries? If Brookfield is the owner of the WEC facility, why isn't Brookfield seeking an NRC licenses for operation of the fuel plant? What would be the impact to environmental and health impacts if WEC is sold by Brookfield? (9-4-21 [Clements, Tom])

Comment: It has been said that there could be a national security implication to not renewing the license. That is to say that national security could be so threatened, by so much as one production facility going offline. If this is true, then why have other production facilities not been created to ensure adequate supply in the event one or more facilities are unable to operate or produce? How is it that something so vital could have such a precarious supply? Such poor planning does not, in itself, reason to be in the best interest of national security, and seems a flimsy argument at best. (29-6 [May, Stephen])

Comment: All analysis models are run for forty years, however since the current license doesn't expire until 2027, clarification should be provided as to when the start and stop date of the model apply. Alternatively, perhaps modeling for a 50 year time span should be considered. (39-3 [Ghanem, Sahar] [Plauche, Mary])

Comment: With the rate of technological developments, esp. over a span 40 years, this report should discuss what improvements to technology are anticipated and how that may affect the industrial processes at the facility (i.e. what are the anticipated technologies that will be phased in and what is anticipated to be phased out?) (39-5 [Ghanem, Sahar] [Plauche, Mary])

Comment: Nuclear power is still one of those types of energy that not everybody understands. The notion is that it is dangerous, hazardous and powerful. While the latter is true that it is a powerful source, nuclear power is actually the most energy efficient and safe for the employees and for our planet. If this regulation is marketed properly, we can shift the industry and the consumers' perception of this power source and use it for positive marketing tactics. This is the number one challenge for the nuclear industry. We need to emphasize how nuclear power is the largest clean energy source, it runs 24/7, and not only does it create jobs but it is safe for everyone involved. (44-1 [Love, Sophia])

Comment: I would like to say that I listened last night to the comments that were from the webinar and it was apparent that people are very concerned about Westinghouse receiving relicensing and today I saw that Arundhati Roy has some words that I think are very appropriate related to the whole issue of what goes on over there that the Nuclear Regulatory Commission has to deal with. And it relates to what we've experience with the virus. So, what is this thing that has happened to us? It's more than a virus, it has brought the world to a halt like nothing else could and we are all searching for some kind of normality but that rupture still exists. And in the midst of our despair, it offers us a chance to rethink the doomsday machine we have built for ourselves. She doesn't mention nuclear weapons, but it certainly seems appropriate here. Nothing could be worse than return to normality. In the past, historically, pandemics have forced humans to break with the past and imagine their world anew. And this one is no different. It is a portal, a gateway between one world and the next. (48-6-1 [Fralix, Cassandra])

Comment: We continue to walk through it bringing the evil and the hatred and the destruction in creating nuclear weapons. Or we can walk through lightly, with little luggage, ready to imagine another world and willing to fight for it, but not with nuclear weapons, with kindness and caring. You've seen what happened in Afghanistan and you saw what happened in Vietnam. That people do not want you in their country and they will keep working to keep you out. So, we have nothing to fear. We need to stop creating nuclear weapons; they are destroying our earth; they're destroying the people. We don't need that. Thank you so much. (48-6-2 [Fralix, Cassandra])

Comment: If you are working for the NRC, you are part of this larger issue of destruction. Please consider what is going on. (48-6-3 [Fralix, Cassandra])

Comment: *[voice recording]* Background noise. No discernable comment.

(48-14-1 [Davis, Ethel Lee])

Comment: And we know that this is just the path that we are going through because there's too much money involved and (inaudible). Richland County and South Carolina has shown a bad record with these types of companies. (48-19-2 [Anonymous, James])

Comment: Government entities must be fully forthcoming about management of the nuclear weapons aspects of the Westinghouse fuel fabrication facility. The Nuclear Regulatory Commission must reconsider its lack of regulation of the production of Tritium Producing Burnable Absorber Rods (TPBARs), reveal what types of waste are generated by the production of those rods, regulate the resultant waste and allow the public to comment about that in the current draft Environmental Impact Statement that must remain open for public comment. (49-2-15 [Clements, Tom])

Comment: U.S. fabrication of tritium rods in a commercial facility and production tritium gas in commercial reactors reveals the weakened state of U.S. nuclear non-proliferation policies. The tritium issue underscores that the U.S. has a double standard on such matters while it seeks to impose a stricter standard on other countries. Production of nuclear weapons materials in the civilian fuel cycle undermines international nuclear non-proliferation norms and must be halted in the U.S. and all other countries. (49-2-19 [Clements, Tom])

Comment: Using a commercial nuclear fuel factory to produce material that also supports the military weapons effort sets a bad example for countries the United States is trying to discourage from developing atomic weapons, critics say. (49-2-20 [Clements, Tom])

Comment: Our community wants the NRC to protect employee and public health while promoting safe practices at Westinghouse. The community advocates for the NRC to continue with annual inspections, not once every two years. (50-14 [Woods, Felicia])

Response: *The scope of the EIS is limited to an analysis of the environmental impacts from the proposed action, i.e., the proposed license renewal of the CFFF. Comments about specific sites or facilities regulated by the NRC (other than the CFFF) or in general about the NRC's oversight process, including enforcement, are outside the scope of the EIS. Comments related to operating nuclear reactor sites and NRC's consideration of reactor license renewals beyond the current 20-year license renewal terms are also outside of the scope of this EIS. The status of other nuclear fuel types, the future of nuclear power, and the security or fabrication of nuclear weapons is not a part of the proposed action or addressed by the environmental review in the EIS and considered outside of the scope of the EIS. No changes were made to the EIS as a result of these comments.*

D.12 Comments Concerning Issues Outside Scope - NRC Oversight

D.12.1 Outside Scope - NRC Oversight

Comment: Again, we, the residents of Lower Richland don't believe that. They treat us like collateral damage, and we're tired of being treated that way. The Nuclear Regulatory Commission, and the DHEC are the people that should be protecting us from Westinghouse, but they're not, they're not, and now they have the audacity to even consider given Westinghouse a 40 year permit with their horrible track record of safety. And they're talking about cutting back the number of inspections, they're throwing us to the wolves, and the wolf in this case is that Westinghouse plant that's located about six miles down the road where I live. (1-13-3 [Sanders, Virginia])

Comment: And so NRC's inspections were not doing the job. And I'm not saying the people at NRC, that the inspectors don't do their jobs, but they're not asked to do what our Department of Health and Environmental Control was able to do. And that is not the way the NRC needs to operate. Where if they don't catch the problem, you hope the state will. So, it's another reason not to do a 40 year license anywhere in the United States, even if they've behaved well. The NRC's cutting back on inspection schedules, and they missed what was going on here, okay? Until DHEC stepped up, and I'm proud of them, I don't often say that, but I'm very proud of them, they did an outstanding job. (1-15-3 [Greenlaw, Pamela])

Comment: What would it take to be so contaminated that the facility would have to close? And the consequences, I'm not saying that that's what should happen, I'm trying to find out how much contamination would be enough to say stop, and what it would take to clean that up? And which communities are allowed to have these higher amounts of contamination? (1-16-3 [D'Arrigo, Diane])

Comment: [Westinghouse can't be trusted with a new 40 year license] 1. The existing NRC license failed to prevent extensive radioactive and hazardous pollution by the Westinghouse Nuclear Fuel Fabrication Facility over the last 50 years which threatens air quality, groundwater and surface water quality including the waters of Mill Creek which flows through the site and into the Congaree River; 2. Under the existing NRC license Westinghouse has failed to demonstrate the necessary corporate character or competence to comply with regulatory requirements. A history of spills, leaks, accidents and corporate malfeasance undermine assurance that Westinghouse will comply with future regulatory requirements under a new 40-

year license; 3. Under the existing license the NRC has failed to exercise sufficient oversight to prevent and remedy pollution discharges and violations by Westinghouse; (7-2 [Cothran, Penny Delaney])

Comment: Concerning the recently released NRC document Audit of the NRC's Material Control and Accounting Inspection Program for Special Nuclear Material
As the documents, released in March 2021, states: "The audit objective was to assess the effectiveness of the NRC's inspection program for the accounting and control of special nuclear material at fuel fabrication facilities." The document states that "Starting in 2021, the inspection frequency at Cat III facilities will decrease from once a year to once every 2 years." This reduction in inspections is of concern and must be addressed in the draft EIS as reduced inspections could have implications for the MC&A program at WEC, which is a Category III facility. The document says: "The Nuclear Regulatory Commission (NRC) is responsible for protecting the health and safety of the public and the environment by licensing and regulating the civilian uses of radioactive materials." What is the connection between MC&A and safe operation of the WEC facility? Can this be accomplished with only one MC&A inspection n every two years? The draft EIS must discuss this. Given their oversight of WEC's MC&A program, what role does the NRC's Office of Nuclear Material Safety and Safeguards (NMSS) have in the EIS process? What is coordination with Region II's Division of Fuel Facility Inspection (DFFI)? (9-5-17 [Clements, Tom])

Comment: NRC needed to investigate Westinghouse's track record of safety, security, and the environment over the past 20 years, not merely the past 2 years of conformance during the time with the Consent Agreement with the South Carolina Department of Health and Environmental Contro. (17-3 [Greenlaw, Pamela])

Comment: NRC has planned fewer direct, in-person inspections since COVID-19 began. NRC inspectors have found surprising incidents of poor safety practices in person which are not reflected in written reports by the company. If fewer, direct, in-person inspections continue and become the norm, the result will be lapses back into poor safety culture, more errors, and more instances of non-compliance on the part of Westinghouse. (17-5 [Greenlaw, Pamela])

Comment: I also recommend that oversight by regulatory agencies be increased at Westinghouse to ensure lives are protected. (25-3 [Brawley, Wendy])

Response: *The NRC is committed to ensuring safe and secure operations of the facilities it regulates. The WEC is subject to NRC's oversight program under which inspections of the WEC's facility and operations are routinely conducted. The NRC performs inspections at fuel cycle facilities covering areas such as security, material control and accounting, nuclear criticality, radiation safety, emergency preparedness, and environmental protection.*

The results of the fuel cycle facility inspections are documented in NRC inspection reports as described in Section 2.2.2.1.2. The licensee performance assessment process is conducted on a biennial basis and involves the review of all inspections (including violations and enforcement actions) conducted over the period to determine whether an "Area Needing Improvement" (ANI) must be identified. In general, an ANI is a significant safety or security concern for which additional inspection is warranted. The assessment process includes external stakeholder input through a corresponding public meeting. Additionally, when issues such as leaks and spills (inadvertent releases) are reported to the NRC, the staff evaluates the safety significance and determines the most appropriate response. As part of the fuel cycle oversight process, the NRC issues enforcement actions to licensees who violate NRC regulations. These enforcement

actions are communicated through inspection reports or letters and include notices of violation; monetary fines; orders to modify, suspend, or revoke a license; or required actions because of a public health issue.

Regarding the NRC's environmental protection inspections, these are performed every 3 years. During these inspections, the NRC staff reviews, among other matters, the WEC's airborne and liquid effluent reports, public dose assessment, records of spills, records documenting that the WEC's operations are conducted in a manner to minimize contamination to the environment (including the subsurface), corrective actions related to environmental protection, and sampling and monitoring procedures and analysis.

The WEC's environmental sampling and monitoring program under its NRC-issued license, which is discussed in Section 2.2.2.1 of the EIS, consists of sampling air particulates, surface water, soil, vegetation, fish, well water, Congaree River, and sediment. The WEC is required to submit a semi-annual report to the NRC specifying the quantity of each of the principal planned radionuclides released in liquid and gaseous effluents during operations. Additionally, the State has issued a permit to the WEC for discharges to the Congaree River under the National Pollutant Discharge Elimination System (NPDES). These radiological and nonradiological releases are controlled and monitored to meet regulatory limits to protect public health, safety, and the environment (including radiological and nonradiological).

Finally, as part of the license renewal application review process, the WEC has agreed to three new license conditions, if the license is renewed. The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to SCDHEC (WEC 2021-TN7106). These license conditions are also discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2 and 2.4.2 of this EIS. Additionally, the WEC plans to continue to share information with the community through several community engagement activities. No changes to the EIS were made as a result of these comments.

D.13 Comments Concerning Land Use

D.13.1 Land Use - Site Vicinity

Comment: Please note that the Mill Creek Mitigation Bank (SAC-2014-00222), an approved stream and wetland mitigation bank under the Compensatory Mitigation Framework authorized by the U.S. Army Corps of Engineers, is within 5 miles of the project area located on a 1,769-acre parcel at Latitude 33.823886°N and Longitude -80.884224°W. Please include this property when describing the site vicinity. (47-2 [Riggin, Lorianne])

Response: *The Mill Creek Mitigation Bank project has been added to Section 3.19 on Cumulative Impacts and is discussed in Section 3.1.1 and of the EIS.*

D.13.2 Land Use - Impacts

Comment: The Department disagrees with the statements in the draft EIS that, "The use of the land in the surrounding area is not expected to change from its current uses, including the CFFF's operations," (page 3-4, line 10) and "that land use around the CFFF site will not change during the assessed upcoming 20 years." (page 3-3, line 38). Several large infrastructure projects (including a major sanitary sewer expansion) and regional planning initiatives (including the lower Richland Strategic Community Master Plan - <http://richlandcountysc.gov/Portals/0/Departments/Planning/NeighborhoodPlanning/MasterPlans/LowerRichlandFinal.pdf>) suggest that significant urbanization and population increases within the study area are reasonably foreseeable. This would likely coincide with increased area of impervious surfaces in the local watershed, which when compounded with climate change impacts, would lead to increased frequency and intensity of flooding events, as well as traffic (risk) increases and population densities at risk for public health impacts. (21-8 [Stanley, Joyce])

Response: Section 3.1 of the EIS discusses the land uses for the site and vicinity (e.g., locations of schools, farming areas, hospitals, etc.). This commenter provided information about infrastructure projects and regional planning initiatives that indicates that urbanization and population increases within the study area are reasonably foreseeable, and would increase land use. Documents cited include Richland County's 2014 Strategic Community Master Plan and the 2015 Comprehensive Plan. These documents were considered in the EIS to support the conclusion that the land use in the surrounding area is not expected to change. For example, as stated in the 2014 Strategic Community Master Plan, "The low density pattern of development contributes to the challenges of providing water and sewer services. There are too few customers to justify the costs of utility extension." Section 3.1.2 of the EIS has been updated to reflect that population growth and increased areas of impervious surfaces in the local watershed could lead to increased public health risks and flooding events, in addition to increased traffic.

D.14 Comments Concerning Meteorology and Air Quality

D.14.1 Air Quality Impact Determination

Comment: I have not fully reviewed the whole EIS at this point, but am concerned about air monitoring, and how much monitoring is really being done off site, and how much radioactivity. (1-16-4 [D'Arrigo, Diane])

Comment: We've talked some about water, but what about air, and there are a lot of unanswered questions that I have that I need to look more in detail on this, but I do support the concerns that have been raised, and from a national perspective, we see that this is an important piece to the whole nuclear power fuel chain. But that should not mean that it gets a special pass on the impacts on the community. So, I guess that's really it. I wanted to express my concerns, and call on the NRC to give a tougher review of this, and other applications. (1-16-5 [D'Arrigo, Diane])

Comment: Particulate release, whether routine or through accident, could be of concern to local inhabitants in Lower Richland. What assurance is that such releases won't occur and there that they will not be impacts to the public at some distance from the facility? What happens if particulate filters fail to function properly? (9-3-20 [Clements, Tom])

Comment: Reference: Page 3-68, Lines 16-18 and 21-22; including Table 3-9 - Annual Air Pollutant Emissions in Metric Tons for Richland County.

Comment: It is unclear what the inclusion of National Emission Inventory data is meant to provide. The text only states that the information is in the table. There is no explanation of its relevance to the topic. (41-1-11 [Taylor, Ken])

Comment: Page: 3-70

Line: 36

Current Wording: "...emissions from proposed continued operation of the CFFF would not be significant."

Suggested Wording: N/A - see justification.

Justification: Westinghouse agrees with the conclusion that greenhouse gas (GHG) emissions from the continued operation of CFFF would not be significant. The analysis presented and this conclusion, however, do not provide the full context of the environmental benefits of the proposed action. Specifically, CFFF manufactures fuel that ultimately supports approximately 10% of U.S. electricity generation, which amounts to the largest single source of low-emission electrical power generation capability in the United States. The minimal GHG emissions from CFFF operations and from the other stages of the nuclear fuel cycle in fact represent a significant environmental benefit, by providing substantial baseload electrical power with minimal GHG emissions in comparison to all reasonable alternatives. See, e.g., NUREG-1437, Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 6, Second Renewal, Regarding Subsequent License Renewal for Surry Power Station Units 1 and 2 (<https://www.nrc.gov/docs/ML2007/ML20071D538.pdf>) (p. 4-127, tbl. 4-12). These positive environmental impacts should be acknowledged and disclosed in Section 3.7.2.3. This point is also missed in the discussion of the impacts on Climatology, Meteorology, and Air Quality associated with the No-Action Alternative (Section 3.17.1.6). Specifically, under the No-Action alternative, the closure of CFFF in 2027 would reduce the supply of clean nuclear fuel in the United States and worldwide, thereby increasing the cost of such fuel and compounding the existing financial pressures on the nuclear industry. Given that many plants in the United States are already financially at risk of shutting down prematurely, the increased fuel costs stemming from the No-Action alternative would likely lead to the shutdown of existing low-emissions baseload electrical generation capacity. This would exacerbate the national and global problem of GHG emissions and resulting environmental impacts. By contrast, the 40-year license renewal requested by Westinghouse would secure the continued supply of nuclear fuel at the lowest cost, minimizing the potential for continued closures of valuable low-emission assets. The draft EIS alludes to this problem in Section 3.18.4.1 (Comparison of the Economic and Other Costs and Benefits). Westinghouse agrees that the economic costs of building a replacement facility elsewhere would greatly surpass the costs of continued operation, but it respectfully suggests that the draft EIS has not fully evaluated and disclosed the reasonably foreseeable environmental impacts of this fact. To ensure fully informed decision-making and inform all stakeholders, including the public, of the full scope of environmental impacts of the proposed action, Westinghouse suggests that Sections 3.7.2.3, 3.17.1.6, and 3.18.4.1 be revised to disclose and more fully explain the beneficial environmental impacts of renewing the CFFF license for 40 years. (42-2-5 [Malek, Elise])

Response: *As described in Section 3.7 of the EIS, the NRC staff concluded that the proposed action's impact on air quality would be SMALL. Under the proposed action, there would be no significant changes in the WEC's fuel fabrication operations that would result in a significant change in air emissions. The NRC staff considered both radiological and nonradiological emissions from the CFFF. Radiological effluent releases are described in Section 2.2.1.1 of the*

EIS. The WEC is required by NRC regulations to monitor the release of radioactive materials in liquid and gaseous effluents, and any direct radiation from the facility. The NRC requires the WEC to submit a semi-annual report specifying the quantity of each radionuclide released in liquid and gaseous effluents during operations. The stacks that have the potential to emit radiological effluents are continuously sampled for uranium to ensure concentrations are below the WEC's action level. Nonradiological emissions from boilers, calciners, and scrubbers within the facility were evaluated using the WEC's State air permitting renewal application submitted to SCDHEC (SCDHEC 2019-TN6598). That permit application is still pending before SCDHEC. Section 3.7.2.2 of the EIS discusses the air quality impacts from the nonradiological emissions on the surrounding atmosphere. The EIS provides information about the total emissions in Richland County where the facility is located to describe the existing or baseline nonradiological air quality in the project area. The potential impacts on air quality from the proposed action are considered in light of the total emissions in Richland County and are described in Section 3.7.2.1. Richland County is in attainment of the National Ambient Air Quality Standards. No changes were made to the EIS as a result of this comment.

D.14.2 Comparison of the CFFF's Emissions to Richland County Total Emissions

Comment: Reference: Page 3-70, Lines 7-8

A comparison of the facility's NO_x emissions to the whole county may not be germane. A facility is required to not cause or contribute to an exceedance of a NAAQS at its property boundary and beyond (i.e., ambient air). (41-2-5 [Taylor, Ken])

Comment: Page 3-101, Line 43; continued Page 3-102, Lines 1-3. These lines state: *The CFFF has been below all regulatory limits for gaseous radiological effluents and nonradiological effluents, except for sulfur dioxide. No actions by SCDHEC have been taken for sulfur dioxide emission rates to date (WEC 2019-TN6510).* The Department has not found nor been notified of an exceedance of any sulfur dioxide regulatory limit. The referenced document from Westinghouse, "Enclosure 4-Environmental Report;" dated March 28, 2019; ADAMS Accession No. ML 19088A 100; states: *Table 3.12-2 contains the modeled concentrations for various CFFF nonradiological gaseous pollutants. All pollutant concentrations were below regulatory limits. The only pollutant with concentrations greater than 18 percent of the limit was sulfur dioxide. The sulfur dioxide concentration ranged between 25 and 68 percent of the limit depending on the averaging time used for the calculation. [emphasis added]* (41-2-14 [Taylor, Ken])

Comment: Page/Line: 3-101/43; 3-102/1-3

Current Wording: "The CFFF has been below all regulatory limits for gaseous radiological effluents and nonradiological effluents, except for sulfur dioxide. No actions by SCDHEC have been taken for sulfur dioxide emission rates to date (WEC 2019-TN6510)."

Suggested Wording: "The CFFF has been below all regulatory limits for gaseous radiological effluents and nonradiological effluents. ~~except for sulfur dioxide. No actions by SCDHEC have been taken for sulfur dioxide emission rates to date (WEC 2019-TN6510).~~"

Justification: Source WEC 2019-TN6510 does not state that sulfur dioxide emissions from the site exceed regulatory limits. The WEC is a minor source and does not have requirements in its current SCDHEC air operating permit to monitor and measure for any gaseous emissions. The site does monitor radiological emissions as part of its special nuclear material license with the NRC. (42-14-2 [Malek, Elise])

Response: *The local meteorology and local dispersion determine the NAAQS exceedances, not just the emissions magnitude alone. However, the information in the EIS intends only to*

provide a perspective of the relative magnitude of the facility emissions compared to total emissions from all sources in Richland County. Additionally, the statement about the sulfur dioxide (SO₂) emission limit violation has been removed from the EIS in response to the comments.

D.14.3 Air Dispersion Modeling and Compliance

Comment: Page 2-13, Lines 28-30. Air dispersion modeling is one method the Department uses during its technical review to evaluate a facility's potential to comply with certain air quality regulation. It does not determine potential, or ongoing, compliance with all regulations. After a technical review has determined that a facility can comply with air quality regulations, an issued permit will include regulatorily prescribed ongoing monitoring, recordkeeping, and reporting; and/or the Department will create conditions that include ongoing monitoring, recordkeeping, and reporting, as necessary, when a regulation does not contain prescriptive requirements. (41-1-9 [Taylor, Ken])

Comment: Reference: Page 3-70, Lines 8-10 The statement that "the air dispersion modeling in the air permit applications clearly showed that the CFFF complies with the current air pollution standards in South Carolina," is not accurate. As discussed in comments for Page 2-13, Lines 28-30, air dispersion modeling is one method used during the technical review of an application to evaluate the potential of a facility to comply with certain regulations. It does not show potential compliance with all regulations, nor does it demonstrate continued compliance. The requirements in the permit are what is necessary to demonstrate continued compliance. (41-2-6 [Taylor, Ken])

Response: *Section 3.7.2.2 of the EIS has been revised to clarify that air dispersion modeling is one of the methods SCDHEC uses to determine potential compliance with certain regulations. Additionally, this section of the EIS was also revised to describe SCDHEC's technical review conducted to determine compliance with South Carolina air quality control regulations and establish conditions that include ongoing monitoring, recordkeeping, and reporting as necessary when a regulation does not contain prescriptive requirements.*

D.14.4 Climatology and Air Quality - Updates, Clarifications, and Corrections

Comment: Page 2-5, Lines 23-25. The exhaust stream from combustion sources will also include particulate matter (including speciated particulate matter with mean aerodynamic diameters of less than 10 microns and less than 2.5 microns), sulfur dioxide, carbon monoxide, oxides of nitrogen, and volatile organic compounds. These pollutants and their estimated emission rates are included in Westinghouse's amended air permitting renewal application dated May 30, 2019. (41-1-7 [Taylor, Ken])

Comment: Page 2-13, Line 26, Table 2-1 - Emission Summary for CFFF Nonradiological Air Pollutants. Although some values are close; overall, the facility-wide emission rates shown in Table 2-1 are not consistent with the rates that the Department has approved or those that Westinghouse submitted; nor is it a complete list of air pollutants. As examples, please see Table 1 below. "Westinghouse 2019 Application Summary Table" refers to the Summary Table 1 from Westinghouse's May 30, 2019, renewal application; "Department Approved" refers to the facility-wide totals of the emission rates that the Department has reviewed and accepted. More pollutants exist but are excluded here for brevity.

Table 1 - Emission Rate Comparison

	-----Uncontrolled (ton/yr)-----		
Pollutant	Table 2-1 Draft EIS Department Approved[1]	Westinghouse 2019 Application Summary	
PM	5.74	8.79	9.627
PM10	5.39	8.79	9.627
PM2.5	5.39	8.79	9.216
SO2	3.04	3.04	3.106
NOx	28.47	45.00	50.475
CO	16.01	16.00	25.233
VOC	4.11	4.13	4.268

[1] These values include emissions from emergency generators and other exempt equipment. (41-1-8 [Taylor, Ken])

Comment: Page 3-68, Lines 3-14; including Table 3-8 - National Ambient Air Quality Standards for Criteria Pollutants. The text above Table 3-8 references the National Ambient Air Quality Standards and indicates that the NAAQS are shown in Table 3-8. The text lists the pollutants in the NMQS as including lead (Pb) and "Total Suspended Particles [sic]." Lead is missing from Table 3-8. Total Suspended Particulate (TSP) was one of the original NMQS and it did not measure particulate of a particular size. TSP was removed as a NMQS circa 1987 and replaced with the more specific PM10 and PM2.5 standards. (41-1-10 [Taylor, Ken])

Comment: Page 3-68, Lines 19-20 and 23-25; including Table 3-10 - Annual Design Values for Ozone and Nitrogen Dioxide at Sandhill Experimental Station in Columbia, South Carolina. The design values for ozone and nitrogen dioxide at the nearest ambient air quality monitor should not be taken to "clearly demonstrate attainment in compliance with NMQSs in the region." As listed in Table 3-8 directly above the referenced text, the NMQS includes more pollutants than just ozone and nitrogen dioxide. Whether the area is in attainment, nonattainment, or unclassifiable, and the size of the affected area, is based on the determination from EPA; the design values are a large component of that determination, but a single site's values does not necessarily make the determination. Plus, that site does not measure all NAAQS. (41-1-13 [Taylor, Ken])

Comment: The title of Table 3-10, correctly, states "Nitrogen Dioxide" (NO2). The pollutant shown in the table is "NOx," which would be Oxides of Nitrogen, and is not the measured pollutant. (41-1-14 [Taylor, Ken])

Comment: Page 3-69, Lines 1-5. These two sentences state that EPA was directed to create certain federal air quality regulations. There is no other information providing the relevance of these two sentences to the topic. Additionally, "National Emissions Standards for Hazardous Air Pollutants" is the title of 40 CFR Part 61. Please see the comment for Page 3-97, Line 45. (41-1-15 [Taylor, Ken])

Comment: Page 3-69, Line 10. Based on context, the term presumed to be intended would be "synthetic minor;" not "significant minor." (41-1-17 [Taylor, Ken])

Comment: Page 3-69, Line 12. It is presumed that "WEC's air permit" refers to the State Operating Permit issued June 7, 2012; as the renewal has not been issued. While it does "[address] NMQS pollutants, nitric acid, and opacity," that is an oversimplification of its contents. (41-1-18 [Taylor, Ken])

Comment: Page 3-69, Lines 12-14. That the "permit limits are based on process throughputs at rated capacities as outlined in [air quality regulations]," is not accurate. Some regulations apply a limit expressed in units of pounds of pollutant per total heat or material input; but this does not mean that a static limit is applied by multiplying the limit factor by the rated capacity. The limit at any given point in time is based on the total heat or material input to that source at that time. For the purposes of evaluating whether a source may need monitoring, recordkeeping, or reporting, a technical review may look at the resultant limit at a source's maximum rated capacity. Additionally, the regulations and the permit contain opacity limits at fixed values; not based on capacity. (41-1-19 [Taylor, Ken])

Comment: Page 3-69, Lines 14-16. That the "emission rates are calculated based on these throughputs because the permit does not require monitoring for any of the six criteria pollutants under the NMQS," is not accurate. Here is a quick overview of a technical review from the emission rates to permit monitoring: A facility submits an application with their calculated rates at their potential to emit; the Department reviews the application and rates, which normally includes some level of correction or modification of the rates; the emission rates and the details of the proposed operation are used to determine what applicable requirements exist in the regulations; the regulatorily prescribed, and any Department added, limits, monitoring, recordkeeping, and reporting are included in an issued permit. (41-1-20 [Taylor, Ken])

Comment: Page 3-69, Lines 27-29. Westinghouse is classified as a minor source. Besides not being subject to SC Regulation 61-62.5, Standard 7 -Prevention of Significant Deterioration (a review of new sources), it is also not subject to SC Regulation 61-62.70 -Title V Operating Permits. (41-2-2 [Taylor, Ken])

Comment: Page 3-69, Lines 36-37; including Table 3-11 - Annual Potential Emission Estimates for WEC CFFF as Reported in Permit Renewal Application. The values shown in Table 3-11 are consistent with the values shown in Summary Table 1 of Westinghouse's May 30, 2019, renewal application, which are lower than the rates approved by the Department. It is unclear why these do not match those in Table 2-1 Emission Summary for CFFF Non radiological Air Pollutants. (41-2-3 [Taylor, Ken])

Comment: Page 3-70, Line 6. It is unclear what is meant by stating that the stack emissions are "nominal." (41-2-4 [Taylor, Ken])

Comment: Page 3-71, Line 24. It is unclear where "catalytic reduction of NOx" came from as a practice that Westinghouse could conduct. Westinghouse does not have catalytic reduction control devices for NOx; nor is it common for sources of this size. (41-2-10 [Taylor, Ken])

Comment: Page 3-97, Line 45. This sentence states that Westinghouse is subject to and has to comply with 40 CFR Part 61. Westinghouse has not been subject to 40 CFR Part 61 since EPA modified Subpart I in 1996. (41-2-11 [Taylor, Ken])

Comment: Page 3-134, Resource Area "Climatology, Meteorology, and Air Quality", last paragraph of Unavoidable Adverse Environmental Impacts. "National Emissions Standards for Hazardous Air Pollutants" is the title of 40 CFR Part 61. Please see the comment for Page 3-97, Line 45. (41-2-15 [Taylor, Ken])

Comment: Page: 3-70

Line: 7

Current Wording: "...calciners, and six process scrubbers..."

Suggested Wording: "...calciners, and ~~six~~ **five** process scrubbers..."

Justification: There are only five process scrubbers (S-1008, S-1030, S-1190, S-958, and 2A/2B) since the plating operation was discontinued in February 2020. (42-12-8 [Malek, Elise])

Comment: Page: 3-70

Line: 13-14

Current Wording: "The program includes 47 stacks as well as 4 onsite locations monitored for the presence of radioactive material."

Suggested Wording: "The program includes ~~4247~~ stacks as well as 4 onsite ~~locations~~ **ambient environmental air stations** monitored for the presence of radioactive material."

Justification: WEC has 42 monitored stacks. One previously independent stack originating from the chemical lab was tied into a larger, main ventilation system, reducing the number of total stacks by one. Additionally, four additional sample locations (1240, 1242, 1243, and 1246) were removed from the total because these four systems are non-process related, do not exhaust to the atmosphere, and are recirculating comfort air systems. The air sampling stations identified in the site SNM-1107 license are called "Ambient Environmental Air Monitoring Stations" per WEC procedure ROP-06-003. (42-12-9 [Malek, Elise])

Comment: Page: 3-71

Line: 17

Current Wording: "The WEC monitors radiological gaseous emissions from 47 stacks."

Suggested Wording: "The WEC monitors radiological gaseous emissions from ~~4247~~ stacks."

Justification: WEC has 42 monitored stacks. One previously independent stack originating from the chemical lab was tied into a larger, main ventilation system, reducing the number of total stacks by one. Additionally, four additional sample locations (1240, 1242, 1243, and 1246) were removed from the total because these four systems are non-process related, do not exhaust to the atmosphere, and are recirculating comfort air systems. (42-12-11 [Malek, Elise])

Comment: In accordance with the South Carolina State Climatology Office, the following clarifications are needed for the Final EIS.

* In Section 3.7.1.3 Winds, page 3-64 line 4 and 5 should be corrected to state "and higher average winds occur from November to April." (47-10 [Riggin, Lorianne])

Comment: In Section 3.7.1.4 Severe Weather, page 3-64 line 17-19 should have an additional sentence to state "These events were likely all that were in the database, but lightning and lightning damage are far more common than what is reported." (47-11 [Riggin, Lorianne])

Comment: In Section 3.7.1.4 Severe Weather, page 3-65 line 22-25 mentions Hurricane Floyd and SCDNR Climatologist find that this is not applicable to the project site as there was no significant effect on Richland County from that storm. However, more data regarding Hurricane Hugo should be included as this storm moved inland and had a recorded 8-hour period of winds gusting past 40 mph and a peak gust of 64 mph at the Columbia Metropolitan Airport. Additionally, further down in line 25-27, Richland County has been impacted by more than three tropical systems and two hurricanes since 1930. More data regarding hurricanes and tropical storms that have impacted the state can be found here: <https://www.dnr.sc.gov/climate/sco/hurricanes/>. (47-12 [Riggin, Lorianne])

Response: Sections 2.1.2, 2.2.1, 3.7.1, 3.7.2, and 3.7.3 of the EIS have been revised to reflect the updated information, clarifications, and corrections presented in these comments. Specifically, Section 2.1.2 of the EIS has been revised to add the additional pollutants, PM₁₀,

PM_{2.5}, sulfur dioxide, carbon monoxide, oxides of nitrogen, and volatile organic compounds from combustion sources. Facility-wide emissions in Table 2-1 have been updated with the latest information in Westinghouse's air permit renewal application (SCDHEC 2019-TN6598) and also provided in Table 3-11 of the EIS.

Section 3.7.1 was revised to clarify the content of the database used to describe severe weather events and provide additional information about tropical storms and hurricanes. Section 3.7.1 was also revised to clarify the air quality standards and limits for the CFFF. Table 3-8 in Section 3.7.2.1 of the EIS was revised to identify the Federal limit for lead (Pb). Further, Section 3.7.2.1 of the EIS was revised to (1) remove the reference to total suspended particles (TSP) and list particulate matter PM₁₀ and PM_{2.5}, which are already included in Table 3-8; (2) correct "significant minor" to "synthetic minor" and added hazardous air pollutants to the list of pollutants reported to SCDHEC; (3) clarify the permitting requirements and process of establishing the emissions limits to permit monitoring; and (4) clarify that the design values for ozone and nitrogen dioxide are below Federal standard limits. With respect to the use of the term "nominal," Section 3.7.2.2 has been revised to provide additional clarification that the stack emissions from the CFFF are negligible. Finally, the EIS was revised to reflect the correct number of stacks (i.e., 42) and process scrubbers (i.e., 5) at the CFFF.

D.14.5 Climate Change

Comment: Please note the discussion regarding sea level rise in Section 3.7.1.6 is not relevant to the project location. However, there are other components of the 2018 Fourth National Climate Assessment that could be included specifically impacts of temperature changes within the Southeast Chapter of the Assessment: <https://nca2018.globalchange.gov/chapter/19/>. (47-13 [Riggin, Lorianne])

Response: *While a rise in sea level may not directly impact the facility infrastructure in the future, the discussion is pertinent in the context of climate change. Synoptic meteorology can significantly vary due to change in sea level, salinity, and other climate variables, which also impacts air dispersion. No changes were made to the EIS related to the comment on the sea level rise.*

Additionally, the impacts on temperature and precipitation due to climate change have already been provided for South Carolina from 2021 data in the NOAA technical report (Runkle et al. 2022-TN7161) in Section 3.7.1.6 of the EIS. The EIS has been revised with 2022 data from the NOAA state summary.

D.14.6 Cumulative Impacts

Comment: Reference: Page 3-70, Lines 38-40; continued Page 3-71, Lines 1-2
Comment: This section is titled as "Greenhouse Gases" and that is what is discussed for the first paragraph of this section. Beginning at Line 38 there is discussion of ozone formation and the impact of Westinghouse's NO_x emissions to this formation. Neither ozone nor oxides of nitrogen are listed greenhouse gases. The description of "nominal" is used again here. (41-2-7 [Taylor, Ken])

Comment: Page 3-71, Lines 2-3. Comparison of a facility to neighboring, dissimilar operations, is not a standard method of evaluating the impact of a facility's air emissions. (41-2-8 [Taylor, Ken])

Comment: Page 3-71, Lines 3-5. Similar to the comment for Lines 2-3 of the same page, a neighboring facility's emissions of PM₁₀, SO₂, NO_x, and Fluorides would not be relevant to a Greenhouse Gas discussion. None of these are greenhouse gases. The list of greenhouse gases contains numerous fluorinated compounds but not all fluorides are greenhouse gases. (41-2-9 [Taylor, Ken])

Response: *The second paragraph in Section 3.7.2.3 of the EIS discusses the cumulative impacts of the proposed emissions on the regional air quality. Section 3.7.2.3 was revised to remove the discussion about pollutants ozone and NO_x because these are not greenhouse gases, and the discussion about impacts from nearby facilities (e.g., Dominion natural gas pipeline and fiberglass manufacturing plant). These discussions have been incorporated in the cumulative impacts analysis in Section 3.19. The air quality cumulative impacts conclusions remain unchanged.*

Also, the word "nominal" has been deleted because the discussion explains that NO_x emissions from the continued operation of the CFFF are not expected to significantly increase regional ozone (O₃) concentrations

D.15 Comments Concerning Nonradiological Health

D.15.1 Worker's Health and Safety

Comment: VII. Health of Workers over time has not been addressed in the DEIS. Health surveys of workers from onset of employment and through the remainder of their days have not been set up and no long-term health data on workers have been collected and considered. (17-16 [Greenlaw, Pamela])

Comment: While workforce training may not be under the purview of the NRC and therefore bears no discussion in the EIS, other than cultural resource training, please consider a trained workforce would keep the plant and the community safe. (35-9 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Response: *Health surveys of CFFF workers from the beginning of employment through the worker's death are not established and there is no requirement to do so. The NRC staff, however, discussed the health of workers over time in the EIS. As stated in Section 3.12.4, the WEC has a radiation safety program and a chemical safety program, among other occupational programs in place to ensure protection of the workers' health and safety. The WEC is required to implement radiological monitoring and safety programs that comply with 10 CFR Part 20 requirements to protect the health and safety of workers and the public. Doses to workers are required to be maintained as low as [is] reasonably achievable (ALARA), per 10 CFR Part 20. The NRC periodically inspects the WEC's radiation safety programs. The NRC staff agrees that a trained workforce keeps the plant and community safe. As stated in EIS Section 3.12, the WEC is required by Federal law to comply with the OSHA General Industry Standards (29 CFR Part 1910-TN654) that establish practices, procedures, exposure limits, and equipment specifications to preserve worker health and safety. Standards for occupational exposure to hazardous chemicals in laboratories are found at 29 CFR 1910.1450, and personal protective equipment standards are found at 29 CFR 1910, Subpart I (TN654). Many OSHA standards include explicit safety and health training requirements (OSHA 2015-TN7194). (~~TNXXX~~ REFERENCE pg 13 of 270 of Training Requirements in OSHA Standards at <https://www.osha.gov/sites/default/files/publications/osha2254.pdf>). No changes were made to the EIS as a result of these comments.*

D.16 General Comments in Opposition to License Renewal

D.16.1 Opposition - License Renewal

Comment: MS. PRESTON: Thank you. Again, my name is Priscilla Preston, and I would like to briefly list all the various reasons why I feel that Westinghouse should not be allowed a 40 year license. The existing NRC license failed to prevent extensive radioactive, and hazardous pollution over the last 50 years, which threaten air quality, ground water, and surface water.

(1-8-1 [Preston, Priscilla])

Comment: But I would like to list some of the other things [why not to allow the renewable of the license for any amount of time]. The NRC in general just hasn't sufficiently prevented, or provided remedies for the previous discharges. So, until those previous discharges have been corrected, or until NRC can be certain that they're not likely to happen again, we shouldn't extend the license. (1-8-3 [Preston, Priscilla])

Comment: I think that this whole thing needs to just be shut down, and stopped immediately, personally, but I don't get to make that call. (1-9-11 [Mitchum, Chief Michelle])

Comment: And the fact that this company, as you know, and I know has a horrible record of safety. They have no safety standards, and to give them a 40 year permit would be like signing a license for them to murder us, okay? That's how I see it, and that's how other people in this community who are not on this phone call, so not only am I speaking for myself, but I'm speaking for hundreds of other people in the community who feel the same way that I do. So, I'm asking you to consider, and take into account all those factors before you give Westinghouse a 40 year permit. Thank you. (1-13-7 [Sanders, Virginia])

Comment: So, I just wanted people to be aware of that [that WesDyne operations should be examined], and I'm going to put my comments into writing, that I got it submitted earlier, but the fact that NRC came up with this 40 year license business, they haven't even completed the process, and the analysis saying that the predetermination could -- 40 years is most reasonable, and there's not going to be anymore impact on the environment, give us a break. We are logical people, and that just is so much nonsense. I'm very angry about it, but I'm not trying to take it out on you, but I just want to make sure that you have the message loud, and clear from everybody who has spoken this evening, that we are not ready for Westinghouse to have a blank check. We've already faced blank checks in this state from utilities, and they just take it, and they run over everybody, and that has to stop. Thank you very much. (1-15-5 [Greenlaw, Pamela])

Comment: To what end does everybody come out, and tell you it doesn't make sense, make it make sense, make 40 years make sense, and for you to hear that, and to hear the impact of our community, and to hear our pleas, because we have a unique community. (1-17-2 [Reese, Robert])

Comment: And now we've learned that there is an Indian mound that's on that property, or near that property, there is a historic cemetery that is on that property, it abuts the national park, which is a swamp, Westinghouse sits next to the Congaree National Swamp. It's a swamp because it gathers water, and if the swamp is gathering water, it's more likely that Westinghouse is gathering water. So, for you to not take those things into consideration, I don't understand the

logic behind giving an aging, a diminishing nuclear plant 40 years to operate unchecked doesn't make sense to me. (1-17-7 [Reese, Robert])

Comment: So, there's the issue of history, history in the area is telling its presence, and that's why this is such a big step for everybody to speak up in this meeting, and make sure they're being heard. And I realize that you're recording, I realize that the comments are being taken into context, and are going to be submitted as comments towards the draft, but again, I stress that there's so much at stake here, and our position, the tribe's position is no renewal of this license, go ahead, and let it go. The expectation that anything different can happen than the past 52 years has shown is just, that's unlikely, that is predictable, because history is telling that story for us. But again, I do want to thank you all for putting this together, I know you're all tired, and the participants that have spoken, thank you all for making your voice heard. I can tell you I've heard everything, and I don't doubt that these panelists that are on here representing the NRC, I believe they've heard you too. Thank you all, I will continue to pray for this community, and put them up in prayer during smudge ceremony, and I hope to hear something very soon about all of the issues that have been brought to the table tonight, thank you (1-18-4 [Mitchum, Chief Michelle])

Comment: Our community has previously been negatively impacted by the harmful effects of Westinghouse. The plant was shut down for a reason, and until those reasons are clear, and concise, we do not support any license for Westinghouse. Over the years we have heard the countless promises that Westinghouse has provided to our community without a true commitment to our community, and the people who are placed in harm's way by them. (1-20-1 [Brown, Erniko])

Comment: [Westinghouse can't be trusted with a new 40 year license...] Only through action by the local State authorities-SCDHEC-as recently as 2019, did Westinghouse disclose extensive radioactive and toxic contamination of groundwater at the site and sediments at the bottom of Mill Creek which flows to the Congaree River. Such sediment contamination includes radioactive Uranium and Technetium 99. The sources of such pollution remain unidentified and its extent and remediation remain incomplete. No new license should be approved until such historic pollution has been cleaned up and full corrective action to prevent future pollution has been implemented; (7-3 [Cothran, Penny Delaney])

Comment: [Westinghouse can't be trusted with a new 40 year license...] For these reasons, I humbly request that their request for relicensure be rejected. Westinghouse is a terrible neighbor, and I cannot fathom why I would want them for another 40 years. (7-11 [Cothran, Penny Delaney])

Comment: Of paramount importance, the draft EIS totally fails to justify preparation of a document on a 40-year license extension. While the NRC has accepted the license application by Westinghouse Electric Company, LLC (WEC), no reason is given in the draft EIS justifying the 40-year period of time that is under consideration. (9-1-16 [Clements, Tom])

Comment: I want to voice my strong opposition to Westinghouse's request to allow 40 years of use and discharge into the environment of highly dangerous, radioactive and polluting substances which pose a risk of harm to workers, neighbors and our environment. (14-1 [Carroll, Vivian])

Comment: Look at what is happening in the world -fires, storms, air quality, flooding, heatwaves, etc. and do you want to contribute to making things worse. Can you look your

children and their grandchildren' grandchildren in the eye and say I did no harm. You can only do so if you vote NO. Please vote no as our lives and future lives depend on you doing so. (14-2 [Carroll, Vivian])

Comment: Flawed Assumptions by NRC include the following:

- the belief that the NRC always will discover facility errors, violations, and mismanagement in a timely manner and that none of these faults will result in instances of criticality;
- the likelihood the tenure of current Westinghouse management who instituted the required improvements on the campus will still be actively employed in their positions for the next 40 years and will keep to agreements with DHEC which are not in the permit application;
- there will not be any serious non-compliance issues;
- pressure to work leaner by the owners of Westinghouse/WesDyne, Brookfield Asset Partners, will not occur.

The track record of Westinghouse and of other human-operated facilities for the past 10 years has not been taken into account. See examples of current lapses at other facilities:

Letter from NRC to River Bend in Louisiana, Inspection Report dated July 16, 2021. Upcoming predecisional enforcement conference on August 16, 2021
<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML21209A0>. See instances having occurred at Westinghouse: scrubber incident leaking through a hole in the cement floor avoidance of reporting incidents/events, i.e., noncompliance (NRC already has these records) (17-4 [Greenlaw, Pamela])

Comment: For all these and many more reasons, the conclusions drawn by the NRC in the Draft EIS are incomplete and do not indicate any rationale for the issuance of a 40-year license. Please do NOT issue a license for WEC-CFFF for a period of 40 years! (17-22 [Greenlaw, Pamela])

Comment: I wanted to comment briefly on this issue because I am a resident in the area and I love the Congaree Swamp. I read the proposals and have been following this issue for many years while growing up here. While this issue appears to be very complicated the answer is quite simple. No, do not allow the additional 40 years. If Westinghouse and their partners in crime have not been able to get a handle on this why in the world should they be allowed to continue taking advantage of this situation? (22-1 [Martin, Joy])

Comment: If Westinghouse had been more prudent about taking care of this I might better understand but this has gone on way too long. Moveit....do something but not this! There is too much at stake here. I pray you will do the right thing. (22-3 [Martin, Joy])

Comment: I am a lifetime resident of Columbia, SC and do not live far from the Westinghouse plant on Bluff Road. I am against a 40 year license for this plant for the following reasons:
1) The lack of candor by Westinghouse over the years regarding the effect upon the environment of its operations; (23-1 [Harrison, James])

Comment: I am writing to express my surprise and disappointment that The United States Department of Interior or any other State or National controlling entity would consider a 40 year license for a Nuclear Facility like Westinghouse located near Columbia, SC. It appears

Westinghouse has an abysmal safety record in terms of environmental problems at the facility. (24-1 [Singleton, Raymond])

Comment: I respectfully request you deny this 40 year request and suggest the Westinghouse Facility be inspected to ensure they are in compliance with all federal, state, and local requirements if they intend to continue their operation. (24-4 [Singleton, Raymond])

Comment: Many of the residents who live near Westinghouse do not support the 40-year permit recommended by the NRC. I agree with them and believe that a 40-year permit extension could be detrimental to the health and well-being of residents in communities near the facility, would pose a risk to employees at Westinghouse and a lasting threat to the environment, given the many spills and past incidents that have happened at the facility. Hazardous incidents at Westinghouse have not been promptly reported in the past to regulators or residents in close proximity to the facility. (25-2 [Brawley, Wendy])

Comment: We can no longer rely on the staff at the facility to self-report incidents, thus limiting regulatory intervention and required warnings to the public when spills and potential environmental threats occur. A 40-year permit renewal is simply too long a period to allow the facility to operate. (25-4 [Brawley, Wendy])

Comment: In summary, Westinghouse's past actions have made it impossible for observant citizens, or any governmental entity, to continue to allow business as usual. They clearly cannot be trusted to be a good corporate citizen, or steward of the environment. In short, their credibility and esteem has evaporated. (29-7 [May, Stephen])

Comment: I urge you to not allow this permit to be issued. Westinghouse's cavalier attitude toward the environment simply cannot continue to be ignored. Surely, there is another facility somewhere in the United States that is more suitable for production. (29-9 [May, Stephen])

Comment: We want the NRC to be a voice for residents opposed to granting a 40-year license renewal to Westinghouse. The existing NRC license has failed in preventing numerous safety and environmental incidents at the plant. There should be a finding of significant impact to the community and no 40-year license renewal. (31-5 [Woods, Felicia])

Comment: We don't have access to the Westinghouse safety environmental review which will be released March 2022. Past safety and environmental issues at the plant do not justify a 40-year license renewal. Westinghouse does not have a proven track record regarding employee and community safety. The plant has been operating for over 50 years. (31-6 [Woods, Felicia])

Comment: Please take into consideration the opposing comments received by mail, e-mail and public meeting webinar by not granting Westinghouse a 40-year license renewal. (31-10 [Woods, Felicia])

Comment: I am writing to you in opposition to the proposed 40 year license for the Westinghouse facility in Hopkins. The many unknowns that we face-flooding, drought, temperature rise and more would suggest a more thoughtful, incremental approach to the work done at this facility would be appropriate. (32-1 [Gifford, Grace])

Comment: As a resident of Lower Richland and an organizer for the National Sierra Club, I have been working to inform my neighbors to write, call and email The Nuclear Regulatory Commission to tell you not to give Westinghouse a 40 year permit. (37-1 [Sanders, Virginia])

Comment: The building that Westinghouse operates in is over 50 years old and sits on heavily contaminated soil and groundwater. People who live in close proximity to Westinghouse fear contamination of their drinking water wells. This facility has a poor safety record and over the years instead of getting better it has gotten worse. You (NRC) have said that you expect the plant to continue having spills or other accidents in the future. Would you give Westinghouse a 40 year permit if you lived where I do? (37-3 [Sanders, Virginia])

Comment: The Midlands Group of the South Carolina Sierra Club does not support the 40-Year License Extension Request for the Westinghouse Columbia Fuel Fabrication Facility. Both Westinghouse and the Nuclear Regulatory Commission (NRC) have been unable to prevent and remediate existing pollution from the site during the current license period. Granting such a long license is not in the best interests of the Environmental Justice (EJ) community in which Westinghouse is located and is a concern throughout the Midlands area. The existing NRC license failed to prevent extensive radioactive and hazardous pollution by the Westinghouse Nuclear Fuel Fabrication Facility over the last 50 years which threatens air quality, groundwater and surface water quality including the waters of Mill Creek which flows through the site and into the Congaree River. Under the existing license the NRC has failed to exercise sufficient oversight to prevent and remedy pollution discharges and violations by Westinghouse. (40-1 [Preston, Priscilla])

Comment: Only through action by the local State authorities-South Carolina Department of Health and Environmental Control (SCDHEC) -as recently as 2019, did Westinghouse disclose extensive radioactive and toxic contamination of groundwater at the site and sediments at the bottom of Mill Creek which flows to the Congaree River. Such sediment contamination includes radioactive Uranium and Technetium 99. Uranium may lead to thyroid problems, leukemia and infertility and other health conditions. Technitium-99 affects the thyroid and digestive system when inhaled or swallowed in foods. The sources of such pollution remain unidentified and its extent and remediation remain incomplete. No new license should be approved until such historic pollution has been cleaned up and full corrective action to prevent future pollution has been implemented. (40-2 [Preston, Priscilla])

Comment: I'm a resident of Lower Richland County. Actually, I live down the street from Westinghouse and I oppose the 40-year permit that they're trying to pass. I don't think it is fair to the people in Richland County. So, this is my opinion and my voice, and I would like for it to be heard. I do oppose of the 40-year permit Westinghouse is trying to put in place. (48-5-1 [Grant, Rena])

Comment: I am calling to give an emphatic no to the 40-year permit request from the Westinghouse Columbia facility. It just smacks of, of everything wrong to me. The facility has a long history of poor, poor safety practices and violations and radiological accidents and to, you know, go ahead and give them 40 more years for such blatant toxic behavior is beyond the pale. (48-7-1 [Johnson, Alan])

Comment: I'm calling about, I'm calling about the Westinghouse 40-year license extension. I say no, we do not need it. The 40-years license extension for Westinghouse, I'm calling to say no. (48-8-1 [Mosley, Johnny])

Comment: I say no. (48-9-1 [Hightower, Louis])

Comment: Yes, yes, I'm a resident down in Lower Richland area, that lives about maybe a mile - a mile and a half from the Westinghouse Plant and I'm calling about the renewal of their 40-year permit and I'm against it being renewed. (48-10-1 [Anonymous, Anonymous])

Comment: And we've been living here (inaudible) 52-years in 1969 and we moved here, and we did not know anything about Westinghouse, besides it was up the road. And uh, any way (inaudible) I care to be protected from all the pollution and various things that's going on down at that Westinghouse. Known and unknown. So, I voice my opinion against this 40-year permit for Westinghouse. (48-10-4 [Anonymous, Anonymous])

Comment: I'm just calling the concern about the Westinghouse. We don't need all that stuff they got for the next, the next 40 years. (48-11-1 [Eddy, Rosetta])

Comment: I have some friends that lived real close to the plant. They had a business right across the street from the plant that was considered to be the most toxic waste. At the time they found that the toxic waste was the most serious in the Carolinas. I think they got it removed, and this was Harvey Campbell, Fred Campbell and their families that own this property out there and they finally had to abandon the property, I believe because of the contamination.

I live about 10 miles from that area and my family has all departed and left me here alone now. I am 91 years old living by myself. But I don't know of any physical damage that I have suffered, or my family have suffered from the contaminants, but I am opposed to the renewal of license of this facility. I think it ought to be closed, and the area surrounding it cleaned up and the facility completely closed to nuclear waste materials. (48-12-1 [Raynor, Luby])

Comment: I'm calling about the Westinghouse nuclear plant that's going to reopen. The answer is no, please don't allow them to do this. (48-13-1 [Mayo, Michael])

Comment: No for the Westinghouse 40-year permit. (48-15-1 [Williams, Kathle])

Comment: Yes, I live in the Lower Richland area and I am calling to say no to another 40 years of extension to the Westinghouse facility. Again, I am calling to say no to the extension of 40 more years of the Westinghouse in the Lower Richland area. (48-17-1 [Brown, Edward])

Comment: I don't think that the license for Westinghouse plant needs to be renewed. We have lived with this for over 40 or 50 years with these air pollutants not knowing what is going on down there at that plant. (48-18-1 [Gray, Ellen])

Comment: I live on Bluff Road and my comment is I want them to not have that permit renewed. (48-18-2 [Gray, Ellen])

Comment: I think the past history shows that they don't deserve another permit. They just taking on more responsibility that positively they can't handle. And I just think that after the past history that they've shown, that they have not shown responsibility as a corporation to take care of the environment, they not responsible with the spills and things that they do. So, I just think that they shouldn't get another permit. (48-19-1 [Anonymous, James])

Comment: Yes, I'm saying no, no, "N," "O," to the Westinghouse renewal license extension. No! I live in the Lower Richland area and we've had problems before with them. No. My answer is no. (48-20-1 [Alexander, Evelyn])

Comment: We want the NRC to be a voice for residents opposed to granting a 40-year license renewal to Westinghouse. The existing NRC license has failed in preventing numerous safety and environmental incidents at the plant. There should be a finding of significant impact to the community and no 40-year license renewal. (50-6 [Woods, Felicia])

Comment: We don't have access to the Westinghouse safety environmental review which will be released March 2022. Past safety and environmental issues at the plant do not justify a 40-year license renewal. Westinghouse does not have a proven track record regarding employee and community safety. The plant has been operating for over 50 years. (50-7 [Woods, Felicia])

Comment: Please take into consideration the opposing comments received by mail, e-mail and public meeting webinar by not granting Westinghouse a 40-year license renewal. (50-12 [Woods, Felicia])

Response: *The NRC acknowledges the comments in opposition to the proposed renewal of the CFFF license for another 40 years. Under the Atomic Energy Act, as amended, Congress mandated that the NRC establish regulations for the safe and secure use of radioactive materials for civilian purposes. Accordingly, the NRC is responsible for the licensing of the CFFF under 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." The NRC provides licensing and regulatory oversight for the safety, security, and environmental protection of fuel fabrication operations involving radiological materials. The NRC follows its NEPA regulations at 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," that form the basis for the NRC's NEPA compliance and establish the process for performing environmental reviews.*

As part of the safety review, the NRC staff reviews the licensee's proposed programs for radiation protection, criticality safety, chemical process safety, emergency management, organization and administration, environmental protection, integrated safety analysis, decommissioning, material control and accounting, fire safety, and physical protection, and documents the results in a Safety Evaluation Report. In the EIS, the NRC staff evaluates impacts from the proposed action on land use, water resources, ecology, air quality, geology and soils, socioeconomic, environmental justice, waste management, public and occupational health, visual and scenic resources, and historic and cultural resources, waste management, and visual resources. The EIS also evaluates alternatives to the proposed action, considers the costs and benefits, and analyzes cumulative impacts from past, present, and reasonably foreseeable future actions when considered with the proposed action. Additionally, the NRC will issue a license if it can conclude that there is reasonable assurance that (1) the activities authorized by the license can be conducted without endangering the health and safety of the public, and (2) such activities will be conducted in compliance with the rules and regulations of the Commission.

While the comments expressing general opposition are useful for the NRC to understand public opinion about the proposed licensing action, the comments provided no new information regarding the EIS. Therefore, no changes were made to the EIS as a result of these comments.

D.17 Comments Concerning Radiological Health

D.17.1 Radiological Risks to Public

Comment: So, the other thing I wanted to mention was something that is dear to me because of my work in the field of speech language pathology, we know that our little guys, fetuses, and

small children respond differently to environmental impacts than grownups do. And Dr. Shanice Swan, and Dr. Leo Trisandy have really laid out this important part that the NRC must consider, and that is that the dose does not make the poison. The dose makes the poison is old thinking, but now we know that it's the timing of the dose, and it can be infinitesimally small, may make the impact on a child, and provide them with lifelong challenges. So, I hope that we will consider the two issues of climate change, and flooding, and the impact on our youngest citizens with high priority. (1-11-2 [Gifford, Grace])

Comment: Are risks to the Lower Richland population the same as populations much further from the site? (9-5-21 [Clements, Tom])

Comment: Monitoring and verifying health and environmental outcomes for those who work or live close to Westinghouse should be frequent and consistent. (25-5 [Brawley, Wendy])

Comment: How many citizens in the vicinity and downstream of this facility will be forced to endure adverse health conditions brought on by these contaminants? (29-4 [May, Stephen])

Comment: 6. It is unclear whether Westinghouse Electric Company, LLC (WEC) conducted a risk assessment to inform how contamination may affect populations surrounding the facility. We suggest that the U.S. Nuclear Regulatory Commission (NRC) consider completing a risk assessment that evaluates how contamination could potentially impact surrounding populations and summarize the findings in the Safety Evaluation Report as well as the Final EIS. (34-1-17 [Fite, Mark])

Comment: There are, we only know about one spill we got to learn about down here I think it was uranium or something spill in the floor back here a few years ago and we found out about that late and it burnt a hole in the floor up there. We are humans, we live down here in this area and we need to be protected too. (48-10-2 [Anonymous, Anonymous])

Response: Commenters expressed concerns about the radiological risks to the public both in the immediate vicinity and downstream of the CFFF. The NRC's mission is to regulate the Nation's civilian use of radioactive materials to protect the public and worker's health and safety, to promote the common defense and security, and to protect the environment. The NRC's regulatory limits for radiological protection are set to protect workers and the public from the harmful health effects of radiation on humans. The limits, found in 10 CFR Part 20, "Standards for Protection Against Radiation," are based on the recommendations of standards-setting organizations. Radiation standards reflect extensive scientific study by national and international organizations (International Commission on Radiological Protection [ICRP], National Council on Radiation Protection and Measurements, Health Physics Society, and the National Academy of Sciences) and are conservative to ensure that the public and workers at nuclear facilities are protected. The international community and the Federal agencies (including the NRC) follow ICRP's current guidelines that the overall annual dose to members of the public from all sources should not exceed 1 mSv [100 mrem]. The purpose of the public dose limit is to limit the lifetime risk from radiation to a member of the general public. The conversion factor used to equate dose into risk is based on data from various populations exposed to very high doses of radiation such as the atomic bomb survivors, and these populations contained individuals of all ages. Therefore, even though the studies use the term reference man, the variation of the sensitivity to radiation given age and gender is built into the standards, which are based on a lifetime exposure. A lifetime exposure includes all stages of life, from birth to old age. For ease of implementation, the radiation standards, which are developed to minimize the lifetime risk, limit the annual exposure that an individual may receive.

Once facilities are constructed and/or in operation, the NRC provides regulatory oversight to ensure that the dose to the public is within the established limits.

The WEC is required to implement radiological monitoring and safety programs that comply with 10 CFR Part 20 requirements. Monitoring effluent releases as well as public and occupational exposures are addressed in the EIS. The WEC conducts a radiological effluent monitoring program to meet the regulatory requirements in 10 CFR 70.59, "Effluent monitoring reporting requirements." The WEC uses data from this monitoring program to perform annual assessments of dose to the public to demonstrate that limits to the public in 10 CFR 20.1301 are met and are ALARA. Information regarding the WEC's effluent and environmental monitoring programs can be found in Section 2.2 of the EIS. Public health impacts from the proposed license renewal of the CFFF are addressed in Section 3.12.3 of the EIS.

Finally, the Consent Agreement between the WEC and SCDHEC addressing the known contamination in soil, surface water and groundwater requires that the WEC conduct a human health risk assessment to be submitted to SCDHEC with the final Remedial Investigation Report. The WEC anticipates submitting the final report, including the human health risk assessment, to SCDHEC in summer 2022. No changes were made to the EIS as a result of these comments.

D.18 Comments Concerning Site Layout and Design

D.18.1 Facility Oversight

Comment: What is the status of the "contaminated wastewater (CWW) line" installed in 1978? Is it accessible and can it be inspected? (9-3-16 [Clements, Tom])

Comment: On page 2-14, the draft EIS seems to base information on the status of waste lagoons on information provided by Westinghouse, such as "The WEC stated that additional inspection is also performed to observe signs of erosion, cracks or bulges, seepage, or wet or soft soil in the dams, dikes, and toe areas. The additional inspection also includes observation of changes in geometry..." Did the NRC itself not make any observations on the status of the lagoons and inspection of them? If not, why not? Please elaborate in the EIS. (9-4-2 [Clements, Tom])

Comment: The inspections and monitoring of Westinghouse operations by the NRC and DHEC are not dependent on the length of the relicensing from the NRC. Both regulatory organizations conduct scheduled and unscheduled inspections as well as respond to incidents. It is our understanding that the NRC and DHEC each have authority to issue cure or stop work notices should conditions warrant. Between the two organizations, all activities on the Westinghouse site are subject to regular inspections by regulatory personnel. (26-2 [Lee, Rick])

Response: The WEC is subject to an oversight program that includes inspections, assessment, and enforcement. The NRC performs inspections at fuel cycle facilities multiple times a year and covers areas such as security, material control and accounting, nuclear criticality control, chemical processes, emergency preparedness, fire safety, radiation safety, environmental protection, waste management, and others. During these inspections at WEC, the NRC staff reviews the WEC's onsite records related to compliance with the license and NRC regulations. As discussed in Section 2.1.3.1, the CWW line breach contamination has been reassessed and no new concerns identified from the event (WEC 2019-TN6510), and the line is no longer in service. For example, NRC inspectors review the WEC's effluents reports and any modification

of systems (e.g., lagoons) in accordance with facility changes. Additionally, the WEC has removed the East Lagoon from service, and remediated and restored the former lagoon footprint to a grassy field. The WEC is planning to close the Sanitary Lagoon and has begun to conduct the corresponding studies. No changes were made to the EIS as a result of these comments.

D.18.2 Facility Operations

Comment: Please clarify that the facility produces uranium fuel for foreign and domestic commercial reactors. How much uranium is handled at any one time? In what forms? Does the facility hold any uranium in reserve for any type of national security or other special reasons? If so, what are potential environmental, health and security impacts of any such stored stocks? (9-2-13 [Clements, Tom])

Comment: In addition to the detailed comments in Enclosure 1 through 4, Westinghouse has installed programmatic controls at the site to further assure that future operations are safe and protective of employees, the public and the environment. These include an extensive environmental monitoring network with established action levels well below regulatory limits, a Conceptual Site Model that is kept current, and implementation of a risk-based remediation procedure that assures a predictable response to any issues in the future. (42-1-1 [Malek, Elise])

Comment: Page: 2-6

Line: 21-26

Current Wording: "The East Lagoon has a 36 mil Hypalon liner (NRC 2018-TN6549) and 21 was last relined around 1980 when the site's Waterglass system was installed (NRC 2019-TN6472). The WEC, however, has decided to decommission the East Lagoon (WEC 2020- TN6844). Characterization of the East Lagoon sludge and closure processes are ongoing in accordance with the Consent Agreement (CA) and the closure plan approved by the South Carolina Department of Health and Environmental Control (SCDHEC) (WEC 2020-TN7020, WEC 2020-TN7004)."

Suggested Wording: "The **former** East Lagoon ~~has~~ a 36 mil Hypalon liner (NRC 2018-TN6549) and was last relined around 1980 when the site's Waterglass system was installed (NRC 2019-TN6472). The WEC, however, ~~has~~ decided to decommission the East Lagoon (WEC 2020-TN6844). Characterization of the East Lagoon sludge and closure processes ~~are~~ **were completed** ~~ongoing~~ in accordance with the Consent Agreement (CA) and the closure plan approved by the South Carolina Department of Health and Environmental Control (SCDHEC) (WEC 2020-TN7020, WEC 2020-TN7004)."

Justification: The former East Lagoon area is now green space and its closure has been approved by SCDHEC. (42-4-1 [Malek, Elise])

Comment: Page: 2-7

Line: Figure 2-6

Current Wording: Figure 2-6 "URRS Process Streams (Source: WEC 2019- TN6510)

Suggested Wording: Replace Figure 2-6 with updated figure in Enclosure 3.

Justification: The East Lagoon appears in this image as a process unit. In 2019, when the ER (TN6510) was submitted, the East Lagoon was still in service. The East Lagoon was decommissioned in 2021. (42-4-2 [Malek, Elise])

Comment: Page: 2-10

Line: 33-39

Current Wording: "The WEC also improved the design for both spiking stations and diked areas

to prevent spills of process solution from impacting the concrete, protect the concrete with a floor coating that is impervious to acidic materials, and guard against undetected deterioration of the concrete floor (WEC 2020-TN6521). In addition, the WEC described other modifications, such as replacing tanks, installing removable polypropylene catch pans, replacing couplings and piping, installing automatic shutoff valves to remove hydrofluoric system pressure, and modifying the berms (WEC 2020-TN6521)."

Suggested Wording: "The WEC ~~also~~ improved the design for both spiking stations and diked areas to prevent spills of process solution from impacting the concrete., ~~protect~~ **The concrete is protected** with a floor coating that is impervious to acidic materials, and guards against undetected deterioration of the concrete floor (WEC 2020-TN6521). In addition, ~~the WEC described other modifications, such as~~ **replaced** tanks, **installed** removable polypropylene catch pans, **replaced** couplings and piping, **installed** automatic shutoff valves to remove hydrofluoric system pressure, and **modified** the berms (WEC 2020-TN6521)."

Justification: Changed the tense to clearly communicate that this work is completed and not on-going. (42-4-4 [Malek, Elise])

Comment: Page: 2-11

Line: 5

Current Wording: "...recycling and others are reloaded and sent offsite for disposal as low-level waste."

Suggested Wording: "...recycling and others ~~are~~ **were** reloaded and sent offsite for disposal as low-level waste."

Justification: Clarification on completed work with the SSAOU. (42-4-6 [Malek, Elise])

Comment: Page: 2-15

Line: 12

Current Wording: "...which is then physically removed (via centrifugation or settling). The WEC sends the calcium..."

Suggested Wording: "...which is then physically removed (~~via centrifugation or~~ **by** settling). The WEC sends the calcium..."

Justification: The reference to centrifugation as a treatment for ammonium fluoride in the site's ER was in error. (42-5-5 [Malek, Elise])

Comment: Page: 2-16

Line: 6-7

Current Wording: "The process will also include removal and disposal of the lagoon liner and evaluation of the subsurface soils..."

Suggested Wording: "The process ~~will~~ **included** removal and disposal of the lagoon liner and evaluation of the subsurface soils..."

Justification: The former East Lagoon area is now green space. (42-5-8 [Malek, Elise])

Comment: Page: 2-16

Line: 9-10

Current Wording: "Additionally, the WEC anticipates rerouting the streams and the lagoon's current function with a storage tank, backfilling the East Lagoon area with virgin materials, and seeding the area for erosion control (WEC 2020-TN7015)."

Suggested Wording: "Additionally, the ~~WEC CFFF~~ **anticipates** ~~rerouting~~ the streams and replaced the lagoon's current function with a storage tank, ~~backfilling~~ **backfilled** the East Lagoon area with virgin materials, and ~~seeding~~ **seeded** the area for erosion control (WEC 2020-

TN7015)."

Justification: The former East Lagoon area is now green space. (42-5-9 [Malek, Elise])

Comment: Page: 2-20

Line: 13

Current Wording: "...uranium and Tc- 99."

Suggested Wording: "...uranium and Tc-99. **This is the same monitoring the CFFF has conducted since the 2007 license renewal.**"

Justification: To remain consistent with the wording in other paragraphs of Section 2.2.2.1.2 Environmental Monitoring Program. (42-5-15 [Malek, Elise])

Comment: Page: 2-21

Line: 21

Current Wording: "...NPDES wells, sentinel wells, and plume wells:"

Suggested Wording: "...NPDES wells, sentinel wells, and ~~plume~~ **area of impact** wells:"

Justification: The site's SNM-1107 license application refers to these wells as "area of impact" wells. (42-6-3 [Malek, Elise])

Comment: Page: 2-21

Line: 22-23

Current Wording: "Perimeter wells will help the WEC detect if groundwater contamination is migrating toward the site boundary. The perimeter wells are the outermost monitoring wells at the CFFF site."

Suggested Wording: "Perimeter wells will help the WEC detect **a potential release before it** if ~~groundwater contamination is~~ migrating toward the site boundary. The perimeter wells are the outermost monitoring wells at the CFFF site."

Justification: To maintain consistency with the site's SNM-1107 license application. (42-6-4 [Malek, Elise])

Comment: Page: 2-21

Line: 24

Current Wording: "NPDES wells are those identified in the NPDES permit to detect leaks from the WWTP."

Suggested Wording: "NPDES **permit required** wells are those identified in the NPDES permit to detect **a leaks in and potential contaminant migration** from the **site** WWTP."

Justification: To maintain consistency with the site's SNM-1107 license application. (42-6-5 [Malek, Elise])

Comment: Page: 2-21

Line: 25

Current Wording: "Sentinel wells are the wells that monitor for releases from each OU."

Suggested Wording: "Sentinel wells are the wells that **detect a potential source or contaminant migration in an** ~~monitor for releases from each OU.~~"

Justification: To maintain consistency with the site's SNM-1107 license application. (42-6-6 [Malek, Elise])

Comment: Page: 2-21

Line: 26-29

Current Wording: "Plume wells are those that monitor for known groundwater contamination plumes. The WEC will monitor, at a minimum, three wells per known plume of radioactive contamination, with one well monitoring the maximum concentration and two wells monitoring

downgradient. These wells are expected to change as the plume moves."

Suggested Wording: "~~Plume Area of Impact~~ wells are those that monitor for known groundwater contamination plumes. **areas impacted by uranium and Tc-99.** The WEC CFFF will monitor, at a minimum, three wells per known plume **for each area impacted by uranium and Tc-99.** of radioactive contamination, with ~~One well is located to detect~~ monitoring the maximum concentration and two wells **are located** monitoring downgradient **of the impacted area.** These wells are expected to change as **if the plume area of impact** moves."

Justification: To maintain consistency with the site's SNM-1107 license application. (42-6-7 [Malek, Elise])

Comment: Page: 3-25

Line: 22

Current Wording: "discharge of plant effluents to the Congaree River and through the transport of inadvertently..."

Suggested Wording: "discharge of **treated** plant effluents to the Congaree River and through the transport of inadvertently..."

Justification: To reaffirm that effluent discharges to the Congaree River have been treated by the WEC on-site wastewater treatment plant. (42-8-10 [Malek, Elise])

Comment: Page: 3-25

Line: 26

Current Wording: "...from the continued discharge of liquid effluents directly into the river. The WEC discharges its..."

Suggested Wording: "...from the continued discharge of **treated** liquid effluents directly into the river. The WEC discharges its..."

Justification: To reaffirm that effluent discharges to the Congaree River have been treated by the WEC on-site wastewater treatment plant. (42-8-11 [Malek, Elise])

Comment: Page: 3-39

Line: 24-25

Current Wording: "...leak on one of the intermodal sea-land) containers south of the WWTP which stores waste drums containing uranium-bearing materials."

Suggested Wording: "...leak on one of the intermodal sea-land) containers south of the WWTP which stores ~~eds waste~~ drums containing uranium-bearing materials."

Justification: The drums contain valuable material destined for recycle/reclamation via incineration. The drums are not waste material. (42-10-8 [Malek, Elise])

Comment: Page: 3-39

Line: 25-26

Current Wording: "The WEC's inspection noted that the waste drums were degraded, and contaminants may have leaked to soils under the container."

Suggested Wording: "The WEC's inspection noted that the ~~waste~~ drums were degraded, and contaminants may have leaked to soils under the container."

Justification: The drums contain valuable material destined for recycle/reclamation via incineration. The drums are not waste material. (42-10-9 [Malek, Elise])

Comment: Page: 3-72

Line: 32-33

Current Wording: "However, the East Lagoon and Sanitary Lagoon are being removed under the CA, which would necessitate the use..."

Suggested Wording: "However, the East Lagoon **was decommissioned** and **the** Sanitary Lagoon ~~are being~~ **will be** removed under the CA, which would necessitate the use..."

Justification: The former East Lagoon area is now green space, and its closure has been approved by SCDHEC. (42-12-12 [Malek, Elise])

Comment: Page: 3-92

Line: 19

Current Wording: "...solvents, lubricating and cutting oils, and spent plating solutions (WEC 2019-TN6510)."

Suggested Wording: "...solvents, **and** lubricating and cutting oils, ~~and spent plating solutions~~ (WEC 2019-TN6510)."

Justification: On-site plating operations were discontinued in February 2020. (42-13-7 [Malek, Elise])

Comment: Page: 3-93

Line: 14-16

Current Wording: "The WEC is actively pursuing closure and cleanup of the East Lagoon, disposal of other contaminated materials, such as calcium fluoride and obsolete cylinders, and analyzing sludge in the Sanitary Lagoon to support closure activities (WEC 2020-TN6844)."

Suggested Wording: "The ~~WEC~~ **CFFF has completed East Lagoon decommissioning and** is actively pursuing ~~closure and cleanup of the East Lagoon and~~, disposal of other contaminated materials, such as calcium fluoride and obsolete cylinders, and analyzing sludge in the Sanitary Lagoon to support closure activities (WEC 2020-TN6844)."

Justification: The former East Lagoon area is now green space, and its closure has been approved by SCDHEC. (42-13-8 [Malek, Elise])

Comment: Page: 3-95

Line: 21-22

Current Wording: "...while process safety management of highly hazardous chemicals are found at 21 29 CFR 1910.119,..."

Suggested Wording: "~~...while process safety management of highly hazardous chemicals are found at 21 29 CFR 1910.119,...~~"

Justification: WEC replaced its only PSM covered material, anhydrous ammonia with aqueous ammonia and therefore this regulation is not applicable. (42-13-9 [Malek, Elise])

Comment: Page: 3-97

Line: 42

Current Wording: "There are 47 exhaust stacks that..."

Suggested Wording: "There are **4627** exhaust stacks that..."

Justification: WEC has 42 monitored stacks. One previously independent stack originating from the chemical lab was tied into a larger, main ventilation system, reducing the number of total stacks by one. Additionally, four additional sample locations (1240, 1242, 1243, and 1246) were removed from the total because these four systems are non-process related, do not exhaust to the atmosphere, and are recirculating comfort air systems. (42-13-11 [Malek, Elise])

Comment: Page: 2-6

Line: 1-12

Current Wording: "The SOLX process separates uranium from contaminants, recovers it as clean UN solution, and delivers it to storage tanks for conversion back to usable product UO2. In 2019, the WEC modified its management practices for the SOLX mixture (WEC 2020-TN6844). The WEC no longer adds SOLX mixture to wet combustible material (WCM) and

revised its process to segregate WCM containing the SOLX mixture into a dedicated Satellite Accumulation Area. The WEC has also ceased charging WCM containing the SOLX mixture into the incinerator. Any bulk SOLX mixture that existed as of July 1, 2019 was processed to recover uranium and then sent offsite to a licensed facility as mixed hazardous waste for treatment and disposal. In April 2020, the WEC eliminated its use of perchloroethylene (PCE) in the SOLX process and replaced it with dodecane. In 2021, the WEC anticipates resuming the incineration of SOLX materials containing dodecane and will submit a revised air permit application to reflect this change, including new emissions calculations."

Suggested Wording: "The SOLX process separates uranium from contaminants, recovers it as clean UN solution, and delivers it to storage tanks for conversion back to usable product UO₂. In 2019, the WEC modified its management practices for the SOLX mixture **containing PCE** (WEC 2020-TN6844). The WEC no longer adds SOLX mixture **containing PCE** to wet combustible material (WCM) and revised its process to segregate WCM containing ~~the SOLX mixture~~ **any PCE residual** into a dedicated Satellite Accumulation Area. The WEC has also ceased charging WCM containing the ~~SOLX mixture PCE~~ into the incinerator. Any bulk SOLX mixture that existed as of July 1, 2019 was processed to recover uranium and then sent offsite to a licensed facility as mixed hazardous waste for treatment and disposal. In April 2020, the WEC eliminated its use of perchloroethylene (PCE) in the SOLX process and replaced it with dodecane. In 2021, the WEC anticipates resuming the incineration of SOLX materials containing dodecane and will submit a revised air permit application to reflect this change, including new emissions calculations."

Justification: The site discontinued use of PCE in April of 2020. All PCE residual has been removed from the site's SOLX process. WEC is not generating any new containers (Satellite Accumulation Area or otherwise) of WCM with PCE material or residual. Likewise, WEC is not incinerating any new containers of WCM with PCE material or residual. (42-1-7 [Malek, Elise])

Comment: Page: 2-14

Line: 45-46

Current Wording: "The lagoons are also inspected on an annual basis by the State."

Suggested Wording: "The lagoons are also inspected on an annual basis ~~by the State~~ **by a South Carolina registered professional engineer (PE) with knowledge relevant to impoundment stability.**"

Justification: The draft NPDES permit, to which WEC is already complying for lagoon maintenance, requires annual inspection of impoundment stability by a SC registered PE. Additional inspections of lagoon liners are required either annually or biennially, also by a SC registered PE. There are no prescribed inspections for lagoons by state officials in either the current NPDES permit or the draft NPDES permit. (42-1-9 [Malek, Elise])

Comment: Page: 1-1

Line: 33-36

Current Wording: No mention of the uranyl nitrate process.

Suggested Wording: Suggest incorporating language from the license renewal application.

Justification: CFFF uses UF₆ and uranyl nitrate (UN) to manufacture nuclear fuel. (42-3-5 [Malek, Elise])

Comment: Page: 1-11

Line: 1-8

Current Wording: N/A

Suggested Wording: East Lagoon Closure Plan

Justification: There is no mention of the East Lagoon Closure Plan that was submitted to SCDHEC staff for approval prior to the decommissioning efforts. The former East Lagoon area

is now green space, and its closure has been approved by SCDHEC. The Remedial Investigation Report will be submitted to DHEC upon completion in 2022 for subsequent review, comment, and final approval. (42-3-7 [Malek, Elise])

Comment: Page: 2-6

Line: 13

Current Wording: "The CFFF site has six lagoons that support..."

Suggested Wording: "The CFFF site has six **five** lagoons that support..."

Justification: The former East Lagoon area is now green space and its closure has been approved by SCDHEC. (42-3-18 [Malek, Elise])

Comment: Page: 2-6

Line: 14-16

Current Wording: "The West Lagoons Area includes the West I and West II lagoons. The Wastewater Treatment Area includes the South, North, and East Lagoons; and the Sanitary Lagoon Area includes the Sanitary Lagoon."

Suggested Wording: Suggest deleting sentences.

Justification: These sentences seem to describe the operable units (OUs) of the Remedial Investigation. These OU names, although helpful for the remedial investigation work, are not used in site wastewater treatment procedures or SCDHEC permitting documents to describe the treatment processes at CFFF. Including them here could cause confusion. (42-3-19 [Malek, Elise])

Comment: Page: 2-11

Line: 4

Current Wording: "The WEC has emptied the intermodal storage containers. Some are sent offsite for..."

Suggested Wording: "The WEC has emptied **all** the intermodal storage containers **containing accountable uranium and uranium contaminated materials from, the southern storage area**. Some **were** are sent offsite for..."

Justification: Clarification on completed work with the Southern Storage Area Operable Unit (SSAOU). The WEC has emptied all the intermodal storage containers containing accountable uranium and uranium contaminated materials. (42-4-5 [Malek, Elise])

Comment: Page: 2-11

Line: 19-21

Current Wording: "The WEC anticipates completing the removal of the remaining intermodal containers that do not contain radioactive materials in 2021 (WEC 2020-TN6844)."

Suggested Wording: "~~The~~ **In 2021 the WEC CFFF completed** the removal of the remaining intermodal containers **in the southern storage area** that do not contain radioactive materials ~~in 2021 (WEC 2020-TN6844).~~"

Justification: CFFF emptied all the intermodal storage containers in the southern storage area containing accountable uranium and uranium contaminated materials. (42-4-8 [Malek, Elise])

Comment: Page: 2-13

Line: 12

Current Wording: "...through the 47 exhaust stacks at the CFFF,..."

Suggested Wording: "...through the **4247** exhaust stacks at the CFFF,..."

Justification: CFFF has 42 monitored stacks. One previously independent stack originating from the chemical lab was tied into a larger, main ventilation system, reducing the number of total stacks by one. Additionally, four additional sample locations (1240, 1242, 1243, and 1246) were

removed from the total because these four systems are non-process related, do not exhaust to the atmosphere, and are recirculating comfort air systems. (42-4-12 [Malek, Elise])

Comment: Page: 2-14

Line: 17

Current Wording: "The WWTP includes a system of six lagoons - North, South, West I, West II, East, and Sanitary."

Suggested Wording: "The WWTP includes a system of six **five** lagoons - North, South, West I, West II, ~~East,~~ and Sanitary."

Justification: The former East Lagoon area is now green space. The lagoon's function within the wastewater treatment system was replaced with an above ground tank. (42-4-13 [Malek, Elise])

Comment: Page: 2-14

Line: 18-19

Current Wording: "The East Lagoon is no longer in operation and the WEC anticipates decommissioning the lagoon in the near future."

Suggested Wording: "The East Lagoon is no longer in operation and ~~the WEC anticipates was~~ decommissioned ~~the lagoon in the near future~~ in 2021.

Justification: The former East Lagoon area is now green space. (42-4-14 [Malek, Elise])

Comment: Page: 2-14

Line: 19-20

Current Wording: "Figure 2-4 shows the location of the six onsite lagoon storage basins in the West Lagoons Area, Wastewater Treatment Area, and Sanitary Lagoon Area."

Suggested Wording: "Figure 2-4 shows the location of the ~~six~~ **five remaining** onsite lagoons and the former location of the East Lagoon. ~~storage basins in the West Lagoons Area, Wastewater Treatment Area, and Sanitary Lagoon Area.~~"

Justification: These sentences seem to describe the operable units (OUs) of the Remedial Investigation. These OU names, although helpful for the remedial investigation work, are not used in site WWT procedures or SCDHEC permitting documents to describe the treatment processes at CFFF. Including them here could cause confusion. (42-5-1 [Malek, Elise])

Comment: Page: 2-14

Line: 20-24

Current Wording: "These lagoons are for settling solids from treated process wastewater prior to discharging liquid effluents to the Congaree River. Treated wastewater from the West I and West II lagoons is then sent to the North and South Lagoons for further treatment. The treated sanitary wastewater is mixed with the stream from the North and South Lagoons, receives further..."

Suggested Wording: "These lagoons are for settling solids from treated ~~process~~ wastewater prior to discharging liquid effluents to the Congaree River. Treated wastewater from the West I and West II lagoons is ~~then~~ sent to the North ~~and or~~ South Lagoons for further treatment. The treated sanitary wastewater is mixed with the stream from the North ~~and or~~ South Lagoons, receives further..."

Justification: Unlike the other lagoons, the Sanitary Lagoon does not receive "process" wastewater. All lagoons are used to settle solids from treated wastewater. The Sanitary Lagoon aids in settling solids from the site's package plant.

Flow from the West I and West II lagoons is sent to either the North or South Lagoon, as these lagoons are used alternately, not in parallel. (42-5-2 [Malek, Elise])

Comment: Page: 2-15

Line: 10-11

Current Wording: "The main constituents of the process liquid waste streams are uranium and ammonium fluoride. The ammonium fluoride is mixed with lime and caustic to create an insoluble calcium fluoride,..."

Suggested Wording: "The main constituents of the process liquid waste streams are uranium and ammonium fluoride. **Uranium is removed in the Waterglass treatment process, where the aqueous waste stream is contacted with sodium silicate solution. Sodium silicate entraps (flocculates) insoluble uranium and precipitates soluble uranium out of the liquid ammonia wastewater. The precipitated uranium is processed through a filter plate system and dewatered before being returned to the conversion process.** The ammonium fluoride is mixed with lime and caustic to create an insoluble calcium fluoride,..."

Justification: As written, the text does not address how uranium is removed from the site's liquid waste streams. Suggest adding wording that describes how uranium is removed from process liquid waste streams. (42-5-6 [Malek, Elise])

Comment: Page: 2-15

Line: 25-26

Current Wording: "The liquid waste stream is discharged into the Congaree River through a submerged pipe, about 6 m (20 ft) from the shore. The flow rate into the river is 405,000 liters per day (L/d)..."

Suggested Wording: "The liquid waste stream is discharged into the Congaree River through a submerged pipe, **located within the riverbed** about 6 m (20 ft) from the shore. The flow rate into the river is 405,000 liters per day (L/d)..."

Justification: To clarify the pipe location from the shoreline of the Congaree River. (42-5-7 [Malek, Elise])

Comment: Page: 2-16

Line: 31-37

Current Wording: "Using the sampling results, the WEC calculates the estimated dose to the public and worker. The WEC conducts representative stack sampling from 47 stacks to monitor gaseous effluents. Sampling and monitoring methods and frequencies are determined by the WEC. The WEC also samples its liquid effluents before they are discharged to the Congaree River. The NRC's limits for liquid and gaseous effluents are provided in Table 2 of Appendix B to 10 CFR Part 20 (TN283). For uranium, the limit is 300 pCi/L and for Tc-99 it is 60,000 pCi/L."

Suggested Wording: "Using the sampling results, the ~~WEC~~ **CFFF** calculates the estimated dose to the public ~~and worker~~. The ~~WEC~~ **CFFF** conducts representative stack sampling from ~~47~~ **42** stacks to monitor gaseous effluents. Sampling and monitoring methods and frequencies are determined by the ~~WEC~~ **CFFF per NRC guidance**. The ~~WEC~~ also samples its liquid effluents before they are discharged to the Congaree River. The NRC's limits for liquid and gaseous effluents are provided in Table 2 of Appendix B to 10 CFR Part 20 (TN283). ~~For uranium, the limit is 300 pCi/L and for Tc-99 it is 60,000 pCi/L.~~

Justification: CFFF has 42 monitored stacks. One previously independent stack originating from the chemical lab was tied into a larger, main ventilation system, reducing the number of total stacks by one. Additionally, four additional sample locations (1240, 1242, 1243, and 1246) were removed from the total because these four systems are non-process related, do not exhaust to the atmosphere, and are recirculating comfort air systems. Suggest removing the references to limits since those are only for liquid effluents and this section discusses both liquid and gaseous effluents. In addition, the limits are referenced in the previous sentence. (42-5-11 [Malek, Elise])

Comment: Page: 2-17

Line: 8-10

Current Wording: "Past laboratory analysis had indicated that gross beta was a reasonable indicator of Tc-99; however, a direct correlation between gross alpha and uranium concentrations attributed to CFFF operations was not as clear."

Suggested Wording: "Past laboratory analysis had indicated that gross beta was a reasonable indicator of Tc-99; however, a direct correlation between gross alpha and uranium concentrations attributed to CFFF operations was not as clear **because of naturally occurring alpha emitters.**"

Justification: Clarification. (42-5-12 [Malek, Elise])

Comment: Page: 2-17

Line: 10-11

Current Wording: "Because there is known uranium in the subsurface, the WEC will be able to identify impacts on the various mediums..."

Suggested Wording: "Because there is known **naturally occurring** uranium in the **subsurface environment**, the **WEC CFFF** will be able to identify impacts on the various mediums..."

Justification: Clarification. (42-5-13 [Malek, Elise])

Comment: Page: 3-101

Line: 38

Current Wording: "...to discharge from the 47 exhaust stacks."

Suggested Wording: "...to discharge from the **4247** exhaust stacks."

Justification: WEC has 46 monitored stacks. One previously independent stack originating from the chemical lab was tied into a larger, main ventilation system, reducing the number of total stacks by one. Additionally, four additional sample locations (1240, 1242, 1243, and 1246) were removed from the total because these four systems are non-process related, do not exhaust to the atmosphere, and are recirculating comfort air systems. (42-14-1 [Malek, Elise])

Response: *As described in Section 2.1.2 of the EIS, the CFFF is a fuel fabrication facility that manufactures fuel assemblies and components for use in commercial nuclear reactors to generate electricity, and the amount of uranium onsite is not publicly available. The fuel assemblies consist of uranium dioxide (UO₂) powder that is processed and pressed into fuel pellets for use in fuel rods. In addition to manufacturing fuel assemblies and components for use in commercial nuclear reactors to generate electricity, the CFFF also assembles tritium-producing burnable absorber rods (TPBARs). Assembly of TPBARs is not under NRC's regulatory oversight. The TPBAR operations at CFFF are addressed under Cumulative Impacts in Section 3.19 of the EIS, which has been revised to include additional information about this activity. Additionally, Section 2.1.3 of the EIS describes the facility events and changes, including ongoing changes such as the removal of the East Lagoon and planned closure of the Sanitary Lagoon. Further, the WEC must submit annual reports about the facility changes per 10 CFR 70.72, which the NRC staff routinely inspects. The NRC staff has also verified and revised the descriptions of the facility operations in Chapters 1 and 2 of the EIS per the updates provided in these comments.*

D.18.3 Facility - Scrubber

Comment: Please provide a diagram and explanation of where the uranium scrubber that caused problems is located. How has it been modified so as not to cause a release or near-criticality accident? (9-3-14 [Clements, Tom])

Comment: The scrubber incident could have resulted in release of solid uranium particles, so future release of such material is possible. Please include a discussion and analysis of potential aerial release of uranium particles or other solid contaminants. Could there be pathways into the environment without filtration (such as a broken HEPA filter or scrubber)? [I note that "particulates" are mentioned on page 2-17, so there must be such discharge: "A significant change is the direct analysis for uranium and Tc-99 for all media, except air particulates, instead of the analysis of gross alpha and gross beta activity as surrogates." Likewise, "air particulates" are listed in Table 2-4.] What is the potential environmental and health impact of such particulates? What do these particulates consist of? (9-4-1 [Clements, Tom])

Response: *Information about the scrubber operation and the event mentioned by the commenter is described in Section 2.1.2 of the EIS. Additionally, the WEC is required by NRC regulations to monitor the planned releases of radioactive materials in liquid or gaseous effluents as part of its operations. The NRC requires the WEC to submit a semi-annual report specifying the quantity of each of the principal radionuclides released in liquid and gaseous effluents as part of the CFFF operations. The NRC's limits for liquid and gaseous effluents are provided in Table 2 of Appendix B to 10 CFR Part 20. Using the results of the monitoring program, the WEC also calculates the estimated dose to the public. These semi-annual effluent monitoring reports are publicly available via NRC's ADAMS. The EIS discusses gaseous effluents in Section 2.2.1.1 of the EIS. The CFFF's gaseous effluents are treated by HEPA filters, scrubbers, or both prior to discharge through the 42 exhaust stacks at the CFFF. The CFFF also operates gas-fired boilers, calciners, and oil-fired diesel generators, all of which generate air emissions. The nonradiological air pollutant emissions are managed under the State's air operating permit. Air quality impacts from the proposed action are discussed in Section 3.7.2 of the EIS. No changes were made to the EIS as a result of these comments.*

D.18.4 Facility- Incinerator

Comment: Where is the incinerator that processes uranium-bearing and other materials located? Is this inside or outside the main processing facility? (9-3-15 [Clements, Tom])

Response: *The incinerator process is described in EIS Section 2.1.2. The facility incinerator is located onsite and isolated from the rest of the facility by a rated fire barrier (WEC 2021-TN7106). No changes were made to the EIS as a result of this comment.*

D.19 Comments Concerning Socioeconomics

D.19.1 Uncertainty of Socioeconomic Impacts

Comment: I don't think that it's very fair to throw the economy of Hopkins alongside an uncertain future of a potential 20, or 40 year license when any affect on the economy, if the NRC were to entertain a no action, and let the decommission process start, the economy effect is a short term effect. We can't -- I don't think anybody can effectively predict that the economy of Hopkins is going to be so devastated that Hopkins is going to dry up over the next 40 years because Westinghouse is not there. We can't say that, so I think that it's unfair to throw the economy in there as a deciding factor. If we're also not going to weigh in on the health effects that Westinghouse may be posing. (1-3-9 [Mitchum, Chief Michelle])

Comment: And again, I'm concerned about the people who are there right now. There is an explanation that if a no action decision is rendered, and the current Westinghouse license expires, potential impacts on socioeconomics would be moderate because the plant would

cease to operate, and begin decommissioning activities. The decommissioning, which we've already established, is going to be, funding is available to handle that, would likely cause Westinghouse to employ a smaller work force than the current work force. Decommissioning activities would also be temporary, and eventually the employment, and other economic activities associated with the site would end, resulting in a noticeable adverse impact on the local economy, and I'm quoting out of the thing again. But again, I think that the local economy issue is a short term issue. Hopkins is in a hub zone, and it's in what's termed an opportunity zone. So, there's no way to know what Hopkins will be in five years, whether Westinghouse is there, or not. And I do feel that the hazardous impact seriously outweighs the guessing of what might be, even in ten years, either way. (1-9-10 [Mitchum, Chief Michelle])

Comment: 3) The risk the plant poses due to its physical location in relation to an urban community; (23-3 [Harrison, James])

Response: *Socioeconomic impacts, including impacts on local employment, income, and tax revenues, are subject to uncertainty. During the 40-year analysis period, many factors can affect the local area surrounding the CFFF site as well as the greater Columbia metropolitan area. Growth or decline of new or existing industries can offset any effects resulting from the NRC's licensing decision regarding the CFFF. While socioeconomic impacts are subject to uncertainty, the NRC staff's impacts analysis appropriately considered publicly available information, including information from Federal and State agencies, regarding (1) demography, (2) employment structure and personal income, (3) housing availability and affordability, (4) tax structure and distribution, and (5) community services. The NRC staff's analysis appropriately considered the effects of time in its impact determinations for the proposed action (i.e., operation of the CFFF for an additional 40 years), the 20-year renewal alternative (i.e., operation of the CFFF for an additional 20 years, see Section 3.17.2.10), and the no-action alternative (i.e., operation of the CFFF through 2027, see Section 3.17.1.10). Section 3.11.4 of this EIS has been modified to address this concern and provide clarification.*

D.20 Comments Concerning Soils

D.20.1 Geology and Soils - Affected Environment - Tc-99 Contamination

Comment: 11. "Soils and Soils Impacts" Section 3.2.4, page 3-15 discusses the source of Tc-99 contamination as being unknown, but elsewhere in the DEIS, the source of Tc-99 is identified as historical U feed sources (pp. 3-40). We recommend that the Final EIS clarify this issue. (34-2-2 [Fite, Mark])

Response: *In July 2020, the WEC submitted the final Tc-99 source investigation report to SCDHEC. While the WEC concluded that, based on the evaluation of the sampling data, the source of the Tc-99 groundwater impact "is historical and not the result of current operations at the facility" (WEC-2020-TN7011), the WEC considered potential sources and discussed likely sources of the Tc-99 contamination. EIS Section 3.2.4 was revised to be consistent with other EIS sections in the discussion of potential sources for Tc-99 contamination.*

D.20.2 Geology and Soils - Soils Impact Determination

Comment: In the draft statement, the statement is on one of the pages says some soils near the plant buildings have been contaminated, but soils away from the operational area have only been minimally affected to date, but you state that while it is noticeable, it is small. You also wrote that under the consent agreement, Westinghouse would accept remediation efforts, which

are expected to disturb surface soils only near the plant buildings. But as previously discussed, we already see a discrepancy in the impact statement where this is being put into the Congaree River, so obviously that can't be correct. (1-9-5 [Mitchum, Chief Michelle])

Response: *As described in EIS Section 3.2.4, some soil samples collected from the CFFF site have shown evidence of contamination from CFFF operations. Because contaminants have been detected in soils, the NRC staff determined that CFFF operations have had a noticeable effect on site soils. Further, because the soil contamination has been localized to the area around the plant buildings and remediation efforts under the CA executed between the WEC and SCDHEC have been directed at removing surface soil contamination above the WEC's action levels, there has been neither destabilization nor noticeable alteration of any important attribute of the soils. In accordance with the NRC staff's environmental impact definitions (SMALL, MODERATE, and LARGE impacts) as described in EIS Section 2.5, the NRC staff finds that these conditions are consistent with a SMALL environmental impact finding as cited in the staff's guidance in NUREG-1748. Additionally, discharges to the Congaree River are regulated by SCDHEC under the NPDES permit. Soil contamination at the site does not contribute to the discharge. No changes to the EIS were made in response to this comment.*

D.20.3 Geology and Soils - Soils - Contaminants and Environmental Monitoring

Comment: On 2-18, it is stated that "During the proposed license renewal period, the WEC will collect four co-located soil and vegetation samples annually and evaluate them for uranium and Tc-99 content (WEC 2019-8 TN6423)." Does this imply that Tc-99 could be mobilized from the soil into vegetation or that aerial release of Tc-99 could occur? Likewise, what would be the source of uranium deposited on vegetation? (9-4-5 [Clements, Tom])

Response: *As described in EIS Section 2.2.2.1.2, the WEC samples various media, including vegetation, as part of the CFFF's environmental sampling and monitoring program, and evaluates the samples for the potential radionuclides that could be released during operation of the CFFF. No specific transport mechanisms are implied. The environmental sampling and monitoring program is a component of the WEC's environmental protection program described in the license renewal application (WEC 2020-TN6844, WEC 2021-TN7042); it is intended to address (through prevention and mitigation) inadvertent releases to the environment and to provide assurance that exposures to radionuclide contaminants are kept below permissible limits. Additionally, Section 3.5 of the EIS discusses the terrestrial and aquatic resources. The NRC staff's evaluation of impacts on ecological resources considered the known onsite contamination at the CFFF and found that impacts on terrestrial and aquatic resources would be SMALL. No changes to the EIS were made in response to this comment.*

D.20.4 Geology and Soils - Volatile Organic Compounds (VOCs) - Remediation Actions and Regulatory Authority

Comment: 9. Section 2.2.2.2, "Monitoring of SCDHEC NPDES Permit" also describes sampling for multiple constituents including volatile organic carbons (VOCs), nitrate, fluoride, gross alpha, and gross beta. Under the current permit requirements, it is unclear whether there are any actions that need to be taken if samples exceed an EPA Maximum Contaminant Level (MCL) or some predetermined value. VOC degradation by soil microorganisms occurs at a very slow rate (Page 3-44), as does denitrification. The soils need to be characterized to determine if biodegradation processes are possible or dependable as remediation options. We recommend that the Final EIS provide a more in-depth discussion on VOCs to determine if statistically significant trends demonstrate an increase in contamination in the wells. We also recommend

that the soils be characterized to determine if biodegradation processes are possible or dependable as remediation options. (34-1-20 [Fite, Mark])

Response: As described in EIS Chapter 2, the WEC procedure RA-433, "Environmental Remediation" (this procedure can be found at ADAMS Accession No. ML20353A288), identifies the actions that the WEC would take in the event of detecting an inadvertent release of contaminants to the environment. Remediation of existing contamination would be conducted in accordance with the process established in the CA executed between the WEC and SCDHEC. Additionally, while the NRC has regulatory authority over the use of radioactive material for civilian purposes, the SCDHEC has authority for regulating nonradioactive contaminants, including VOCs. As described in EIS Section 3.4.1, SCDHEC requires groundwater at the CFFF site to meet drinking water quality standards. No changes to the EIS were made in response to this comment.

D.21 General Comments in Support of License Renewal

D.21.1 General Licensing Renewal Support

Comment: As a former (retired) forty three year employee I can say that the Columbia facility works very hard to not only comply but exceed regulations and laws. I have personally seen that in action with the Malcolm Baldrige Award in the late eighties. That same level of quality continues to this day. The Columbia facility is a significant benefit to the community employing over a thousand people. I wholeheartedly support another forty years of excellence. (2-1 [Plowden III, Henry])

Comment: During our discussions we noted the following. Westinghouse:

1. Is executing a full EIS, as directed by the NRC and advocated by DHEC, to meet NEPA standards, including extensive modeling and investigation. Such a study will completely address the environmental concerns being advanced by others who are in favor of a shortened license period.
2. Completed the removal of all shipping containers containing uranium bearing materials
3. Completed the remediation and closure of the East Lagoon
4. Installed additional wells on the grounds to monitor subsurface conditions
5. Formed a community stakeholder group complete with regular site meetings and a newsletter
6. Submitted a request to the NRC to include several conditions in the renewed license that ensure sustainability of programmatic improvements that have been made, resulting in reduced risk of future operations
7. Has maintained a transparent relationship with GNAC, DHEC and the citizens group
8. Has moved ahead with the remediation of the Sanitary Lagoon well ahead of receiving directions from regulators to do so
9. Is investing significantly in upgrading and modernizing the facilities
10. DHEC has regularly affirmed the absolute cooperation they have received from Westinghouse including data, schedules, compliance with DHEC requests and the performance of activities by Westinghouse above and in advance of requirements.
11. Changed processes within the plant to eliminate the use of certain hazardous chemicals as a means of eliminating potential problems in the future (26-4 [Lee, Rick])

Comment: Following our discussion, a motion was made and unanimously approved that if the NRC chooses to relicense the Westinghouse facility, we urge a 40 year license be awarded to Westinghouse for the reasons noted above. We fully acknowledge that the decision rests exclusively with the NRC. However, in light of advocacy for the shorter-term permit by special interest groups, we felt compelled to participate in your comment period and represent the State of South Carolina, the 1100 employees at site and speak favorably about the efforts Westinghouse has made to prepare their site and plant for the future. (26-5 [Lee, Rick])

Comment: I am writing on behalf of the Westinghouse Electric Company in Hopkins, South Carolina. As a native of the Columbia South Carolina community I have had numerous friends who have been employed at Westinghouse. We appreciate the jobs, economic impact and spin off services that accompany the facility and their over 900 employees. The \$60 million in salaries and the spending it represents in communities across the Greater Midlands makes a tremendous impact. As do the corporate contributions of Westinghouse to numerous community projects and non profit programs designed to enhance the lives of our local citizens. It has been my pleasure to serve on the Community Advisory Board with Westinghouse and numerous other community leaders as we continue to learn about the various challenges and opportunities of working for a major corporation in the nuclear fuels business. I have found the leadership at Westinghouse to be very forth coming with sharing information regarding operational and safety performance, willing to respond to inquiries regarding operations, safety and community outreach, and proud of their efforts to be responsive to the community. It is apparent they are concerned with the well being of their employees, their community, and with operating within all OSHA, NRC, etc., guidelines. (38-1 [McPherson, Susan])

Comment: The Department has no comment on the length of the proposed license renewal. The enhanced environmental monitoring, progress toward removing wastewater surface lagoons, and improved environmental communication protocols are all components with which make it possible for safe and secure plant operations. (41-1-1 [Taylor, Ken])

Comment: Westinghouse has made improvements to site operations to further assure that future operations are safe and protective of employees, the public and the environment.

For example, over the past several years, Westinghouse has:

- completed extensive fieldwork under a Remedial Investigation Work Plan to characterize the source, nature, and extent of impact in groundwater, surface water, soil, and sediment. This work included the addition of 57 new groundwater monitoring wells;
- eliminated a nickel-plating operation;
- eliminated the use of tetrachloroethylene (PCE) and replaced it with a non-hazardous material;
- completed a Technetium-99 (Tc-99) source investigation which determined current site operations do not have the potential to introduce concentrations of Tc-99 above the Environmental Protection Agency's drinking water standard into the environment;
- removed legacy UF6 cylinders for off-site disposal;
- re-designed the Hydrofluoric Acid (HF) Spiking Stations;
- installed a sentinel groundwater monitoring well network around the Chemical Area manufacturing building;

- removed all intermodal storage containers with radiological materials from the Southern Storage Area and implemented procedural requirements to forbid this method of storage;
- removed out-of-service equipment and disposed of uranium contaminated equipment on the manufacturing building roof;
- removed the East Lagoon from service, remediated, disposed of waste materials, and restored the former lagoon footprint to a grassy field;
- established a Community Engagement Board;
- completed fieldwork for a cultural resource survey in accordance with a plan approved by the South Carolina Historic Preservation Office; and
- initiated sanitary lagoon sludge characterization activities and process replacement design in preparation for lagoon closure.

Additionally, Westinghouse continues to invest in infrastructure in preparation for an additional 40 years of operation. To ensure infrastructure longevity Westinghouse has replaced or refurbished key systems such as boilers, cooling towers, fire system, and underground piping, and executes a process to continually assess infrastructure and capital assets for future replacement and refurbishment.

In summary, Westinghouse believes that for all of the reasons described in this letter, its enclosures, and the draft EIS, the environmental impacts of a 40-year license renewal have been assessed and the benefits of the proposed action clearly outweigh the economic and environmental costs. Indeed, when considering the small overall adverse environmental impacts of the proposed action, it would be unreasonable to foreclose the option of license renewal.

(42-1-5 [Malek, Elise])

Response: *The NRC acknowledges the comments in support of the licensing renewal of the CFFF for another 40 years. The NRC will issue a license if it can conclude that there is reasonable assurance (1) that the activities authorized by the license or permit can be conducted without endangering the health and safety of the public, and (2) that such activities will be conducted in compliance with the rules and regulations of the Commission. While the comments expressing general support, including those about the site environmental improvements and compliance, are useful for the NRC to understand public opinion about the licensing action, the comments provided no new information regarding the EIS and are not addressed further. No changes were made to the EIS as a result of these comments.*

D.22 Comments Concerning Surface Water Hydrology

D.22.1 Surface Water - Affected Environment

Comment: 7. After the flooding events described in Section 2.1.3, "Facility Event and Changes Since 2007 License Renewal," the DEIS states that "No long-term impacts on groundwater wells within the existing monitoring well network and the water table on the bluff are anticipated because most of the rainfall left the site via overland flow in CFFF's network of stormwater ditches" (Page 2-9). To support the statement above, we recommend that the Final EIS indicate whether measurement was taken of either surface water or groundwater, and the Congaree River following previous flood events. (34-1-18 [Fite, Mark])

Response: *The EIS statement referred to by the commenter was based on information provided by the WEC in the cited document (WEC 2019 TN6510, the March 2019 Environmental Report). Site data used to evaluate the baseline conditions of the site's surface water and groundwater resources are described in EIS Sections 3.3 and 3.4, respectively. No changes to the EIS were made in response to this comment.*

D.22.2 NPDES General Permit for Storm Water Discharges

Comment: We also recommend that WEC consider implementing best management practices during maintenance of the facility on an as-needed basis for areas greater than one acre per the Clean Water Act National Pollutant Discharge Elimination System Permit for stormwater, where applicable. (34-1-5 [Fite, Mark])

Response: *As described in EIS Section 3.3.1.2, stormwater discharges from the CFFF are permitted by the SCHDEC under the NPDES General Permit for Storm Water Discharges Associated with Industrial Activity. Use of control measures, including best management practices, to meet effluent limits is required by the general permit. No changes to the EIS were made in response to this comment.*

D.22.3 Sediments

Comment: Sediment sampling and the Sediment Transect Sampling Work Plan. Detection of uranium in sediment/sludge samples from stormwater ditches, wastewater treatment plant lagoons, and both Sunset lakes precipitated further study. Sediment sampling included the East lagoon and sanitary lagoon as well as waterbodies in the floodplain. Sediment sampling in Upper and Lower Sunset Lake and the channel of Mill Creek was required under the Consent Agreement, and results from the sampling were troubling. Fluoride and Nitrate were detected in many of the samples, and Uranium was detected in the wastewater treatment lagoon and four samples from the Sunset lakes. As SCDHEC noted in its comments on the Draft Interim Remedial Investigation report, the presence of uranium in the Sunset lakes was unexplained. Westinghouse speculated the uranium may have resulted from a 1971 spill of 1 to 1.5 million gallons of wastewater, while SCDHEC noted that information from the spill had not been shared in Westinghouse's reporting since 1977. We request that additional investigation of the 1971 incident be required, and that a source study for uranium in the Sunset lakes be conducted rather than accepting Westinghouse's explanation at face value. (11-6 [Grego, John])

Comment: The discussion of sediment quality throughout the draft EIS is, at best, confusing. Sediments are treated primarily in discussions about surface water resources and quality. Example: "3.3.2.3 Surface Water Impacts Conclusion -Past operation of the CFFF has had a noticeable effect on the water quality of the onsite surface water bodies. However, uranium contamination in the upper and lower portions of Sunset Lake currently exceeds the residential use screening levels (based on 2019 sampling). Based on the existing data, the NRC staff expects that there is a low potential for significant contamination to move off/site via a surface water pathway and noticeably degrade water quality in Mill Creek downstream from the CFFF site boundary." The uranium contamination noted in this excerpt is in the sediments of Upper and Lower Sunset Lakes, not in the water in those lakes, and thereby, is far less likely to be transported within the surface water itself. The presence of uranium in the sediments of both Upper and Lower Sunset Lakes was discovered during the 2019 sampling directed by the Consent Agreement. WEC informed DHEC at that time that this likely was the result of a lagoon failure that occurred in October 1971. The fact that these sediments likely reflect an event that happened 48 years before these samples were collected, is an additional indicator of the

immobility of the uranium in the Sunset Lakes sediments. DHEC specifically commented that this event was a possible explanation for the presence of the uranium in those sediments in letters of 11-26-2019 and 04-27-2020 to NRC. DHEC has since found this lagoon failure was previously documented in Westinghouse's 1975 Environmental Evaluation and in NRC's 1977 CFFF Environmental Appraisal (ML 1792A037). In the February 2021 NRC Scoping Process Summary Report, NRC acknowledged this event (Section B.11) and stated it would be evaluated in the EIS. However, in the draft EIS, the only mention of this event is in Section 3.12.1, p. 3-92 line 31 with no attribution of how that contamination may have come to be. (41-1-2 [Taylor, Ken])

Comment: Page/Line: 3-26/46; 3-27/1-7. Current Wording: "Contaminated Mill Creek sediments could be transported offsite during flood events. Sediment samples obtained in 2019 from the Upper and Lower Sunset Lake sections of Mill Creek exceeded residential screening levels for uranium (WEC 2020-TN6526). Mill Creek sediment samples obtained between the Lower Sunset Lake dike and the exit dike contained uranium isotope activities below the residential screening levels (the largest activity was about one-half of the residential screening level) (WEC 2020-TN6526). Additional sediment sampling in Mill Creek and Sunset Lake is being conducted as part of the remedial investigation process under the CA (WEC 2020-TN6707)."

Suggested Wording: "Contaminated Mill Creek sediments could ~~be~~ **are unlikely to** be transported offsite during flood events; **however if some of these sediments were transported offsite during a flood event, they would not be a risk to human health or the environment.**"

Justification: The minor impact of this unlikely event is described on page 3-28, lines 19-24. A West II Lagoon rupture, which occurred in 1971 is the likely source of contaminated sediment located in Upper Sunset Lake. At the time of the lagoon rupture, liquid and sediment wastes being held within the lagoon for treatment contained higher levels of uranium than what is present now. Around 1980 the site installed a "waterglass process" to remove additional low-level uranium from liquid waste so that the uranium could be recycled. This change also reduced the uranium content in process lagoon sludges (calcium fluoride) such that it meets free release criteria and can be recycled. As stated above, the draft NPDES permit, to which WEC is already complying for lagoon maintenance, requires annual inspection of impoundment stability by a SC registered PE. Additional inspections of lagoon liners are required either annually or biennially, also by a SC registered PE. The Technical Basis Document (TBD), Remedial Investigation Phase II Sediment Sampling and Sediment Transect Interim Evaluation for the Westinghouse Columbia Fuel Fabrication Facility was submitted to SCDHEC with the July 2021 CA Monthly Progress Report. This document explains: "Evaluation of the elevated sediment results identified on CFFF property could lead to three possible conclusions. First, the results could indicate an immediate need to take remedial action based on the determined level of risk. Second, the results could indicate that further evaluation is warranted in the Feasibility Study (FS) that will be performed as part of the Consent Agreement, and third, the results could indicate that no action is necessary. Based on this interim evaluation of the Phase II remedial investigation sediment sampling results, the follow up bounding sampling results, and the dose modeling/associated risk estimates, no immediate action is necessary. The results of these comprehensive sampling campaigns have defined the limited horizontal and vertical extent of sediment impact. There are no current or future concerns for contaminants to potentially move offsite, and the documented impacts pose no potentially significant threat to plant workers, the general public or the environment. Continued environmental monitoring per the site's NRC license and CFFF's procedure RA-434, Environmental Data Management, will be performed, and further evaluation in the areas of the site drainage ditch, Gator Pond and the Mill Creek Corridor will be included in the Final remedial investigation report and in the FS required by the Consent Agreement." (42-1-13 [Malek, Elise])

Response: Section 3.3 of the EIS was revised to clarify that the NRC staff considered the potential transport of CFFF contaminants offsite to be dissolved constituents in the water of Mill Creek and contaminated sediments suspended in Mill Creek flows. The text of the surface water impacts conclusion cited by one of the commenters was revised to make clear when the staff are referring to dissolved contaminants and to contaminated sediments. Discussion of the 1971 lagoon failure and its potential effect on Sunset Lake sediments was added to EIS Section 3.3.1.3.

D.22.4 Discharges to the Congaree River - Tc-99

Comment: 12. Section 3.3.1.1 "Congaree River", the average discharge of Tc-99 is 4.9 mCi/year. With discharge to the river at 378,541 L/d, the daily discharge of Tc-99 is about 1.34E7 pCi/day or 35.5 pCi/L of the river. This 35.5 pCi/L is below the EPA Tc-99 MCL of 900 pCi/L. We recommend that the Final EIS clarify how CFFF could ensure that these concentrations stay below the stated values downstream from the facility over the next 20-40 years. (34-2-3 [Fite, Mark])

Response: As noted by the commenter and as described in EIS Section 3.3.1.1, Tc-99 discharges to the Congaree River have been below the MCL for the last decade and no changes to the CFFF operations have been identified that would greatly increase the discharge. As described in EIS Section 3.3.1.1, discharges to the Congaree River are made in compliance with the NPDES permit and are expected to be quickly diluted in the river; conditions that are expected to continue under the proposed license renewal. No changes to the EIS were made in response to this comment.

D.22.5 Surface Water - Congaree River Monitoring and Impacts

Comment: We would also welcome another sampling point on the Congaree River downstream from the Mill Creek discharge. This could be co-located along the park's West Boundary Road, which is the site for the USGS gage and South Carolina Department of Natural Resources (SCDNR) radio transponder for short-nosed sturgeon. (21-14 [Stanley, Joyce])

Comment: 4) Congaree National Park, a precious gem to the people of South Carolina is very close to this plant on the south. Due to the uncertainty of climate conditions, especially water flow, it is unreasonable to grant a 40 year license given the risk of loss to this national park. (23-4 [Harrison, James])

Comment: "In addition, the Congaree River is not impaired downstream of the CFFF discharge by any identified COPCs attributed to CFFF operations" (Section 3.3.2.1, "Congaree River" page 3-25). We recommend that the Final EIS provide additional map(s) and discussions on downstream sampling. (34-2-6 [Fite, Mark])

Comment: I have grave concerns about the eventual migration of pollutants towards nearby surface waters and eventually the Congaree River. There should be additional groundwater and surface water sampling conducted. Clean water is essential for healthy living things, including humans. As a frequent visitor of the Congaree River and Congaree National Park I am passionate that they be preserved for future generations. (45-2 [Hendley, Viola])

Comment: The community wants better oversight of the wastewater discharge - continue to test for high levels of nitrate-nitrogen, uranium and terchnetium-99 in the treatment system. There have been liner issues in the past. (50-4 [Woods, Felicia])

Response: The NRC staff reviewed an extensive set of CFFF monitoring data as part of the NEPA environmental review of the CFFF license renewal application. The data included historical data as well as data from the current CFFF monitoring programs described in EIS Section 2.2.2. The WEC monitors effluent discharged to the Congaree River as a condition of the NPDES permit, and monitors the Congaree River upstream and downstream of the discharge point as a condition of the NRC license. As described in EIS Section 3.3.1.1, the observed effect of the CFFF discharge on Congaree River water quality is small; effects would be no greater further downstream. No changes to the EIS were made in response to these comments.

D.22.6 Surface Water - Flooding

Comment: Yes, my name is Virginia Sanders, I'm a resident of Lower Richland. My comments are just going to be plain comments. That Westinghouse plant is located in the community that they call Lower Richland, as one of our previous callers spoke of. We have flooding from rain, and know that we're living in the time of climate change, and global warming. I mean last week we had rain every day, and we had flooding every day. Westinghouse persists, and says constantly, and I'm assuming that the NRC agrees with them, that the contaminants that they have spilled on their campus, and the pods of uranium, and other toxic chemicals that has been spilled into the ground on the Westinghouse campus, they keep telling us that it has not gone off of their grounds. Now, we would have to be completely crazy to believe anything that they say. I mean you don't control where water flows, and Westinghouse doesn't control either. (1-13-1 [Sanders, Virginia])

Comment: While it is true that the area has historically experienced large floods from tropical systems (i.e., page 3-16, line 35), NPS and USGS data dispute the assertion that, "Flooding... on the Congaree River is most likely to occur from June through October..." Rather, these data (including 20 years of data from gauges) clearly show patterns of increasing water levels and flood frequency during winter and spring. (21-12 [Stanley, Joyce])

Comment: Additionally, while the acknowledgement of climate change (Section 3.7.1.6) is appreciated, especially the note that "Extreme rainfall events have increased in frequency and intensity in the Southeast and will continue to increase in the future." (page 3-67, line 11), a 20- or 40-year license renewal should acknowledge such models that may - in concert with both local (Mill Creek watershed) and larger (Congaree River watershed) development trends in increased area of impervious surfaces - increase the likelihood of the 2015 flood, which was associated with unplanned releases at the site (i.e., page 3-23). (21-13 [Stanley, Joyce])

Comment: 2) The uncertainty of environmental conditions, particularly flooding, occasioned by our rapidly changing climate. This has been clearly obvious with the historic flooding in the midlands over the past few years; (23-2 [Harrison, James])

Comment: The DEIS also states that after the 2015 flooding event and associated lagoon spills "No supplemental sampling of 18 environmental mediums was conducted during or immediately after the flooding event." This is very concerning, and any new license should require immediate sampling after any flood event or possible release of pollutants into the environment. (43-2 [Stangler, Bill])

Response: The characteristics of flooding at the CFFF site are described in EIS Section 3.3. Congaree River flooding of the CFFF buildings is unlikely due to the elevation of the site buildings. Local flooding in the area of the CFFF buildings could result from intense

precipitation such as the 2015 event discussed in EIS Section 3.3.1.2. In the event of inadvertent releases during a flood event, the WEC provides notification to SCDHEC of emergency releases to the Congaree (per the NPDES permit) and follows their environmental remediation procedure for monitoring and mitigation of contaminant releases locally. While flooding can occur at any time of the year, flooding of larger basins such as the Congaree is more likely to occur from June to October. The WEC evaluated additional information related to flood hazards at the CFFF site within their integrated safety analysis, which is reviewed by NRC staff as part of its safety evaluation. The WEC is required by 10 CFR 70.62(c) and 70.64(a) to maintain baseline criteria and an integrated safety assessment to be protective of flooding at the facility. No changes to the EIS were made in response to these comments.

D.22.7 Surface Water - Inadvertent Release and Impact Determinations

Comment: 5. Significant uncertainties exist between the extent of the interchange between surface water and groundwater regarding the additional sources of future Technetium-99 (Tc) and Uranium (U) contamination. We recommend that the Final EIS state what criteria were used to justify a Small impact to surface water resources and a Small to Moderate impact to groundwater resources in the Final EIS. (34-1-16 [Fite, Mark])

Comment: Based on the report, the facility caused contamination of the onsite surface water with radiological and non-radiological constituents (pp 3-22). Uranium isotopes were detected in all of the samples, and residential use screening level (RUSLs) were exceeded (pp 3-24). Recent sediment sampling data provides additional evidence that the CFFF operations have contributed to technetium-99 (Tc-99) contamination in Gator Pond and potentially uranium contamination in 35 Sunset Lake (pp 3-26, 3-33). These conclusions are alarming and should be considered when making the renewal decision. (39-15 [Ghanem, Sahar] [Plauche, Mary])

Response: *The categories used by the NRC for the significance of potential environmental impacts (SMALL, MODERATE, or LARGE) are described in EIS Section 2.5. The NRC staff established these standards of significance using the CEQ's terminology and definition for "significantly" (see 40 CFR 1508.27). Because significance and severity of an impact can vary with the setting of a proposed action, the NRC staff considers both "context" and "intensity" as defined in the CEQ's regulations (40 CFR 1508.27). These established three levels of significance for potential impacts provide a common framework for each of the resource areas assessed in this EIS. For additional information, see the NRC staff's response to comments on the NRC's environmental impact level descriptions (Section D.27.10). Application of these categories to the evaluation of water resources impacts is discussed in EIS Sections 3.3.2.3 and 3.4.2.4 for surface water and groundwater, respectively.*

At the CFFF site, water resource impacts were based on the effects of CFFF operations on water quality and the potential impacts on other water uses and users. Water quality impacts are SMALL when they are undetectable or so minor that their extent is limited (e.g., a mixing zone or a controlled access area) and water quality standards are not violated. Surface water impacts from past operations of CFFF were determined to be MODERATE because CFFF contaminants are detectable in the Gator Pond at levels exceeding a water quality standard, but the contamination has not moved offsite, does not currently affect other water users, and has therefore not destabilized the resource. Potential impacts under the proposed license renewal would be SMALL if CFFF operated without any future contaminant releases or if future releases were quickly detected and remediated without violations of water quality standards. In EIS Section 3.3.2.3, however, the NRC staff concluded that future inadvertent releases are reasonably foreseeable. Future releases may affect water quality in the onsite surface water

bodies, but are unlikely to exceed water quality standards and are unlikely to move offsite. As a result, the staff concluded that surface water impacts would be SMALL under proposed license renewal. EIS Section 3.3.2.3 was revised to clarify the staff's basis for the impact determination.

D.22.8 Surface Water - Tc-99 Contamination

Comment: The DEIS section 3.4.1.2.2 "Gross Beta and Technicium-99" needs to discuss the historical source of Tc-99 from previous decades, and why gross beta counts at Gator Pond (i.e., Fig 3-11) are basically constant over time after an initial short increasing trend around 2010 and not decreasing afterward. We recommend that the Final EIS provide a more in-depth discussion regarding the history of Tc-99 at Gator Pond. (34-2-13 [Fite, Mark])

Response: As discussed in EIS Sections 3.3 and 3.4, the NRC staff reviewed the available data on the occurrence and extent of Tc-99 contamination and evaluated the publicly available Tc-99 source investigation report prepared by WEC under the CA with SCDHEC (WEC-2020-TN6538). Potential sources for Tc-99 releases to the environment are described in EIS Section 3.4.1.2.2. EIS Sections 3.2.2.2 and 3.4.1.2.2 attribute the continuing gross beta activity in Gator Pond to discharge to the pond of groundwater contaminated with Tc-99. Groundwater monitoring data described in EIS Section 3.4.1.2.2 show Tc-99 activities to be highest in a region of the surficial aquifer likely to be discharging to the pond. Uncertainties regarding the occurrence and future transport of Tc-99 in groundwater are described in EIS Section 3.4.2. As described in EIS Section 3.4.2, remediation efforts under the CA with SCDHEC, ongoing monitoring, and implementation of procedures to detect and respond to potential future inadvertent releases were all factors considered by the NRC staff in reaching its impact determination. No changes to the EIS were made in response to this comment.

D.22.9 Surface Water - Use of MCLs for Onsite Water Bodies

Comment: Page: 3-22

Line: 40

Current Wording: "Uranium was detected in all but one sample and had a maximum concentration of less than 4 percent of the 30 µg/L MCL."

Suggested Wording: "Uranium was detected in all but one sample and had a maximum **Total U concentration of 1.78 µg/L** less than 4 percent of the 30 µg/L MCL."

Justification: Surface water and river water samples are not within the scope of EPA's drinking water standard and, as a result, no MCLs exist for these environmental sample types. In the absence of a regulatory standard, Westinghouse has instituted **internal investigation levels** for gross alpha in surface water (50 pCi/L) and river water (15 pCi/L). (42-8-2 [Malek, Elise])

Response: Text in EIS Section 3.3.1.2 was revised for clarity, but the use of MCLs as reference concentrations was not deleted as suggested. The NRC staff believes it serves the public interest to show a comparison of site surface water contaminant concentrations and drinking water standards, even when those standards do not apply to the specific surface water body.

D.22.10 Surface Water - Wetlands Occurrence and Contamination

Comment: MR. OVERLY: Hello, thank you all for having this meeting tonight. Personally, I don't have a problem with nuclear, to me it's the ultimate green energy. But some things that I've heard tonight really kind of raised my curiosity a lot. I have to be forthright, I'm a 25 year hydro geologist, and so a lot of the stuff I heard, I kind of squinted a little bit. The first thing I kind of draw question to is when you indicate that a level of contamination is listed as quote

moderate.

I mean, your moderate might be my slight, my slight might be your extreme, that to me is a very disingenuous way to describe the contamination. If you're finding volatiles in a creek, I don't know much about Mill Creek, I don't know what the setting (inaudible) is for that creek, but if you're pulling grass samples, and you're actually getting a measurable result, that tells me the true result is much higher, because of all the dilution that would go along with moving water, and what not. (1-4-1 [Overly, David])

Comment: My biggest concern is the Wetlands adjacent to the facility. It is my understand there is a significant water table, rivers and creeks at risk. Our wetlands are dwindling away and cannot be replaced. Of all the places for this to facility to operate why let it occur in such an important resource? (22-2 [Martin, Joy])

Comment: How long before these contaminants leak into the neighboring, and fragile, wetlands and rivers (if they haven't already done so)? (29-2 [May, Stephen])

Comment: The Wetlands adjacent to the facility are subject to considerable contamination. Our water table, rivers and creeks are at risk substantial risk. Our wetlands are dwindling away and cannot be replaced, and the plants sits adjacent to the only National Park in the entire state - the Congaree Swamp - our communities most prized ecological asset. (35-10 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Response: *Onsite surface water bodies, including wetlands and surface water-groundwater interactions, are described in EIS Section 3.3, with additional discussion of wetlands in EIS Section 3.5. The occurrence of wetlands within the CFFF site property boundary was significantly affected by alterations to Mill Creek that occurred before the existence of CFFF. Continued operation of the CFFF would not affect the occurrence of wetlands on the site. Existing contamination of onsite surface water bodies and sediments is described in EIS Sections 3.3.1.2 and 3.3.1.3. As described in EIS Section 3.3.2.2, the CFFF operations have had a minor effect on water quality in Mill Creek, and contaminants were determined to be unlikely to move beyond the site boundary. No changes to the EIS were made in response to these comments.*

D.22.11 Surface Water Impacts - Sediments

Comment: Page: 3-26

Line: 34-36

Current Wording: "Recent sediment sampling provides additional evidence that the CFFF operations have contributed Tc-99 contamination in Gator Pond and potentially uranium contamination in Sunset Lake (WEC 2020-TN6526)."

Suggested Wording: Relocation to 3.3.1.3

N/A

Justification: Because these sentences discuss sediment contamination, CFFF suggests moving this content from section 3.3.2.2, Onsite Surface Water to section 3.3.1.3, Sediment. (42-8-13 [Malek, Elise])

Response: *EIS Section 3.3.2.2 discusses the potential impacts of CFFF operations on surface water resources. Observations of contaminated sediments obtained from onsite surface water bodies are an indicator of the effect of CFFF operations on the affected water resource. No changes to the EIS were made in response to this comment.*

D.22.12 Surface Water Impacts - Withdrawal and Consumptive Use

Comment: Page: 3-25

Line: 1-5

Current Wording: "Surface water withdrawals and consumptive use of water for CFFF operations directly reduces the quantity of water available for other uses and users of the same resource. Degradation of water quality by the intentional or inadvertent release of contaminants to surface water bodies potentially renders the water resource unsuitable for other users and designated uses."

Suggested Wording: "~~Surface water withdrawals and~~ Consumptive use of water for ~~by~~ CFFF operations **would** directly reduces the quantity of water available for other uses and users of the same resource. Degradation of water quality by the intentional or inadvertent release of contaminants to surface water bodies **could** potentially renders the water resource unsuitable for other users and designated uses."

Justification: CFFF does not directly withdraw surface water. CFFF receives water from the City of Columbia. Suggest rewording for clarification. (42-8-9 [Malek, Elise])

Response: *EIS Section 3.3.1 states the source of water for CFFF operations. Water is withdrawn by the City of Columbia for use at CFFF. Some of this water is consumed and the remainder is returned to the Congaree River downstream from the point of withdrawal. Both the withdrawal and consumptive use, therefore, have potential impacts on other users of the resource. No change to the EIS was made in response to this comment.*

D.22.13 Surface Water-Groundwater Interaction

Comment: [In many respects, the relicensing decision feels premature...] Surface water sampling had been intermittent in the past, but sampling conducted as part of the Remedial Investigation found Fluoride in all samples, nitrate in several, and CVOCs in two. Sampling includes drainage ditches, Gator Pond and Upper and Lower Sunset Lakes. Uranium was detected in all samples, though an order of magnitude below the MCL (Maximum contaminant level); no Technetium-99 was discovered in the water samples. A better understanding of the interaction between groundwater and surface water needs to be completed. (11-5 [Grego, John])

Comment: The Department recommends sediment sampling along the West Boundary Road, closest to the WEC, and event-based sampling after major floods such as the 2015 event. (21-9 [Stanley, Joyce])

Comment: Surface water resources are hard to separate from groundwater resources due to the hyporheic exchange. We understand why this distinction is made in the document, but evidence abounds for complex, dynamic relationships that are not adequately addressed. Examples include: (a) the observation that "Gator Pond is fed by a natural spring, the source of which is likely the shallow groundwater directly beneath the plant site," (page 3-18, line 6); (b) NPS staff observations of shallow wells at CONG that can become artesian with no nearby surficial flooding and no apparent relationship to nearby wells; and (c) the United States Geologic Survey (USGS) study that noted significant differences in well behavior and classification with respect to surface water connectivity <https://pubs.usgs.gov/sir/2008/5170>). (21-10 [Stanley, Joyce])

Comment: The Department is particularly concerned that during the 2015 flood "unknown levels of biological oxygen demand, fecal coliform, ammonia, calcium, fluoride, and nitrates could have been released from the lagoon overflow to the surrounding water bodies," (page 3-

23, line 14), and that "no supplemental sampling of environmental mediums was conducted during or immediately after the flooding event," (page 3-23, line 17). Abundant biogeochemical research in wetlands shows that mobilization of water, sediment, and nutrients is clearly pulsed with flood events. Combined with the present uncertainties (acknowledged by both the NRC and WEC) regarding contaminant source, transport, and fate, we request the addition of event-based sampling as part of the monitoring program. Such a design would automatically trigger sampling of all groundwater, sediment, and fish (identical in scope and methodology to other, regular samples) when any floods cross into the "moderate" stage on either the NOAA flood forecast points for Carolina Eastman (<https://water.weather.gov/ahps2/hydrograph.php?wfo=cae&gage=ceas1>) or Congaree National Park (<https://water.weather.gov/ahps2/hydrograph.php?wfo=cae&gage=gads1>). Accounting for such extreme events is fundamental to calibrating contaminant behavior models in ways that long-term averages will completely miss (and underestimate). As these models are calibrated, the long-term climate and development impacts to the flooding regime (which are appropriate to consider over a 20- or 40-year license term) will also become increasingly important. (21-22 [Stanley, Joyce])

Comment: pp 2-20, Figure 2-8: Due to deficiencies in available contaminant distribution data, additional soil and surface water sampling locations should be sited for the smaller streams, in conjunction with the proposed groundwater sampling, to establish if these are pathways into the larger Mill Creek/Sunset Lake water systems. Flow in these streams may be intermittent where surface water sampling would need to be timed with rainfall events, but soil/pore sampling can still be conducted. (39-10 [Ghanem, Sahar] [Plauche, Mary])

Response: *As discussed in EIS Sections 3.2, 3.3, and 3.4, the NRC staff acknowledges the variability of the subsurface sediment deposit of the surficial aquifer, the surface water-groundwater interactions at the CFFF, and the potential for groundwater discharge to contribute to the contamination of the onsite surface water bodies. As described in EIS Section 3.3.2, the NRC staff was able to make an impact determination for the onsite surface water bodies based on the available data. Additional investigation of the dynamic interactions between the onsite surface water bodies and the shallow groundwater occurred as part of the remedial investigation Phase II activities under a CA with SCDHEC, but the results were unavailable during preparation of this EIS. No changes to the EIS were made in response to these comments.*

D.22.14 WEC's Execution of the Consent Agreement with SCDHEC

Comment: * To better understand compliance issues with CFFF and the risk associated with these discharges, we recommend that further discussions include the facility's history of non-compliance with the CA, the cumulative impacts of these discharges, how these discharges impact surrounding communities, and the need for a plan to resolve these issues. (34-1-3 [Fite, Mark])

Response: *The history of past releases at the site since the previous license renewal is described in EIS Section 2.1.3. The SCDHEC has not documented noncompliance with the Consent Agreement and discharges to the Congaree River conform to the conditions of the NPDES permit. As described in EIS Sections 3.3 and 3.4, the contaminants discharged to the environment as the result of past inadvertent releases have not travelled beyond the CFFF site boundary. Additionally, as described in EIS Section 3.4.2, remediation efforts under the CA with SCDHEC, ongoing monitoring, and implementation of procedures to detect and respond to potential future inadvertent releases were all factors considered by the NRC staff when reaching its impact determination. No changes to the EIS were made in response to this comment.*

D.22.15 Impacts on Water Quality During Drought Conditions

Comment: The SCDNR recommends that further consideration be given to what impacts may exist to the facility and associated resources if a drought occurs. How would operations affect water quality if minimum flows continued to an extended drought? Could a drought result in a higher concentration of contaminants in the Congaree River? Additionally, does the facility follow the City of Columbia's Drought Management Plan and Drought Ordinance? If so, include this information in the Final EIS and how that would affect their water use and Columbia's overall water supply. (47-3 [Riggin, Lorianne])

Response: Revisions were made to EIS Sections 3.3.1.1 and 3.3.2.1 to clarify that the impacts of the CFFF discharge to the Congaree River were evaluated for low-flow conditions. Because the CFFF obtains water from the City of Columbia, the CFFF is subject to city ordinances governing water service, including restrictions on water use during drought conditions.

D.22.16 General Comments about Surface Resources and Remedial Investigations under the CA with SCDHEC

Comment: Page: 2-22

Line: 19-21

Current Wording: "The WEC stated that the monthly Discharge Monitoring reports sent to SCDHEC monthly, as required by the NPDES permit, will also be reported to the NRC on a semiannual basis (WEC 2020- TN6844)."

Suggested Wording: "~~The WEC stated that the monthly Discharge Monitoring reports sent to SCDHEC monthly, as required by the NPDES permit, will also be reported to the NRC on a semiannual basis (WEC 2020- TN6844).~~ **Additionally, NRC regulations require monitoring and reporting of radiological effluents in order to estimate the potential dose to public. These results are reported to the NRC on a semi-annual basis.**"

Justification: In the cited reference (TN6844 pg 16 of 74), WEC states "Effluent from the permitted wastewater treatment system including the site lagoons is monitored according to the parameters and limits described in the site NPDES permit. These data are submitted to SC DHEC through required monthly Discharge Monitoring Reports (DMRs). Additionally, NRC regulations require monitoring and reporting of radiological effluents. These results, including liquid discharges to the Congaree River in accordance with the NPDES permit, are reported to the NRC on a semi-annual basis. The paragraph beginning "Additionally, NRC regulations require..." is meant to reference the semi- annual effluent report submitted to NRC as part of the 10 CFR 70.59 requirements to estimate potential dose to the public. The normal liquid discharge path for the CFFF is via the discharge line to the Congaree River. WEC does not submit monthly DMRs to the NRC. (42-1-11 [Malek, Elise])

Comment: Page: 3-26

Line: 25-30

Current Wording: "As described in Section 3.3.1 of this EIS, surface water quality on the CFFF site has been noticeably affected by past plant activities. The WEC's surface water sampling conducted as part of its NRC license requirements has indicated elevated gross alpha and gross beta activities in CFFF site stormwater runoff sampled just before the control valve point of discharge to the drainage ditch (i.e., the Roadway sample location) and elevated gross beta in samples from the Gator Pond spring and the pond itself (WEC 2021-TN6920, WEC 2019-TN6423)."

Suggested Wording: "~~As described in Section 3.3.1 of this EIS, surface water quality on the CFFF site has been noticeably affected by past plant activities. The WEC's surface water~~

~~sampling conducted as part of its NRC license requirements has indicated elevated gross alpha and gross beta activities in CFFF site stormwater runoff sampled just before the control valve point of discharge to the drainage ditch (i.e., the Roadway sample location) and elevated gross beta in samples from the Gator Pond spring and the pond itself (WEC 2021 TN6920, WEC 2019 TN6423)."~~

Justification: Site data submitted with reference WEC 2021-TN6920 and in Section 3.3.1 of the DEIS do not support the assertion that surface water quality on the CFFF site has been noticeable affected by past plant activities. Suggest deleting. "Roadway" is a specific name given to surface water samples collected within a site drainage ditch immediately upstream of C-valve but across the existing roadway. "Roadway" samples are not collected directly after rainfall events. Westinghouse has instituted internal investigation levels for gross alpha and gross beta. These investigation levels are delineated in CFFF procedure RA-434, Environmental Data Management. The following justification is based on measured surface water values from January 2010 through May 2021. Roadway: Since January 2010, the highest gross alpha measurement at the Roadway location was 46 pCi/L in July 2014. The next highest result was 26 pCi/L in Sept 2013. The average gross alpha measurement at the Roadway is 8 pCi/L. Zero samples have exceeded the site's internal investigation level for gross alpha in surface water of 50 pCi/L at the Roadway location. Since January 2010, the highest gross beta measurement at the Roadway location was 52 pCi/L in Feb 2012. The next highest result was 37 pCi/L in November 2012. The average gross beta measurement at the Roadway is 10 pCi/L. Zero samples have exceeded the site's internal investigation level for gross beta in surface water of 300 pCi/L at the Roadway location. Gator Pond: Since January 2010, the highest gross alpha measurement in Gator Pond was 11 pCi/L in Sept 2011. The next highest result was 7 pCi/L in January 2020. The average gross alpha measurement in Gator Pond is 1 pCi/L. Zero samples have exceeded the site's internal investigation level for gross alpha in surface water of 50 pCi/L in the Gator Pond location. Since January 2010, the highest gross beta measurement in Gator Pond was 57 pCi/L in Feb 2020. The next highest result was 56 pCi/L in January 2016. The average gross beta measurement in Gator Pond is 25 pCi/L. Zero samples have exceeded the site's internal investigation level for gross beta in surface water of 300 pCi/L in the Gator Pond location. Tc-99 was not detected above the MDC in any surface water samples collected during Phase I of the remedial investigation Work Plan, including location SW-23 which was in the Gator Pond (WEC 2020 TN6526). (42-1-12 [Malek, Elise])

Comment: Page/Line: 2-18/21, 2-19/4

Current Wording: "The ditch was identified on maps but has not been ground truthed at this time."

Suggested Wording: ~~"The ditch was identified on maps but has not been ground truthed at this time."~~

Justification: The ditch has been ground truthed as part of the Remedial Investigation Work Plan Phase II activities. (42-5-14 [Malek, Elise])

Comment: Page: 3-13

Line: 19

Current Wording: "Biannual soil sampling conducted as part of the environmental monitoring program..."

Suggested Wording: "Annual soil sampling conducted as part of the environmental monitoring program..."

Justification: Per the site's SNM-1107 license, soil sampling is conducted annually. (42-7-6 [Malek, Elise])

Comment: Page: 3-15

Line: 14-15

Current Wording: "however, the source of the Tc-99 contamination is unknown. "

Suggested Wording: "however, the source of the **historic** Tc-99 contamination is unknown. "

Justification: There are no current sources of Tc-99 at the levels seen in the groundwater. An investigation was completed in July 2020 to confirm that current operations are not the source of the historic impact. Additionally, the Tc-99 source investigation report also concluded that current site operations do not have the potential to introduce Tc-99 levels above the MCL into the environment. (42-7-10 [Malek, Elise])

Comment: Page: 3-15

Line: 15-21

Current Wording: "The WEC is completing a shallow soil gas survey and soil sampling as part of the remedial investigation process to evaluate the continuing presence of a VOC source in the unsaturated sediments west of the main plant building and in the Western Groundwater Area of Concern (AOC) (WEC 2020-TN6707). Soil samples will be collected based on the results of the soil gas survey from the surface to depths up to 5.2 m (17 ft). Soil sampling is planned along the southern edges of the Sanitary and East Lagoons and will be evaluated for potential Tc-99 contamination (WEC 2020-TN6707)."

Suggested Wording: "The **CFFF** ~~WEC is completing~~ **completed** a shallow soil gas survey and soil sampling as part of the remedial investigation process to evaluate the continuing presence of a VOC source in the unsaturated sediments west of the main plant building and in the Western Groundwater Area of Concern (AOC) (WEC 2020-TN6707). Soil samples ~~will~~ **be were** collected based on the results of the soil gas survey from the surface to depths up to 5.2 m (17 ft). **As part of the Tc-99 Source Investigation Study (completed in July 2020), two soil borings were installed** ~~Soil sampling is planned~~ along the southern edges of the Sanitary and East Lagoons and ~~will be~~ **were** evaluated for potential Tc-99 contamination (WEC 2020- TN6707)."

Justification: These investigation activities are completed. (42-7-11 [Malek, Elise])

Comment: Page: 3-17

Line: 4-5

Current Wording: "A portion of Mill Creek flow is diverted at the point where it enters the CFFF site by a canal located..."

Suggested Wording: "**The majority** ~~A portion~~ of Mill Creek flow is diverted at the point where it enters the CFFF site by a canal located..."

Justification: Based upon field observations and transducer data of surface water elevations within various points of Mill Creek (including the canal), the majority of Mill Creek flow is diverted through the canal. (42-7-12 [Malek, Elise])

Comment: Page: 3-17

Line: 16-17

Current Wording: "The irrigation ditch rejoins Mill Creek near the point where the creek crosses the CFFF property line."

Suggested Wording: "The irrigation ditch rejoins Mill Creek near the point where the creek crosses the CFFF property line. **These features existed prior to the construction of the CFFF.**"

Justification: To clarify that the irrigation ditch was not constructed by WEC/CFFF. (42-7-13 [Malek, Elise])

Comment: Page: 3-22

Line: 14

Current Wording: "...indicated levels of gross beta, fluoride, and nitrate above or at the respective MCLs."

Suggested Wording: "...indicated levels of ~~gross beta~~, fluoride, and nitrate above or at the respective MCLs."

Justification: Surface water samples are not within the scope of EPA's drinking water standard and, as a result, no MCLs exist for these environmental sample types. In the absence of a regulatory standard, Westinghouse has instituted **internal investigation levels** for gross alpha in surface water of 50 pCi/L and gross beta of 300 pCi/L. These investigation levels are delineated in CFFF procedure RA-434, *Environmental Data Management*. The result for the Gator Pond was 44.2 pCi/L, which is not above the site's *investigation level* of 50 pCi/L that prompts subsequent speciation for Tc-99. (42-7-15 [Malek, Elise])

Comment: Page: 3-22

Line: 25

Current Wording: "...location on Mill Creek. During the period from 2010 to 2018, gross beta exceeded 50 pCi/L in..."

Suggested Wording: "...location on Mill Creek. During the period from 2010 to 2018, gross beta exceeded **the site investigation level** 50 pCi/L in..."

Justification: Surface water and river water samples are not within the scope of EPA's drinking water standard and, as a result, no MCLs exist for these environmental sample types. In the absence of a regulatory standard, Westinghouse has instituted **internal investigation levels** for gross alpha in surface water (50 pCi/L) and river water (15 pCi/L). (42-8-1 [Malek, Elise])

Comment: Page: 3-22

Line: 16-18

Current Wording: "Fluoride was above the 4 mg/L MCL in the Upper and Lower Sunset Lakes samples and in drainage ditch samples collected between the "C" control valve location and Upper Sunset Lake."

Suggested Wording: "Fluoride was above the 4 mg/L MCL in the Upper and Lower Sunset Lakes samples, **the Gator Pond**, and in drainage ditch samples collected between the "C" control valve location and Upper Sunset Lake."

Justification: Clarification. (42-8-3 [Malek, Elise])

Comment: Page: 3-22

Line: 37-39

Current Wording: "MCLs were exceeded for fluoride in the Gator Pond sample and for TCE at two ditch locations below the drainage ditch connection ("C" valve) location."

Suggested Wording: "MCLs were exceeded for fluoride in the Gator Pond sample and for ~~TCE~~ **tetrachloroethylene** at two ditch locations below the drainage ditch connection ("C" valve) location."

Justification: According to September 2019 data, trichloroethylene (TCE) was only detected in one location, and no locations exceeded MCL. However, tetrachloroethylene (PCE) did exceed MCL in two ditch locations. (42-8-4 [Malek, Elise])

Comment: Page: 3-24

Line: 18-19

Current Wording: "...workers. Excluding the lagoon samples, the largest activity observed was 117 pCi/g (for U- 233/234) in a sample from Lower Sunset Lake."

Suggested Wording: "...workers. Excluding the lagoon samples, the largest activity

observed **during remedial investigation Phase I sampling** was 117 pCi/g (for U- 233/234) in a sample from Lower Sunset Lake (**location SED- 22**)."

Justification: WEC has conducted multiple sediment sampling campaigns throughout the current remedial investigation and the 2013 remedial investigation. Including this information clearly identifies the data set being referenced in the DEIS. (42-8-5 [Malek, Elise])

Comment: Page: 3-24

Line: 28

Current Wording: "Chlorinated VOCs were not detected in sediments with the exception of a single ditch sample that contained TCE (a duplicate sample from the same location was below the detection level)."

Suggested Wording: "Chlorinated VOCs were not detected in sediments with the exception of a single ditch sample that contained ~~TCE~~ **PCE** (a duplicate sample from the same location was below the detection level)."

Justification: Per source WEC 2020 TN6526, one detection of PCE was reported in Sed-17 (5.5 µg/kg). There were no detections of TCE. (42-8-6 [Malek, Elise])

Comment: Page: 3-24

Line: 31-32

Current Wording: "Nitrate was detected in about one-half of the samples at values exceeding 2 mg/kg in lower ditch locations."

Suggested Wording: "Nitrate was detected in about one-half of the **sediment** samples **collected in July 2019. The only two results** at values exceeding 2 mg/kg **were** in lower ditch locations **SED-16 (2.7 mg/kg) and SED-17 (2.1 mg/kg).**"

Justification: This is incorrect. Only 2 locations from July 2019 sediment sampling exceeded 2 mg/kg for nitrate and they were SED-16 and SED-17. (Source: WEC 2020 TN6526) (42-8-7 [Malek, Elise])

Comment: Page: 3-24

Line: 33

Current Wording: " Ammonia exceeded 1,000 mg/kg in the lagoons and in some Upper Sunset Lake locations."

Suggested Wording: " **According to July 2019 sampling data, A**ammonia exceeded 1,000 mg/kg in ~~the lagoons and in some Upper Sunset Lake locations.~~ **one sample from the Sanitary Lagoon (SED-25), one sample from the East Lagoon (SED-28), and one sample from Upper Sunset Lake (SED-20).**

Justification: This is incorrect. Based on July 2019 data (Source: WEC 2020 TN6526) only one result in Upper Sunset Lake (SED-20) exceeded 1,000 mg/kg. (42-8-8 [Malek, Elise])

Comment: Page: 3-26

Line: 30-34

Current Wording: "Sampling conducted as part of the remediation investigation activities under the CA has shown VOC contamination in site runoff; fluoride contamination in site runoff, Gator Pond, and Sunset Lake; and nitrate contamination in site runoff and Gator Pond (AECOM 2013- TN5508; WEC 2020- TN6526)."

Suggested Wording: "~~Sampling conducted as part of the remediation investigation activities under the CA has shown VOC contamination in site runoff; fluoride contamination in site runoff, Gator Pond, and Sunset Lake; and nitrate contamination in site runoff and Gator Pond (AECOM 2013- TN5508; WEC 2020- TN6526).~~"

Justification: Suggest deleting. No storm water runoff was sampled as part of the RIWP. The one mention of storm water runoff in reference WEC 2020-TN6526 (Appendix B) is in relation to

a sediment sample location, SED-19. The site does sample stormwater runoff at the "C valve" location for ISO-U and Tc-99 quarterly, per procedure ROP-06-010. (42-8-12 [Malek, Elise])

Comment: Page: 3-27

Line: 25-27

Current Wording: "The NRC staff also assume that monitoring of surface water quality, including Mill Creek water quality sediment contamination would continue as part of NRC license requirements."

Suggested Wording: "The NRC staff also assume that monitoring of surface water quality **and sediment locations, including the new location identified in the license application as "Lower Sunset Lake"** Mill Creek water quality sediment contamination would continue as part of NRC license requirements."

Justification: To clarify the future commitment in the license renewal application to collect sediment annually at one location in Lower Sunset Lake. (42-8-15 [Malek, Elise])

Comment: Page: 3-28

Line: 9-10

Current Wording: "However, uranium contamination in the upper and lower portions of Sunset Lake currently exceeds the residential use screening levels (based on 2019 sampling)."

Suggested Wording: "However, uranium contamination **in sediment of** the upper and lower portions of Sunset Lake currently exceeds the residential use screening levels (based on 2019 and 2021 sampling)."

Justification: Report section is entitled "Surface Water Impacts" and this sentence addresses contamination related to sediment, not surface water. There is an extra space between the words "of" and "Sunset". (42-8-16 [Malek, Elise])

Comment: Page: 3-28

Line: 19-21

Current Wording: "Contaminated sediments could be transported offsite during significant flooding events, but the large volume of water involved in such an event is expected to result in reduced contaminant concentrations when these sediments are redeposited."

Suggested Wording: "Contaminated sediments ~~could~~ **are unlikely to** be transported offsite during significant flooding events ~~however, a but~~ the large volume of water involved in such an event ~~is~~ **would be** expected to result in reduced contaminant concentrations ~~when these if the~~ sediments ~~are were~~ redeposited."

Justification: Same comment as made in the substantive section on page 3-26, line 46 and 3-27, line 1-7. (42-9-1 [Malek, Elise])

Response: *These comments address specific changes in the text of the EIS proposed by the WEC. The NRC staff reviewed the suggested text revisions and justifications provided by the WEC and revised the text of the EIS to address these comments, as appropriate.*

D.23 Comments Concerning Terrestrial Ecology

D.23.1 Missing Bird Species

Comment: Table 3-5 is missing the following migratory bird species that could be within or in the vicinity of the project footprint: Anhinga, Great Egret, Great Blue Heron, Red-shouldered Hawk, Yellow-billed Cuckoo, Pileated Woodpecker, Snowy Egret, Acadian Flycatcher, Yellow-breasted Chat, Baltimore Oriole, Black-and-white Warbler, Blue Grosbeak, Scarlet Tanager, Summer Tanager, Carolina Chickadee, Black-throated Blue Warbler, Prairie Warbler, Yellow-

throated Warbler, Chestnut-sided Warbler, Pine Warbler, Carolina Wren, Brown Thrasher, Barn Owl, Blue-winged Warbler, Yellow-throated Vireo and White-eyed Vireo.

Additional information regarding these species that are protected under federal or state statutes can be found at: <https://www.dnr.sc.gov/species/index.html> and <https://www.fws.gov/southeast/pdf/fact-sheet/south-carolina-species-list-by-county.pdf>. (47-8 [Riggin, Lorianne])

Response: *The NRC staff reviewed the additional species recommended by commenter and has revised Table 3-5 of the EIS to include anhinga, great egret, great blue heron, red-shouldered hawk, yellow-billed cuckoo, pileated woodpecker, snowy egret, Acadian flycatcher, yellow-breasted chat, Baltimore oriole, black-and-white warbler, blue grosbeak, scarlet tanager, summer tanager, Carolina chickadee, black-throated blue warbler, prairie warbler, yellow-throated warbler, Chestnut-sided warbler, Carolina wren, brown thrasher, barn owl, blue-winged warbler, yellow-throated vireo and white-eyed vireo. Prairie warbler was also requested to be added, but it is already included in Table 3-5. Impacts on terrestrial species and migratory birds will remain SMALL because the WEC is not proposing any construction activities on undisturbed grounds and only minor land disturbances are expected with the installation of additional groundwater monitoring wells. Additionally, wildlife is habituated to daily operating noises because the CFFF has been in operation for decades.*

D.23.2 Fish and Wildlife Contamination Concerns - Lagoons

Comment: Please explain what wildlife would have access, including birds, to the various lagoons on the site, especially near to the facility. Would contamination be encountered by such visiting wildlife? (9-3-10 [Clements, Tom])

Comment: While not included in the current plan, there is precedent from the Savannah River Site and Naval Weapons Station Charleston and vetted USGS monitoring protocols that can extend monitoring to include vegetation. Tree cores are particularly valuable for mapping and monitoring volatile organic compounds (VOCs) in the shallow, surficial aquifer. VOC monitoring has specifically been identified by both WEC and NRC as a deficiency in the current groundwater sampling scheme (e.g., page 3-44, line 7; page 3-45, line 30), and tree tissue provides a good framework (<https://pubs.usgs.gov/sir/2008/5088/pdf/sir2008-5088.pdf>, https://www.srs.fs.usda.gov/pubs/ja/ja_vrobleky001.pdf). (21-21 [Stanley, Joyce])

Comment: How much wildlife will be poisoned? (29-5 [May, Stephen])

Comment: Sections 3.5.1 and 3.5.2 overlook analysis for the potential impacts to herpetofauna that may inhabit wetlands within the floodplain associated with Sunset Lake, Gator Pond, Mill Creek or the Congaree River. Additionally, while contamination levels in surface waters are within health standards for maximum contaminant levels, the standard and threshold for tolerance to contamination for other organisms, especially those species, such as frogs that exhibit cutaneous respiration, cannot be assumed to be the same. The impacts of organisms that depend on those isolated wetlands and the impacts to those species should also be considered in development of a Final EIS. Also, because the emphasis for impacts to aquatic resources has been evaluated solely based on the direct discharges to the Congaree River or surface overland flow and the distance before any contaminants would reach the Congaree River, the SCDNR requests more consideration be given in a Final EIS for mitigating measures to prevent impacts to herpetofauna, such as mechanisms in place to deter entry into the project's lagoons with the use of sediment fencing and a mortality monitoring protocol.

Additionally, open surface water lagoons within the project footprint should also be covered to prevent use by a variety of water bird species. Similarly, since the drainage ditch between the main facility building and Sunset Lake had high levels of TCE, the SCDNR recommends a prevention plan for entry by herpetofauna. (47-4 [Riggin, Lorianne])

Response: Section 3.6.3 of the EIS contains lists of bird species that may be found at the CFFF site and also describes the lagoons that support sanitation plus uranium and recovery services process streams (see Figure 2-4 for an aerial photograph). The lagoons are located adjacent to the noisy operations centers of the CFFF, which would deter wildlife (including birds). The lagoons are within a fenced area that will block access to the lagoons for many species, but not all (e.g., mice and birds); however, the lagoons lack the habitat features that would attract birds and other wildlife on a consistent basis. In conclusion, contamination risks to fish and wildlife due to the lagoons are expected to be minor because the lagoons are fenced-off, have many industrial deterrents (next to CFFF buildings that house pumps, diffusers, etc.), and are manmade ponds that lack suitable habitat to consistently attract birds and wildlife. It is possible that wildlife may periodically encounter the lagoons, but the potential impacts are expected to be minor and infrequent. In Sections 3.5 and 3.6 of the EIS, the NRC staff describes the potential impacts on terrestrial species, aquatic species, and protected species that may have interactions with the site. The EIS also describes the results of contamination surveys for air quality, surface water, and fish tissue sampling as they pertain to the health of aquatic and terrestrial species. The NRC staff also concluded that the potential impact to terrestrial species is SMALL because contamination levels are monitored and because actions are being taken to enhance monitoring and reduce contamination. The U.S. Fish and Wildlife Service and National Marine Fisheries Service also reviewed the proposed action and potential effects and determined that the proposed license renewal is not likely to adversely affect federally listed species or adversely impact listed sturgeons downstream in the Congaree River. No changes were made to the EIS as a result of these comments.

D.23.3 Fish and Wildlife Contamination Concerns

Comment: "Issues Studied in Detail" must include avian and insect populations, which can move long distances, and their potential exposure to radioactive materials or chemical contaminants in surface waterways and lagoons. Likewise, movement of terrestrial creatures such as frogs, lizards and mice, between contaminated and non-contaminated areas must be analyzed. (9-3-7 [Clements, Tom])

Comment: Regarding the ecological resources, the SCDNR finds that impacts to these resources needs to be assessed with additional information, such as monitoring the use of the project site by wildlife and how they are affected, to determine if the impacts are indeed small. (47-9 [Riggin, Lorianne])

Response: In Sections 3.3.1.1 and 3.5.2.2 of the EIS, the NRC staff describes the fish tissue sampling (bluegill and sunfish) that SCDHEC conducted at three sites in the Congaree River in 2019 (above, below, and near the discharge diffuser). In the tissue samples, the SCDHEC found no signal of uranium and that fluoride signals at the diffuser were not statistically different than those at the upriver/downriver control sites. Bluegill and sunfish were intentionally selected because they primarily consume insects and this makes them more susceptible to toxin bioaccumulation. If contamination levels are low for insectivore fish species, this provides a signal that contamination levels are also low throughout the aquatic ecosystem, including lower trophic levels (e.g., insects, fish, frogs) in the Congaree River. This would also apply to birds and other terrestrial species (e.g., raccoons) that consume aquatic insects and fish.

Sections 3.3.1.2, 3.3.2.2, and 3.3.3 of the EIS also describe contaminants present in onsite surface waters (e.g., Sunset Lake), which are currently being addressed by the WEC under the Consent Agreement with the SCDHEC. Regarding ecological contamination concerns with Mill Creek and Sunset Lakes, in Section 3.3.3 of the EIS, the NRC staff identified a mitigation measure addressing further reduction of potential ecological impacts onsite through sampling of fish tissue in Mill Creek. This additional mitigation is not a requirement imposed upon the licensee. The WEC's monitoring and sampling program includes fish sampling at the Congaree River on an annual minimum frequency that consists of isotopic uranium and Tc-99. Further, as discussed in Section 3.3.2.3 of the EIS, the NRC staff expects that there is a low potential for significant contamination to move offsite via a surface water pathway and noticeably degrade water quality in Mill Creek downstream from the CFFF site boundary. The proposed continued operation of the CFFF for an additional 40 years could result in future inadvertent releases that may contribute additional contaminants to the onsite surface water bodies. However, the potential for significant impacts on these water bodies that might result in offsite movement of contaminants would be minimized by the existing inspection, monitoring, and reporting requirements currently in place at the CFFF site, and those activities and programs are expected to continue at the site under the proposed action. For additional information about SCDHEC's expanded fish tissue sampling, see <https://scdhec.gov/environment/environmental-sites-projects-permits-interest/westinghouse/westinghouse/westinghouse-bureau-water>. No changes were made to the EIS as a result of this comment.

D.23.4 Missing Terrestrial Species

Comment: *Table 3-4 is missing the federally protected species Canby's Cowbane *Tiedemannia canbyi*. (47-7 [Riggin, Lorianne])

Response: Table 3-4 of the EIS summarizes federally listed species that have the potential to occur in the CFFF action area. This species list was developed based on ecological surveys of the site, searches of State and Federal ecological databases and interactive maps, and NRC consultations with the FWS and NMFS. After consultation with the FWS, the NRC staff did not identify any additional species such as Canby's Cowbane (a plant). Additionally, the FWS also determined that the proposed license renewal was unlikely to adversely affect terrestrial species, including the installation of new groundwater monitoring wells because the installation would cause minimal land disturbance. Although Table 3-4 did not list Canby's Cowbane, the FWS effects determination regarding terrestrial species would also apply to Canby's Cowbane if they were present in the CFFF action area. No changes were made to the EIS as a result of this comment.

D.24 Comments Concerning Transportation

D.24.1 Future Local Development Impacts on Traffic

Comment: *Transportation Resources:* While it is true that, "During operation there would be no increase in local traffic counts associated with project-related traffic on Highway S 48 or other roadways from the CFFF," (Table 3-29), the transportation resources assessment does not fully account for significant local development pressures that may significantly increase traffic in the area - including SC Highway 48. We recommend updating this in the final EIS. (21-25 [Stanley, Joyce])

Response: The potential for local development to increase traffic is discussed in Sections 3.1.2 and 3.19 of the EIS. Specifically, in the EIS the NRC staff concludes that future development in

the area where the CFFF is located could result in an increase in local traffic. No changes were made to the EIS as a result of this comment.

D.24.2 Low-level Radioactive Waste Shipping Containers

Comment: Are LLW shipping casks inspected and fully certified? (9-3-21 [Clements, Tom])

Response: *The WEC must follow NRC, U.S. Department of Transportation (USDOT), and South Carolina Department of Transportation (SCDOT) requirements for shipment of radioactive materials. Low-level radioactive waste is shipped to a low-level waste disposal site in containers approved by the USDOT.*

D.25 Comments Concerning Waste Processes

D.25.1 CFFF's Waste Processes

Comment: Page: 2-5

Line: 16-19

Current Wording: "Low-level radioactive combustible scrap is incinerated to permit the recovery of uranium and to minimize the volume of waste disposal at a licensed low-level radioactive waste (LLRW) disposal facility. Typical incinerator feed materials include uranium-contaminated paper, shoe covers, gloves, mops, plastic bags, tape, and fiberboard containers (WEC 2012-TN7017)."

Suggested Wording: N/A

Justification: Suggest using a more current reference since the submittal of license renewal application was in 2014. (42-3-16 [Malek, Elise])

Comment: Page: 2-11

Line: 18-19

Current Wording: "The WEC is or will transport affected soil to an approved LLRW disposal site (WEC 2019-TN6552)."

Suggested Wording: "~~The WEC is or will~~ **CFFF transported** affected soil to an approved LLRW disposal site (WEC 2019-TN6552)."

Justification: Because it is included directly after the other sentences discussing PCE impacted soil, this sentence is inaccurate. Soil impacted with uranium and other constituents of concern is transported to an approved LLRW site. However, in the case of the soil impacted by PCE, it was NOT also impacted by uranium. Therefore, the PCE impacted soil was NOT sent to an LLRW facility but rather another approved TSDF. (42-4-7 [Malek, Elise])

Comment: Page: 3-102

Line: 30-32

Current Wording: "The WEC stored drums of combustible waste, containing uranium waiting for uranium recovery via onsite incineration, in intermodal containers (sea-land containers) in an outdoor storage area."

Suggested Wording: "The WEC stored drums of combustible waste, containing uranium waiting for uranium recovery via onsite incineration, in intermodal containers (sea-land containers) in an outdoor storage area. **The CFFF has emptied all the intermodal storage containers in the southern storage area containing accountable uranium and uranium contaminated materials.**"

Justification: Clarification on completed work with the SSAOU. The CFFF has emptied all the

intermodal storage containers containing accountable uranium and uranium contaminated materials (42-14-3 [Malek, Elise])

Comment: Page: 3-103

Line: 30-31

Current Wording: "Calcium fluoride, a nonhazardous industrial waste, is removed from West Lagoon I and West Lagoon II, and is either recycled or disposed of offsite."

Suggested Wording: "Calcium fluoride, a nonhazardous industrial waste, is removed from West Lagoons I and ~~West Lagoon II~~ **approximately every 2 years and from the North and South Lagoons less frequently. Calcium fluoride,** and is either recycled or disposed of offsite."

Justification: Calcium fluoride is dredged from the West Lagoons, approximately every 2 years. The North and South Lagoons are dredged less frequently, approximately every 8-10 years. (42-14-5 [Malek, Elise])

Response: *The commenter's proposed changes to EIS text in Sections 2.1 and 3.14 of the EIS have been verified and incorporated.*

D.25.2 Waste Disposal Sites

Comment: Barnwell is where waste from Westinghouse has been shipped in the past. So, there's a concern about Barnwell county, who is watching Barnwell County with the waste products? And also this new location, I think is Greenview, Idaho, where waste materials are being sent, who is watching that? (1-9-4 [Mitchum, Chief Michelle])

Comment: But I do question who is monitoring the waste that has been shipped to Barnwell in the past, and is now being sent to Idaho, and if someone could answer at least that one question, I would greatly appreciate it, thank you. (1-9-12 [Mitchum, Chief Michelle])

Comment: What are the "approved" low level waste sites to which such waste is shipped and how is it packaged and transported? What are the impacts of waste disposal at those LLW disposal facilities? Are LLW shipping casks inspected and fully certified? (9-3-17 [Clements, Tom])

Response: *The Barnwell site is the regional disposal facility for low-level radioactive waste. The facility operates under a radioactive materials license issued by the SCDHEC. The State regulates the site and oversees the safety of disposal operations. Additional information can be found at <https://scdhec.gov/environment/pollution-types-advisories-monitoring/pollution-services-advisorie/chem-nuclear-site>. Regarding the WEC's alternate disposal requests pursuant to 10 CFR 20.2002, "Method for obtaining approval of proposed disposal procedures," on December 9, 2020, the NRC granted the WEC an exemption (85 FR 81525), and issued a conforming license amendment to allow Westinghouse to transfer specific waste containing byproduct and special nuclear material to the US Ecology Idaho, Inc. (USEI) disposal facility near Grand View, Idaho. The USEI disposal facility is a Subtitle C Resource Conservation and Recovery Act (RCRA) hazardous waste disposal facility permitted by the State of Idaho to receive low-level radioactive waste and is not licensed by the NRC. While Idaho is not an NRC Agreement State, Idaho regulations and the Grand View facility permit make USEI's acceptance of NRC-licensed material for disposal contingent upon NRC approval of the exemptions that the WEC has requested. USEI also requested that it be a party to WEC's alternate disposal request. The specific waste material came from the CFFF's (1) East Lagoon, (2) East Lagoon liner, (3) soils excavated from below the liner, (4) solid calcium fluoride (CaF₂) sludge previously dredged from the Calcium Fluoride Lagoons on the site and placed in a storage pile (all of this*

material is known to contain <0.5 weight percent U-235), and (5) UF6 cylinders previously used for shipping that have gone through an internal wash/rinse process following their last use, but remain internally contaminated with special nuclear material. On March 11 (86 FR 16239) and October 4, 2021 (86 FR 57705), and March 21, 2022 (87 FR 16772-TN7217), the NRC staff granted similar exemptions to the WEC and USEI. The March 2021 exemption allows the WEC to transfer solid contaminated CaF2 sludge from the "Operations" pile, which similar to the December 2020 approved material. The October 2021 exemption allows the WEC to transfer CaF2 sludge generated from CFFF site operations and previously stored in onsite lagoons. The March 2022 exemption allows the WEC to transfer sludge dredged from onsite lagoons, the sanitary lagoon liner, soil and other debris, and surface-contaminated waste.

Notification of the NRC staff's EAs supporting these four approvals was provided in the Federal Register in December 2020 (85 FR 79228), March 2021 (86 FR 13915), October 2021 (86 FR 56729), and March 2022 (86 FR 7217). Regarding transportation, low-level waste is shipped in containers approved by the U.S. Department of Transportation. Section 2.1.3.3 of the EIS has been updated with descriptions of the exemption requests granted to WEC and USEI to dispose of specific waste containing byproduct and special nuclear material (low enriched uranium [$<5\text{wt}\%$ U-235]).

D.25.3 CFFF's Gaseous Effluents

Comment: Reference:

Page: 3-101

Line: 36

Comment: Carbon Dioxide is not a pollutant that is modeled, nor regulated for minor sources. This may be a typographical error and carbon monoxide was the intended pollutant. (41-2-12 [Taylor, Ken])

Comment:

Page: 3-101

Line: 39

Comment: See comment for Page 3-97, Line 45 regarding 40 CFR Part 61. Additionally, 40 CFR Part 50 specifies the NAAQS and measurement methods for the ambient air. While the Department does require a demonstration that a facility will not cause an exceedance of the NAAQS outside of their property, 40 CFR Part 50 does not contain any requirements that apply to specific sources or facilities. Thus, it wouldn't be phrased that "[Westinghouse] operates the [facility] in accordance with 40 CFR Part 50 ... " (41-2-13 [Taylor, Ken])

Response: The NRC staff has reviewed the gaseous air pollutants in Chapter 3 of the EIS. The list of pollutants in Section 3.7.2.1 of the EIS is correct. Section 3.14.1.1 of the EIS has been corrected to read, "...NO_x, carbon dioxide ...". Additionally, the NRC staff has revised Section 3.14.1.1 of the EIS to clarify that SCDHEC does require a demonstration that a facility will not cause an exceedance of the NAAQSs outside of their property boundary, rather than operating in accordance with 40 CFR Part 50, "National Primary and Secondary Ambient Air Quality Standards."

D.25.4 CFFF's Liquid Waste Streams

Comment: On page 2-15 it is stated that "WEC sends the calcium fluoride offsite for reuse in concrete, if uranium concentrations are less than 30 pCi/g." To which concrete facilities is this

material shipped and what are potential impacts to the public of those materials? Who regulates this off-site shipment of the calcium fluoride waste? (9-4-3 [Clements, Tom])

Response: *As discussed by the WEC in its ER, the calcium fluoride is sampled to ensure the content of uranium is less than 30 pCi/g for free release of the material to be sent offsite; for example, for recycling in concrete. Calcium fluoride with less than 30 pCi/g uranium is the release criterion considered by WEC (WEC 2019-TN6510). In 2020 and 2021, the WEC requested exemptions pursuant to 10 CFR 20.2002, "Method for Obtaining Approval of Proposed Disposal Procedures. On December 9, 2020, the NRC granted the WEC an exemption (85 FR 81525) pursuant 10 CFR Sections 20.2002, and issued a conforming license amendment to allow Westinghouse to transfer specific waste containing byproduct and special nuclear material to the US Ecology Idaho, Inc. (USEI) disposal facility near Grand View, Idaho. The USEI disposal facility is a Subtitle C Resource Conservation and Recovery Act (RCRA) hazardous waste disposal facility permitted by the State of Idaho to receive low-level radioactive waste and is not licensed by the NRC. While Idaho is not an NRC Agreement State, Idaho regulations and the Grand View facility permit make USEI's acceptance of NRC-licensed material for disposal contingent upon NRC approval of the exemptions that the WEC has requested. The specific waste material was solid calcium fluoride (CaF₂) sludge previously dredged from the Calcium Fluoride Lagoons on the site and placed in a storage pile (all of this material is known to contain <0.5 weight percent U-235). Similar exemptions were granted by the NRC on March 11 (86 FR 16239), October 4, 2021 (86 FR 57705), and March 24, 2022 (87 FR 16772). Sections 2.2.1.2 and 3.14.1.3 in the EIS were updated to include information about the 30 pCi/g uranium free release criterion and the recently NRC-granted exemptions to the WEC pursuant to 10 CFR 20.2002.*

D.25.5 Effluents from Pellet Fabrication

Comment: What goes up the stacks from "power production" and "powder processing/pellet manufacturing?" (9-3-13 [Clements, Tom])

Response: *The NRC staff has discussed the various exhaust stacks at the CFFF and the related activities and gaseous effluents released through the exhaust stacks in the Section 2.2.1.1 of the EIS. Air permits and related air quality monitoring is discussed with reference to releases from the exhaust stacks at CFFF in Section 3.7.2., and mitigation measures are discussed in Section 3.7.3. The potential for the releases to contribute to the radiological dose in the vicinity of the facility is discussed in the section on public health impacts (see Section 3.12.3). Gaseous effluents and the management of such effluents from CFFF are discussed in Section 3.14.1.1 on waste generation and management. No changes were made to the EIS as a result of this comment.*

D.25.6 Waste from the CFFF's Ammonium Diuranate Process

Comment: What are disposal pathways for used ammonium hydroxide? (9-3-11 [Clements, Tom])

Comment: How is waste from fuel pellet grinding managed and how is it disposed of? (9-3-12 [Clements, Tom])

Response: *The NRC staff discussed the use of ammonium hydroxide in the WEC's fuel fabrication process in Sections 2.1 and 3.12.2 of the EIS. Ammonium hydroxide is chemically consumed in the ammonium diuranate (ADU) process to convert uranium hexafluoride (UF₆)*

into uranium dioxide (UO₂). The use of aqueous ammonium hydroxide at the CFFF replaced the use of anhydrous ammonia in August 2011. The UO₂ is processed and pressed into fuel pellets heated to form a ceramic material, and then processed through a grinding operation. Disposal pathways for gaseous, liquid, and solid wastes from the ADU process are discussed in the Section 3.14.1 of the EIS. No changes were made to the EIS as a result of this comment.

D.25.7 Tritium-Producing Burnable Absorbers (TPBAR) Process and Associated Waste Generation

Comment: The South Carolina Department of Health & Environmental Control (DHEC) says that WesDyne produces hazardous waste and that such waste is handled by the Westinghouse facility. (9-1-8 [Clements, Tom])

Comment: The South Carolina Department of Health & Environmental Control (DHEC) says that TPBAR activities produce hazardous waste and that such waste is handled by the Westinghouse facility. (49-2-8 [Clements, Tom])

Comment: While the defense-related part of the Westinghouse fuel plant does not generate radioactive waste, it produces some hazardous waste as it makes metal bars for the national defense effort, according to the company and the National Nuclear Security Administration. The contaminants include acetone and zirconium, both of which can sicken people who are exposed in sufficient quantities. "We are not asking for state secrets, we just want to know about pollutants and for them to do the right thing," Greenlaw said in an interview with The State this week. "How it is being handled by Westinghouse Fuel Fabrication Facility administrators is not forthright." Both Westinghouse and the National Nuclear Security Administration downplayed environmental threats from hazardous waste generated at the site, saying the amount of toxic refuse produced at the metal-rod operation is minor. "The small amount of non-radioactive waste that can be produced, including acetone rags and zirconium alloy metal shavings, is not released to the environment," the NNSA said in a statement this week. (49-2-22 [Clements, Tom])

Response: *Other products fabricated by WEC at CFFF include neutron-absorbing assemblies such as Tritium-Producing Burnable Absorbers (TPBARs). Per the WEC, TPBARs are used by the U.S. Department of Energy's Tritium Readiness Program and are designed to produce tritium when placed in a low-enriched uranium fuel assemblies and irradiated in a nuclear power reactor. Based on the WEC's Frequently Asked Questions, there are no gaseous or liquid wastes associated with the TPBAR assembly process (WEC 2021-TN7126). As for solid waste, the WEC states that the hazardous wastes from this assembly process include "acetone rags and zirconium fines" (WEC 2021-TN7126). Such wastes and their management by the WEC are discussed in Section 3.14 of the EIS. Further information from WEC (WEC 2022-TN7182) provided specific information about the consolidation of hazardous waste from TPBAR and fuel fabrication activities. Section 3.14.1.3 has been updated. Cumulative impacts associated with manufacturing TPBARs at CFFF are evaluated in Section 3.19 of this EIS.*

D.26 Comments Concerning the Licensing Process

D.26.1 NRC's License Renewal Decision

Comment: COUNCILWOMAN NEWTON: So, I heard you say that at this time, you are not making a recommendation because the review is ongoing. Do you have an approximate time

line for when the NRC would definitively say this is our recommendation, and this is the time line that we recommend? (1-6-2 [Newton, Chakisse])

Comment: And my last question is this facility -- I'm sorry, I had another comment too. To me, the 40 year time frame should be reserved for the elite. That should be reserved for facilities that have caused no contamination, done no harm, done nothing wrong, those should be the ones that get the 40 years. That should be like a carrot hanging out there to say hey, if you achieve perfection, you get 40 years, otherwise you don't get 40 years. (1-14-2 [Overly, David])

Comment: MS. GREENLAW: Okay, very good. Okay, I wanted to reiterate a few things that I had brought up before. That the 40 year license is untenable, and it was NRC's idea to have these longer licenses. Westinghouse didn't pull it out of a hat by itself, it's something that NRC has been having meetings about extending licenses, and for no really good reason, except that they're going to have fewer inspections, and they won't be accountable to people, which is actually very oppositional to NEPA in terms of, especially environmental justice, where the goal appears to include cutting off the voice of two generations of people, parents, children, grandchildren will not be able to speak up. They can send comments, but there will not be a public comment period, there won't be a deep dive into investigating what's going on. (1-15-1 [Greenlaw, Pamela])

Comment: It's very rarely that they [NRC] do that [do not give the maximum timeframe for a license request], and if they are going to do a 40 year license, which I believe, because I don't trust that anything else is going to happen, what are the contingencies that go along with that license? I hope that we're thinking, I hope that we're planning, I'm hoping that we're organizing, and I hope that somebody is listening to the community to say that we have been wronged, we feel wronged, we feel like nobody is hearing us, we feel like we come out, and we make these statements, we make our voices heard, and nobody listens. Nobody is listening to us, and we're wondering at what point do we get somebody to say we hear you, we understand, and it makes sense. It doesn't make sense, and I just want to make sure that we get this on the record, I'm going to submit something in writing, but I'm just appalled at just the conversation. And I started out saying to what end, to what end does this make sense? People don't come to these meetings because they feel like it doesn't make a difference, and you hear the whole community telling you that this does not make sense, and we feel like hey, nobody is going to listen to us, nobody is going to do anything else, it's a corporate giant, they're going to get what they want, they're going to pollute the land as they need to, they're going to make us sick, and then nothing else happens, nothing else matters, I want you to understand that. That's the message that I hear based on all of this discussion that I've heard tonight. Thank you. (1-17-9 [Reese, Robert])

Comment: There are still several years left on the current license, and that time should be dedicated to cleaning up the already existing mess in the community that has already been promised to the community as a priority. Our focus should be on supporting the economic development of a healthy, thriving community, and if we haven't fully cleaned up the previous toxins that have harmed our community, we can't move forward with seeing the possibility of a new licensure. (1-20-3 [Brown, Erniko])

Comment: MS. GREENLAW: Okay, yes. This is Pamela Greenlaw, this is of course my last comment. It's actually not a comment, it's going to be a direct question. When you say you're going to take this back to the people who are making the decisions, what office is that? And who can we contact directly? We trust that you're going to do the reporting that you're supposed to do because -- Diana, you have just been able to answer all my questions these past two years

that we've been working on these issues. So, I'm not faulting the messengers here, however trying to send messengers where we actually should do some direct touching is what we really need. So, what office is making the decisions, and who do we need to talk to? Thank you. That's a question, if you can answer that, that would be fantastic. (1-21-1 [Greenlaw, Pamela])

Comment: The admission by the NRC that more leaks and spills -and perhaps accidents or deliberately instigated events (such as from a currently unknown insider threat) -will occur should alone preclude any consideration of a 40-year license extension. (9-4-19 [Clements, Tom])

Comment: I am writing today to voice my concerns about the proposed 40 year license renewal of the Westinghouse Nuclear Fuel Fabrication Facility, located near Columbia, SC. This facility, with its troubling history of environmental contamination, is located near the Congaree National Park, fragile wetlands and tributaries. Tributaries, which supply water and recreation for both people and wildlife in the area of the Westinghouse facility, and as far downstream as Charleston. I am concerned that given Westinghouse's troubled past of environmental malfeasance, most notably its cover-ups related to radioactive contamination of groundwater, this facility simply cannot be trusted to operate in good faith. (29-1 [May, Stephen])

Comment: Moreover, if the safety review is not completed at such time, we ask that a final decision not be made until the safety review is completed and gone through the public comment process. (35-2 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: Based on the report, many of the uncertainties listed above can be addressed by requiring the final Remedial Investigation Report prior to renewal. Given that there are still six years for the current license to expire, it is recommended that the renewal should be postponed to allow time for the investigation's final report so that the renewal decision may be adequately supported. (39-8 [Ghanem, Sahar] [Plauche, Mary])

Response: *In SRM-SECY-06-0186, "Increasing Licensing Terms for Certain Fuel Facilities," the Commission approved the implementation of maximum license terms of 40 years for license renewals and new applications, specific to licensees required to submit integrated safety analysis (ISA) summaries according to 10 CFR Part 70, Subpart H, requirements. The Commission also approved license terms for less than 40 years on a case-by-case basis where there are concerns about safety risk to the facility or where a licensee introduces a new process or technology. Although the WEC's NRC license for the CFFF does not expire until 2027, in 2014, the WEC made a business decision to submit an application to the NRC requesting to renew its materials license for the CFFF for an additional 40 years.*

The NRC staff's review of the WEC's application consists of safety analysis conducted in accordance with the AEA and a NEPA environmental review. In its safety analysis the NRC staff assess compliance with applicable NRC regulations to determine whether the licensee has adequate programs to conduct NRC licensed operations in a safe and secure manner. The safety review is ongoing and is anticipated to be completed by August 2022.

Additionally, as part of information-gathering activities during the NEPA environmental review process, the NRC staff has been reaching out to SCDHEC to discuss and understand the progress and results of the remedial investigations and activities the WEC is conducting under the CA. The CA was executed between the SCDHEC and WEC. However, publicly available information resulting from these remedial investigations was considered during the preparation of the EIS, particularly in evaluating potential impacts on soil, surface water, and groundwater resources (see Sections 3.2, 3.3, and 3.4 of the EIS, respectively). The NRC staff is aware that

the CA is ongoing and, therefore, the environmental impact evaluation and determinations in the EIS reflect both pending work and analysis to be completed under the CA by the WEC.

Finally, the NRC's decision about whether to renew the WEC license as proposed will be based on the results of the NRC staff's safety review and NEPA environmental review. The NRC staff anticipates making a licensing decision by August 2022. This licensing decision will be made by the Director of the Division of Fuel Management in the NRC's Office of Nuclear Material Safety and Safeguards. Section 2.6 of the EIS has been revised to include NRC's recommendations for relicensing.

D.26.2 License Renewal Process and Decision - Public Participation

Comment: And then when you make your decision is that final, or is that a recommendation that then triggers another round of public input? (1-6-3 [Newton, Chakisse])

Comment: [that" below refers to 40-year license renewal] And there are exceptions that can be made for that, one of them is the safety record, to which we have no access, because it hasn't been completed. So, I believe that this particular hearing that we're having on the publication that is incomplete is insufficient, and we need to have another public meeting after the documents are complete. (1-7-3 [Greenlaw, Pamela])

Comment: MS. GREENLAW: Will you have a second public hearing after these other documents, and issues have been visited by NRC? (1-7-9 [Greenlaw, Pamela])

Comment: MR. REESE: Thank you. And as this call wraps up, I just want to say once again that I live three miles from this plant. I traveled to Atlanta to an NRC meeting because I wanted to voice the concerns of my family, and my neighbors, and my friends from this community. I was appalled at the NRC meeting to see nothing but lobbyists for nuclear firms. That's the only people that were at that meeting. And I wondered when our community would have an opportunity to voice its opinions, and tonight I've heard them overwhelmingly, and I guess this was the reason for my first question. (1-17-1 [Reese, Robert])

Comment: CHIEF MITCHUM: Hi again, I just wanted to reiterate thank you for this meeting. This has been a long two, and a half hours, going on three hours. I know it's been hard for all of the participants to listen to all of these comments, and not feel victimized in this, as if you wrote this all by yourself. What I have heard throughout this time is a great deal of fear of the plant. A lot of concerns, and overall a sense of the people in the area seem to feel muted. They don't feel like you're hearing them regardless of what they do to be heard, it seems like they don't feel like they're being heard. (1-18-1 [Mitchum, Chief Michelle])

Comment: Furthermore, the communities need more time to process this information individually, and collectively, because it is (inaudible) process. (1-20-4 [Brown, Erniko])

Comment: We are humans, and this is our home, please take time to empathize with us, and build with us to create a healthier community for all to thrive in. As a community we should know immediately about the things that are going on inside the plant. There should be immediate media coverage on the things that have a potential to harm our community. (1-20-5 [Brown, Erniko])

Comment: Good evening everyone, my name is Mary Kirkland, and my question, and I hope you have an answer tonight, is that the safety portion is incomplete. So, will we have an

opportunity to comment on the safety portion? That's one question, and can you answer that question? (1-22-1 [Kirkland, Mary])

Comment: The NRC says that a separate Safety Evaluation Report (SER) will be prepared. It is imperative that the SER be provided to the public well before the end of the draft EIS comment period. If it is not, the draft EIS comment period must be extended. Any policy not to release the SER during the draft EIS comment period must be reconsidered. Where is this written into law or NRC policy that a SER will not be released for comment, especially during an EIS process? (9-2-17 [Clements, Tom])

Comment: Were comments solicited by property owners adjacent to the facility? (9-3-4 [Clements, Tom])

Comment: The NRC is using several documents and criteria to determine whether or not the Westinghouse Fuel fabrication facility in Hopkins, South Carolina will be issued a 40-year license to continue operations. Only one of these is the Draft Environmental Impact Statement upon which the public is invited to make comments. The documents and criteria wrapped up in safety and in security are decidedly NOT open for public comment or review. The safety record of this facility and security issues may be considered outside the bounds of public comment on the DEIS; therefore, the NRC MUST provide a safety and security document for public review and comment. Otherwise, the comments about safety and security submitted must be acknowledged and reasonable responses made for their inclusion at the decision-making level at the NRC. Ethics, tenets of environmental justice, and NEPA demand this sort of recognition and response. (17-1 [Greenlaw, Pamela])

Comment: Additionally, we request the inclusion of the safety review in the February 2022 Draft EIS for public comment. (35-1 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: The majority who made comments denounced the effort of the NRC to extend these licenses without having the means to follow-up on environmental, health and safety issues. (50-9 [Woods, Felicia])

Response: *The NRC staff's review of the WEC's license renewal application consists of a safety analysis conducted in accordance with the Atomic Energy Act of 1954 and the NEPA environmental review. In its safety analysis, the NRC staff assesses compliance with applicable NRC regulations, including 10 CFR Part 70 (TN4883), "Domestic Licensing of Special Nuclear Material," and 10 CFR Part 20 (TN283), "Standards for protection against radiation," to determine whether the licensee has adequate programs to conduct licensed operations in a safe and secure manner. The NRC's decision about whether to renew the WEC license as proposed will be based on the results of the NRC staff's safety review and NEPA environmental review. The NRC staff's safety analysis will be documented and made publicly available in a separate Safety Evaluation Report (SER). Unlike the NEPA requirement to publish the draft EIS for public comment, the NRC staff does not publish the SER for public comment.*

The NRC is committed to ensuring an open and transparent process that provides opportunities for meaningful public involvement. In addition to the opportunities for the public and external stakeholders to participate in the NEPA environmental review process described in Section 1.3 of the EIS, during the safety review process, the NRC staff holds meetings with the licensee to discuss the review of the license renewal application. These meetings may include clarifying discussions about topics in the application or the content of responses to NRC's RAIs and are typically open for public participation, unless they involve discussion of nonpublic information

(e.g., proprietary or security-related information). For example, on February 4, 2021, the NRC staff conducted a public meeting to discuss the status of the WEC's license renewal application. The NRC staff's publication of the SER and final EIS is not anticipated to result in another round of public comment. The SER and final EIS will be made publicly available. No changes were made to the EIS as a result of these comments.

D.26.3 License Renewal - Safety Review

Comment: I think that another thing to look at is that because Westinghouse is aging, the DEIS should have included full seismic structural evaluations for the classification C standard. All the buildings, and structures need to be evaluated, that is part of the environment, it is exactly where the workers are living, and working every day. (1-7-5 [Greenlaw, Pamela])

Comment: [And as I realized that their predictions of rain are for even more rainfall levels in the years to come, rainfall levels that would then have detrimental impact on an aging plant.] An aging plant that each decade has had tremendous issues. We're talking about safety issues, there hasn't been a decade that Westinghouse hasn't had real substantial issues, safety issues. For you to then say we're going to move to give them a 40 year ticket because we just think that it's moderate, or the impact would be moderate, it's really sort of incredible to me. (1-17-4 [Reese, Robert])

Comment: Concerning the aging of plant components, the above statement about "aging" implies that risks increase with component aging. What analysis has been conducted as part of the EIS on the impacts of aging component, equipment and facilities? Impacts could be worse with equipment or fixtures that can't be moved or can't be or won't be removed and replaced. How has the EIS taken this into account? Please include any aging-impact reviews as part of the EIS process. I request that an "aging analysis" be conducted and that the public be allowed to comment on it as part of the EIS record. Concerning concrete durability in facility structures" EIS needs to address building aging. (9-5-14 [Clements, Tom])

Comment: Have the condition, status or aging of buildings and facilities been taken into account in the draft EIS? If not, that needs to be analyzed. I note that this article -The problem with reinforced concrete (<https://theconversation.com/the-problem-with-reinforced-concrete-56078>) reviews problems with reinforced concrete using steel rebar: However, when embedded in concrete, steel is hidden but secretly active. Moisture entering through thousands of tiny cracks creates an electrochemical reaction. One end of the rebar becomes an anode and the other a cathode, forming a "battery" that powers the transformation of iron into rust. Rust can expand the rebar up to four times its size, enlarging cracks and forcing the concrete to fracture apart in a process called spalling, more widely known as "concrete cancer". Have the potential environmental and health impacts of potentially degraded buildings, especially those made of concrete, been reviewed? If not, why not? Are buildings more subject to tornado or hurricane damage with age? Has this been reviewed? (9-5-15 [Clements, Tom])

Comment: IV. Physical Plant (Buildings) (taken from injunction request letter and needs adaptation to DEIS): "Built in 1969, the facility is asking for a 40-year license (2027 to 2067). This renewal, as proposed, contemplates continued operations until 2067 when the facility will be 98 years old. There is nothing in this DEIS that discusses infrastructure maintenance and longevity. Infrastructure longevity issues should be addressed." (17-13 [Greenlaw, Pamela])

Response: License applicants and licensees are required, under 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," to perform an integrated safety analysis (ISA) that identifies potential accident sequences in the facility's operations, designates items relied on for safety (IROFSs) to either prevent such accidents or mitigate their consequences to an acceptable level, and describes management measures to provide reasonable assurance of the availability and reliability of IROFSs. The WEC's ISA program is described in its LRA. As part of the safety review of the LRA, the NRC staff reviews the licensee's safety programs and ISA Summary to establish reasonable assurance that the licensee has performed (1) an ISA using methods and staff adequate to achieve the requirements of 10 CFR 70.62(c)(1) and (2); (2) identified and evaluated, in the ISA, all credible events (accident sequences) involving process deviations or other events internal to the facility (e.g., explosions, spills, and fires) and credible external events that could result in facility-induced consequences to workers, the public, or the environment, that could exceed the performance requirements of 10 CFR 70.61; and (3) designated engineered and administrative IROFSs and established a management measures program. Management measures are required to ensure that IROFS are available and reliable to perform their function. Such measures would include actions to address aging of the IROFS to ensure they are performing their intended safety function.

Further, unlike reactors, fuel cycle licensees can halt processes at any time to replace or repair equipment in the facilities. Thus, material degradation and aging can be dealt with throughout the lifetime of fuel cycle facilities (NEI 2014-TN7295), rather than just during an outage, as is often the case at reactors (see <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1611/index.html>). Additionally, licensees must submit annual updates to the NRC of the facility's ISA Summary and facility changes per 10 CFR 70.72. Because licensees must submit annual updates of ISA summaries and NRC routinely inspect a sample of the facility changes, the NRC staff is aware of changes due to material degradation or aging throughout the lifetime of the facility. No changes were made to the EIS as a result of these comments.

D.26.4 License Conditions

Comment: The draft EIS states (on page xiii) the following: "This draft EIS also describes avoidance of potential adverse impacts and mitigation measures for the reduction of potential adverse impacts, including the new conditions that the WEC agreed to add to the license, if renewed, new commitments from the WEC that would be incorporated into the LRA, and additional measures that the NRC staff identified as having the potential to further reduce environmental impacts, but that the licensee did not commit to in its application." The licensee has not agreed to stated "additional measures" in a modified license application and the draft EIS can't hold the licensee to those "additional measures." Thus, there is no guarantee that the licensee will take steps that the NRC might require for tougher license conditions. (9-2-6 [Clements, Tom])

Comment: On page xv, it is stated that "the WEC has committed to submit the environmental monitoring and sampling program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to SCDHEC." What does "committed" mean? Is this a license condition or legally binding? What are the repercussions if the "monitoring and sampling program" is not submitted or if it's faulty? What regulation, if any, does the NRC have over terms of the Consent Agreement? Why doesn't the NRC enter into a similar Consent Agreement with WEC, with milestones that are legally enforceable? (9-2-9 [Clements, Tom])

Comment: Has the Remedial Investigation Work Plan and the Consent Agreement between DHEC and Westinghouse been made a part of the licensing record? Are these documents outside the scope of NRC involvement? If so, what action would formalize the information and requirements under them to be made part of the NRC licensing requirements? The NRC includes much discussion of these non-NRC documents but it does not seem they are up for formal review and assessment in the NRC's EIS process. Please include them for the EIS record. (9-3-8 [Clements, Tom])

Comment: On page 2-17 it says: "If renewed, a new license condition would require the WEC to submit its environmental monitoring and sampling program to the NRC for review and approval upon either SCDHEC's approval of the Remedial Investigation Report (SCDHEC/WEC 2019-TN6554); as required by the CA (see Section 1.5.2.2.1 of this EIS), or within 5 years of 20 the license renewal, whichever comes first." Where did the five-year period of time come from? Is this NRC review stipulated by regulation or not? Given that accidental releases could occur at any time, why isn't review of WEC's environmental monitoring more frequent? (9-4-4 [Clements, Tom])

Comment: In many respects, the relicensing decision feels premature. Again and again, the Draft EIS (Draft Environmental Impact Statement) refers to the Consent Agreement between SCDHEC (SC Department of Health and Environmental Control) and WEC, and it is clear that important decisions to remediate pollution onsite await information from ongoing studies under the SCDHEC Consent Agreement. (11-2 [Grego, John])

Comment: NRC needs to require stronger permit conditions. NRC has attached a couple conditions to the license, but they are weak to the point of irrelevancy; a simple reporting requirement for groundwater and surface water exceedances, and NRC approval of WEC's environmental monitoring and sampling program. Neither of these conditions require WEC to actively address existing sources of contamination onsite. Rather than relying on SCDHEC's enforcement efforts through its Consent Agreement, NRC should take a more active role in ensuring that existing pollution problems on-site are addressed by including more stringent permit conditions. (11-9 [Grego, John])

Comment: Environmental benefits to the preferred alternative are exaggerated when NRC claims that the environment would benefit from new reporting conditions under the license--as noted earlier, the new reporting conditions are weak and reactive. (11-17 [Grego, John])

Comment: Despite the additional purported safeguards such as increased monitoring, agreed upon by Westinghouse and South Carolina DHEC, the Draft EIS does not indicate how they have been added to the application as a permit condition. The DEIS does not refer to any such legal inclusion of any aspects of the SCDHEC-Westinghouse Consent Agreement which would be enforced by the Nuclear Regulatory Commission. (17-6 [Greenlaw, Pamela])

Comment: Westinghouse has previously submitted a proposed license renewal commitment to complete the Consent Agreement (CA) with South Carolina Department of Health and Environmental Control (DHEC) and has proposed two additional license renewal commitments to the NRC as part of the license renewal application. The two new license renewal commitments would address the potential need for adjustments to Westinghouse's extensive environmental monitoring program over the renewed license term. Westinghouse has proposed to (1) submit its environmental monitoring program to the NRC for review and approval upon DHEC approval of the Remediation Investigation report or within five years of the license renewal, whichever comes first; and (2) submit its environmental monitoring program to the

NRC for review and approval when Westinghouse submits the final CA report to DHEC. These proposed commitments provide NRC with two additional opportunities to require adjustments to the environmental monitoring program based on the data acquired during execution of the CA. Thus, under Westinghouse's proposed commitments, the license renewal would represent an approval of the environmental monitoring program for an initial period of five years or less. (42-1-2 [Malek, Elise])

Response: *The NRC's regulations at 10 CFR 70.32, describes the conditions of licenses are subject to. Specifically, 10 CFR 70.32(b) provides that "[t]he Commission may incorporate in any license such additional conditions and requirements . . . it deems appropriate and necessary in order to: (1) Promote the common defense and security; (2) Protect health or to minimize danger to life or property; (3) Protect restricted data; (4) Guard against the loss or diversion of special nuclear material; (5) Require such reports and the keeping of such records, and to provide for such inspections, of activities under the license as may be necessary or appropriate to effectuate the purposes of the act and regulations thereunder.*

The NRC staff used guidance in NUREG-1520, "Standard Review Plan for Fuel Cycle Facility Applications," to assess the need for license conditions. Consistent with NUREG-1520, the staff may recommend license conditions to address any safety issues that were not previously resolved by an applicant's commitments in its application. License conditions are generally agreed upon by the licensee or applicant before becoming part of the license. However, the Commission may impose a license condition by Order, under 10 CFR 2.202(a) of the NRC's regulations. In addition, if the licensee or applicant does not agree to a license condition that the NRC staff finds is necessary to protect the public health and safety, the NRC has the authority not to issue a license, renew a license, or amend a license. However, absent an Order, license conditions must be agreed upon with the licensee or applicant before becoming part of the license.

By letter dated April 6, 2021 (at ADAMS accession number ML21096A268), the WEC agreed to three new license conditions related to the WEC's environmental monitoring and sampling program.

The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to SCDHEC (WEC 2021-TN7106). These license conditions updated and provided in Chapter 2 at Sections 2.2.2, 2.2.2.1.2 and 2.4.2 of this EIS.

Because proposed license conditions S-17 and S-18 were developed as part of the draft EA published in October 2019 and at the that time the anticipated schedule for the final Remedial Investigation Report was unknown, the NRC staff included defined timeframes for submittal of

the environmental monitoring and sampling program. These defined timeframes are still applicable.

While these proposed new license conditions were informed, in part, by the remedial investigations the WEC is conducting under the CA with SCDHEC, the NRC staff is not a party to the CA. The NRC staff, however, has considered the publicly available information resulting from these remedial investigations during the preparation of the EIS, particularly when evaluating potential impacts on soil, surface water, and groundwater resources (see Sections 3.2, 3.3, and 3.4 of the EIS, respectively). Finally, through the NRC's oversight program, the NRC staff conducts inspections, in part, relative to approved license conditions and the licensee's approved programs.

D.26.5 Facility Events

Comment: Since discovery of problems at WEC facilities, have there been any further issues with the Hydrofluoric Spiking Station (HFSS) #2, or intermodal container storage? Are UF6 cylinders in good condition and stored safely? (9-3-18 [Clements, Tom])

Comment: [The Draft EIS often assumes the best possible outcome under the Consent Agreement, which is naive for several reasons...] Another incident from 2019 raised management questions as well. During a May 2019 inspection, SCDHEC found numerous intermodal containers containing storage barrels that had not been previously reported. Some of these intermodal containers and the barrels stored therein were not well maintained, and contamination was found on-site. Further, these containers, designed only for temporary storage, had been used for storage for up to 14 years. Though this incident appeared in the original Environmental Assessment, WEC's failure to disclose the site and existing contamination showed lack of attention to proper site management and disclosure. Further, the Environmental Assessment made no mention of the accidental nature of the discovery of this problem. We find it disingenuous to assume that remedial measures will be effective with no notion what measures might be taken, or whether any will be recommended at all. NRC needs to take a more active role in ensuring that existing problems onsite are resolved before issuing a license. (11-8 [Grego, John])

Comment: Leaks including radionuclides from a contaminated wastewater line in 2008 and 2011 were not reported at the time they occurred. The 2011 incident is particularly concerning because WEC at that time was petitioning SCDHEC to decommission air sparging and soil vapor extraction onsite and was granted relief. (35-7 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: In 2019, another incident raised questions about management decisions. During a May 2019 inspection, SCDHEC found numerous intermodal containers containing storage barrels that had not been previously reported. Some of these intermodal containers and the barrels stored therein were not well maintained, and contamination was found on-site. Further, these containers, designed only for temporary storage, had been used for storage for up to 14 years. Though this incident appeared in the original Environmental Assessment, WEC's failure to disclose the site and existing contamination showed lack of attention to proper site management and disclosure. (35-8 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Comment: The document focuses on fixing damage that already happened or monitoring for these issues. There does not appear to be a clear understanding of why these accidents occurred. A root cause analysis for the releases of contaminants that occurred should be

conducted in order to prevent similar accidents from occurring in the future. (39-13 [Ghanem, Sahar] [Plauche, Mary])

Comment: We continue to ask for transparency and accountability of environmental investigations at the Westinghouse facility. We advocate for the NRC's regulatory agency to protect the community from waste emissions coming from the Westinghouse plant.

(50-5 [Woods, Felicia])

Response: *Section 2.1.3.1 of the EIS discusses the facility events and changes that have occurred at the CFFF since the NRC license was last renewed in 2007. In this section, the NRC staff summarized the contaminated wastewater line breaches that occurred in 2011 and 2018, the storage drum leakage event that occurred in 2019, and the HF spiking station #2 event, among other events. The NRC staff considered these events and the resulting consequences when analyzing and determining the environmental impacts from the proposed action and cumulative impacts. Additionally, through the Consent Agreement with SCDHEC, the WEC is conducting a remedial investigation to understand the source and extent of contamination in soil, surface water, and groundwater, and migration pathways. After the WEC submits the final Remedial Investigation Report to SCDHEC, the WEC will assess remediation alternatives in coordination and consultation with SCDHEC.*

By letter dated April 6, 2021 (at ADAMS accession number ML21096A268), the WEC agreed to three new license conditions related to the WEC's environmental monitoring and sampling program. The first proposed license condition, S-16, would require the WEC to enter groundwater and surface water sampling and monitoring results exceeding Federal and State drinking water standards into its Corrective Action Program (WEC 2021-TN7106). The second proposed license condition, S-17, would require the WEC to submit its environmental sampling and monitoring program to the NRC for review and approval upon either SCDHEC's approval of the Remedial Investigation Report, as required by the CA, or within 5 years of the license renewal (whichever comes first) (WEC 2021-TN7106). The third proposed license condition, S-18, would require the WEC to submit the environmental sampling and monitoring program to the NRC for review and approval, again, at the completion of the implementation of the CA; specifically, within 90 days of the submittal of the CA final written report to SCDHEC (WEC 2021-TN7106). These license conditions are updated and discussed in Chapter 2 at Sections 2.2.2, 2.2.2.1.2 and 2.4.2 of this EIS. Additionally, another new license condition, S-15, is being added stating that WEC commits to comply with the provisions of Section C of Regulatory Guide 3.75, "Corrective Action Programs for Fuel Cycle Facilities."

Further, under the NRC's Decommissioning Planning Rule (DPR), licensees of operating facilities are required to minimize contamination and radioactive waste generation, conduct appropriate radiological surveys including of the subsurface, maintain records of residual radioactivity, and provide adequate funding to complete decommissioning. Although the DPR does require subsurface surveys, it does not require the extensive site characterization and compliance surveys that are required by decommissioning regulations. The DPR also requires that the results of the monitoring and surveys be included in records important to decommissioning.

Finally, the WEC is subject to NRC's oversight program under which inspections of the WEC's facility and operations are routinely conducted. When issues such as leaks and events are reported to the NRC, the staff evaluates the safety significance and determines the most appropriate response. No changes to the EIS other than addition of license conditions were made as a result of these comments.

D.27 Comments Concerning the NEPA Process

D.27.1 EIS Preliminary Recommendation

Comment: Thank you very much for having a long session this evening, so that we can cover these questions. Actually in your EIS, you did state that you had a predecision that you really do favor the 40 year license, I just want to correct that, because I think that what you said, and what you wrote might not be matching. But anyway, I believe that you should change your time table, I agree with the previous speakers that trying to come up with a final draft, and decision before the public gets to look at all of the information is short sighted, and unfair. It doesn't help the NRC, it doesn't help Westinghouse, it doesn't help the community. (1-7-1 [Greenlaw, Pamela])

Comment: Government entities must be fully forthcoming about management of the nuclear weapons aspects of the WEC facility. The Nuclear Regulatory Commission must reconsider its lack of regulation of the production of Tritium Producing Burnable Absorber Rods (TPBARs), reveal what types of waste are generated by the production of those rods, regulate the resultant waste and allow the public to comment about that in the current draft Environmental Impact Statement that remains open for public comment until at least September 20, 2021. (9-1-14 [Clements, Tom])

Comment: Likewise, no reason is given for the draft EIS coming to the "preliminary" conclusion in support of the 40-year license extension before public comments are accepted, reviewed and considered. The beginning of the draft EIS states: "the NRC staff preliminarily recommends that the WEC's license SNM-1107 for the operation of the CFFF be renewed for an additional 40 years." At best, this determination is premature and is reached absent any public stakeholder comments on the draft EIS. (9-1-18 [Clements, Tom])

Comment: On page xvi, the NRC reviews why it is recommending a 40-year license, based on cost and benefits. Stakeholders do not agree with this conclusion. The NRC analysis fails to take into account the negative social, economic, environmental and health impacts of a serious design-basis or beyond-design-basis accident or of a serious leak of radioactive and chemicals to the environment, especially in the last 20 years of an additional 40 years of operation. (9-2-12 [Clements, Tom])

Comment: The "preliminary recommendation" (page 2-28) of a 40-year license extension is of concern given the NRC's acknowledgement of "moderate" impacts to groundwater. That reason alone should result in a denial of a 40-year license extension. (9-4-15 [Clements, Tom])

Response: *In accordance with 10 CFR 51.73(f), the draft EIS normally will include a preliminary recommendation by the NRC staff with respect to the proposed action. Similarly, 10 CFR 51.91(d), requires that the final EIS include a final recommendation on the action to be taken. However, the NRC's license renewal decision will not be solely based on the impact determinations documented in the final EIS. The license renewal decision will be made after the NRC completes its safety review, which will be documented in an SER, and the NEPA environmental review. Additionally, the preliminary recommendation in the draft EIS is made on the basis that no safety issues mandate otherwise. Section 2.6 and Section 3.19 of the EIS have been updated to include NRC's final recommendation.*

D.27.2 NRC's Determination to Prepare an EIS

Comment: I also want to remind everybody here that NRC did not look at producing an environmental impact statement, they were fine with the environmental assessment until a state agency had the data, and said this is a real problem. (1-15-2 [Greenlaw, Pamela])

Comment: The narrative on page xiii fails to fully present the record about environmental review of the license renewal. It fails to present the fact that members of the public were calling for preparation of an EIS well before the NRC made the determination that it would do so. Members of the public were well aware of the uranium scrubber event, leakage of uranium into ground under the facility and chronic groundwater contamination at the plant site. For example, in written and oral comments on the second Environmental Assessment draft at an NRC public meeting on November 14, 2019, SRS Watch called for an EIS to be prepared and that a license period of no more than 10 years be considered. Similar public requests were ignored for over six months until the NRC agreed to prepare the EIS. (9-2-1 [Clements, Tom])

Response: *Section 1.3.1 of the EIS summarizes the history and basis of the decision-making process that resulted in (1) the withdrawal of the June 2018 EA and finding of no significant impact (FONSI), and subsequent publication of a new draft EA in October of 2019, and (2) the preparation of an EIS. Specifically, on June 5, 2020, the NRC staff decided to prepare an EIS for the license renewal of the CFFF because the staff was not able to reach a FONSI. The NRC staff's decision was informed by (1) information from Westinghouse's remedial investigations under a Consent Agreement with SCDHEC, and provided to the NRC in March 2020, that revealed uncertainties related to the source and extent of the contamination onsite and the potential migration pathways; (2) the impact analysis documented in the October 2019 draft EA; and (3) the public comments submitted to the NRC during the October 2019 draft EA public comment period. No changes were made to the EIS as a result of these comments.*

D.27.3 NRC Staff's Coordination with Federal, State, and Local Government Agencies - WEC's Consent Agreement with SCDHEC

Comment: Also has the consent agreement between DHEC, and Westinghouse, and apparently AECOM, has that been amended since the issuance of this draft, or will it be amended? (1-9-2 [Mitchum, Chief Michelle])

Comment: The Westinghouse-SC Department of Health and Environmental Control "consent agreement" is outside the scope of NRC regulation and is not enforceable by the NRC, which essentially has observer status related to the Consent Agreement. (9-2-20 [Clements, Tom])

Comment: The NRC does not adequately explain its role in the DHEC-Westinghouse Consent Agreement or how the NRC can base decisions on information in a non-NRC document. Why doesn't the NRC have a similar CA with Westinghouse or why isn't the NRC party to the Westinghouse-DHEC CA? (9-3-1 [Clements, Tom])

Comment: The report Columbia Fuel Fabrication Facility Tc-99 Source Investigation Report was provide to DHEC by Westinghouse as part of the Consent Agreement. Thus, what NRC regulatory role does this report play? If it has no regulatory status then is this report and other things provided under the Consent Agreement only of informational value from a NRC perspective? Again, why isn't the NRC a party to the Consent Agreement such that the terms of it are binding as far as NRC regulation of WEC goes? (9-4-11 [Clements, Tom])

Comment: The Draft EIS presupposes favorable outcomes. The Draft EIS often assumes the best possible outcome under the Consent Agreement, which is naive for several reasons. First there is the long history of incidents onsite. We discussed these incidents in our August 25, 2020 comments on the EIS Scoping document, but will re-emphasize troubling patterns here. Recall that the EIS has been issued because WEC's poor handling of accidents and issues came to light after NRC had issued a draft EA and FONSI in June 2018. Less than a month after issuing the draft Environmental Assessment and FONSI in June 2018, a leak at Hydrofluoric Acid Spiking Station #2 released uranyl nitrate and hydrofluoric acid into the soil, an incident that further raised concerns about WEC's environmental and safety record. WEC's initial response to the report of this incident also raised alarms; they planned to monitor any COPC (Constituents of Potential Concern) migration using an existing monitoring well 190 ft away from the site; at typical rates of groundwater flow, contamination would not be detected for over a year. Fortunately, SCDHEC requested a more aggressive sampling plan. Leaks including radionuclides from a contaminated wastewater line in 2008 and 2011 were not reported at the time they occurred, and only came to light in 2019. The 2011 incident is particularly concerning because WEC at that time was petitioning SCDHEC to decommission air sparging and soil vapor extraction onsite and was granted relief; would they have received permission remediation efforts if the leaks and 2008 and 2011 had been properly reported to NRC and SCDHEC? (11-7 [Grego, John])

Comment: On June 5, 2020, the NRC prepared an EIS due to new information related to the WEC's remedial investigations conducted under a CA with SCDHEC. These investigations revealed uncertainty related to the source and extent of contamination onsite and the potential future migration pathways offsite that precluded the NRC staff from making a finding of "no significant impact" through the environmental assessment process. The CFFF has a history of non-compliance associated with groundwater and surface water discharges to Waters of the U.S. The EPA's concerns include:

- Preventing uranium and technetium-99 from being discharged to the Congaree River via the submerged pipeline and/or from storm events via the wastewater treatment facility.
- The partial characterization of the contaminated groundwater plume and its containment.
- Unimplemented flood control measures to curtail discharges to the Congaree River from flood/storm events.
- Cumulative effect of discharges to Waters of the U.S. not fully considered.
- Lack of a risk assessment to inform how contamination may affect downstream and surrounding populations.

Recommendations

- The EPA recommends that WEC and the NRC collaborate with the EPA, SCDHEC and Department of the Interior agencies to further discuss our concerns with preventative discharges, groundwater characterization, and cumulative impacts from the hydraulic and hydrological discharges (flood control) to the Congaree River that might result in impacts to terrestrial and/or aquatic species. (34-1-2 [Fite, Mark])

Comment: * Based on recent discussions with NRC, the EPA understands that a risk assessment to inform impacts to communities will be included in the Safety Evaluation Report; however, it would be helpful to include any summary of the findings in the Final EIS/Record of Decision. (34-1-6 [Fite, Mark])

Comment: Also, you know, this facility is on a road that leads to a National Park, you know, the Congaree Park and you know it is just groundwater and uranium and everything at this point to know, even the environmental concerns have concerns and the cemetery that is in that area too, the historic African American Cemetery that would be abused from monitoring. This is just unconscionable, and I want to make it known. (48-7-3 [Johnson, Alan])

Response: Sections 3.3 and 3.4 of the EIS describe and assess discharges, contaminant presence, ongoing mitigation, proposed mitigation, and the impact on water resources from radiological and nonradiological contaminants for the proposed action. Stormwater discharge and discharge to the Congaree River is discussed in Section 3.3.1.2 and summarized in Section 3.3.2.3. Analysis and discussion of contamination migration, including potential for impacts to downstream populations is discussed in Section 3.4.2.3 and 3.4.3. Cumulative impacts from past, present, and reasonably foreseeable future discharges to water sources are updated and discussed in Section 3.19.2. The NRC staff met with EPA, WEC, and SCDHEC on February 4, 2022 to discuss comments the EPA submitted during the draft EIS public comment period. The NRC staff, SCDHEC and WEC provided clarity regarding any misunderstandings concerning movement of contamination, and therefore those comments are not specifically addressed here. The WEC provided a summary of the clarifications discussed during that meeting (WEC 2022-TN7361). A separate Safety Evaluation Report is currently being developed and comments received by EPA and other commenters, especially those concerning flooding analyses, will be considered in preparation of this report. Section 1.5 of the EIS discusses NRC staff's coordination with other Federal and State agencies during the preparation of the EIS and specifically, coordination with the South Carolina Department of Health and Environmental Compliance (SCDHEC) staff regarding the status and progress of the Consent Agreement (CA) between the WEC and SCDHEC. As part of information-gathering activities during the NEPA environmental review process, the NRC staff has been reaching out to the SCDHEC to discuss and understand the progress and results of the remedial investigations and activities the WEC is conducting under the CA. The CA was executed between the SCDHEC and WEC under South Carolina laws, statutes, and regulations. AECOM is a consultant for WEC. The NRC is not a party to the CA. However, publicly available information resulting from these remedial investigations was considered during the preparation of the EIS, particularly when evaluating potential impacts on soil, surface water and groundwater resources (see Sections 3.2, 3.3, and 3.4 of the EIS, respectively). Discussions with Federal and State government agencies have been updated and summarized in Section 1.5 of the EIS. Information about the current status and progress of the CA has been updated in the EIS and summarized in Section 1.5.2.2.1.

D.27.4 Scoping Summary Report

Comment: Though being asked by stakeholders to analyze the operation of WesDyne in the NRC's draft EIS (on extending the Westinghouse operation license), the NRC has totally ignored the matter and in the Scoping Process Summary Report and claims, without a single word of justification or explanation and with no documentation, that WesDyne is "outside of scope" of the draft EIS (9-1-7 [Clements, Tom])

Response: The NRC staff invited the public, Federal, State, and Tribal government agencies, and external stakeholders to participate in the EIS scoping process that began on July 31, 2020. The NRC staff published the Scoping Summary Report in February 2021, which summarized the comments received and provided explained which issues raised in the scoping comments would be within and outside of the scope of the EIS. These determinations were made based on the information available to the NRC staff at that time. Additional information provided by the

public during the draft EIS public comment period and provided by the WEC in response to RAIs issued in February 2022 resulted in some comments deemed "out of scope" during the EIS public scoping process to be considered within the scope of the EIS and evaluated under the EIS cumulative impacts analyses. Newly added Section 3.19 of the EIS describes the NRC staff's cumulative impacts analysis, including consideration of the waste produce by the WEC's TPBARs assembly process.

D.27.5 NRC's Staff's Outreach to Federal, State, Local, and Tribal Government Agencies and Officials

Comment: And I've had conversations with a few individuals who was not aware, and I think information -- I've received the email, but I receive a lot of emails, so that was not the best mode of communication for me. A phone call probably would have been better, and then I would assist in getting the notification out once I was made aware that we were having the public comment session today, and I searched my state house email, then I saw that the emails had been sent there. But elected officials, I know we at the House of Representatives for the State of South Carolina, we do not check our emails every day. And even though we try to, we get so many, and particularly now, when we have so many issues going on with the rescue money, and with the wearing a mask, and the open gun carry, we have so many issues that our constituents are really, really concerned about, so I miss those emails. So, I just need for us to do a better job, maybe someone from the NRC can have someone from there call the elected officials, and ask us to disseminate the information to our constituency, send texts. Just something that we can put our hands on more readily, and then we can go, and check our emails so that we can try to be sure that the audience that should receive this information is broad, and also wide. Again, thank you for allowing me to make these comments, and if there are any questions, I would be more than happy to answer. (1-1-2 [McDaniel, Annie E])

Comment: The recent appointment of Daniel Blackman, Administrator of EPA Region 4 could provide needed resources. According to the Nov. 18, 2021 press release from EPA, Mr. Blackman is experienced in the study of groundwater contamination at nuclear plants and impacts on public health and safety. Please include Mr. Blackman's involvement in your efforts to achieve accountability and transparency in determining the length of the license and the health and safety concerns of the community. (32-5 [Gifford, Grace])

Response: *Public participation in the NEPA process is a vital component of the NRC's environmental review process. The NRC staff reached out to and invited Federal, State, local and Tribal government agencies and officials to provide information to the NRC during the public EIS scoping process between July 31 and August 31, 2020, and the draft EIS comment period between August 6 and November 19, 2021. The NRC staff also noticed and advertised the publication of, public comment period for, and August 26, 2021 public webinar on the draft EIS in the Federal Register Notice; via NRC e-mail distribution and NRC listserv (<https://www.nrc.gov/public-involve/listserver/fuel-cycle-fac-correspondence.html>); and in local newspapers and radio stations. The NRC staff also sent postcards to residences in the immediate vicinity of the CFFF, and distributed flyers via e-mail and NRC's listserv. After publication of the draft EIS, the NRC staff continued outreach to those government agencies and officials that requested continued information. Chapter 5 and Section 1.3 of the EIS have been updated accordingly.*

D.27.6 Requests for Extension of the Draft EIS Public Comment Period

Comment: Based on various comments of mine about the comment period in the text above, I request that the comment period be extended as appropriately requested. (9-6-9 [Clements, Tom])

Comment: Extend the comment period deadline until after the Intensive Archaeological Survey of WFFF is completed, reviewed by SHPO, and made available to the public for review. (12-1 [Judge, Christopher])

Comment: The Catawba Indian Nation's Tribal Historic Preservation Office (CIN-THPO) on behalf of the Catawba Indian Nation would like to go on record with requested changes that we would like to see put into the 40-year re-license plan. 1) We would like to request that the comment period deadline be extended until after the Intensive Archaeological Survey of WFFF is completed, reviewed by SHPO and the CIN-THPO and made available to the public for review. (13-1 [Haire, Wenonah G.]

Comment: I am hereby requesting that the Sept. 20, 2021 commentary deadline be extended for an additional 60 days for the public to review the highly technical NRC report on the proposed 40 year license for the Westinghouse Fuel Fabrication facility in Hopkins, SC. My constituents in Hopkins and nearby communities have not had ample time to review and respond to the NRC report. Several residents and local community groups have contacted me seeking my assistance in requesting this extension and as a Hopkins resident myself, I firmly believe an extension of the commentary period is warranted. Please advise as to NRC's determination regarding this request. (15-1 [Brawley, Wendy])

Comment: 1) Extend the comment period deadline until after the Intensive Archaeological Survey of WFFF is completed, reviewed by SHPO, and made available to the public for review. (16-2 [Mitchum, Chief Michelle])

Comment: pp. 1-11 line 12-13: The link for the updates are not working. Please fix the link or send us the information. Please extend the comment period an additional 10 days to allow time for review of this information. (39-9 [Ghanem, Sahar] [Plauche, Mary])

Response: *The NRC received several comments from the public comments requesting an extension of the public comment period and additional time for the public to review the final EIS and other related environmental information used to inform the EIS. The NRC values the public participation process during the NEPA review and agreed to extend and re-open the draft EIS public comment period for an additional 60 days through November 19, 2021. As discussed in the NRC staff's responses to comments requesting additional opportunities for public involvement in the EIS process, the NRC staff finds that the opportunities provided for public input through the NEPA environmental review process for the WEC's license renewal application have been sufficient and meaningful. Additional opportunities for public input through the NEPA environmental review process are not anticipated. No changes to the EIS were made as a result of these comments.*

D.27.7 Public Participation - Additional Opportunities for Public Input During the EIS Process

Comment: COUNCILWOMAN NEWTON: Okay, and this is my last question, which is more of a response, and I'll let others speak. It's probably part of your plan anyway, but if you could

reiterate throughout the call what those opportunities are for the public to continue to give input, and what the deadline is for that process since once this wraps up you're going to come back to us with a definitive recommendation. And thank you for your time. (1-6-4 [Newton, Chakisse])

Comment: MS. KIRKLAND: Okay, all right. So, this will be the final draft, in the final draft, are you going to have more public comments? (1-22-2 [Kirkland, Mary])

Comment: The public must be allowed to comment in the draft EIS process on the management and impacts of waste streams from TPBAR production. (9-1-13 [Clements, Tom])

Comment: On page 3-45 it is stated that "The Feasibility Study will be provided to SCDHEC within 90 days of SCDHEC's approval of the final Remedial Investigation Report." I request that the draft EIS comment period remain open until the public has had a chance to review both the Feasibility Study and the final Remedial Investigation Report. If this will not be the case, why not? (9-5-2 [Clements, Tom])

Comment: In the May/June 2021 "Key Developments, Highlights and News," by WEC, this is stated: "CFFF will begin the remaining defined Remedial Investigation fieldwork in July. It is believed this field work will complete the remedial investigation data collection and initiate the start of the Final Remedial Investigation report, a comprehensive summary that includes a risk assessment. The Final Remedial Investigation report is tentatively scheduled for submission to DHEC Spring 2022. Some of our RAI responses would be incorporated into the Final Remedial Investigation report, while others will be included in the Feasibility Study (FS). The FS will be completed after DHEC approves the Final Remedial Investigation Report. If the fieldwork identifies additional data collection needs, Westinghouse will continue to work with DHEC on additional work scope to close all data gaps to meet the requirements of the Consent Agreement." Given the importance of the above-mentioned documents to environmental impacts and remediation at the WEC site, I request that the draft EIS remain open for comment until the above-mentioned Remedial Investigation Final Report has been made public and the public has had a chance to review it. Likewise, the draft EIS should remain open until the Feasibility Study has been publicly released and the public has had an opportunity to review them and comment for the EIS record. I further request that the named documents be made part of the EIS record. (9-5-11 [Clements, Tom])

Comment: Problem: Nothing on NRC site for request to have a public meeting. There are rules for only public hearings. The pathway is always one-way, top-down. Solution: public and agency task force to develop workable plans that can lead to rules concerning the public's request for meetings. Public involvement link: <https://www.nrc.gov/public-involve.html> (17-23 [Greenlaw, Pamela])

Comment: 1) Difficulty of Public Comment. As a longtime resident of the area, I have seen several articles about the facility in local newspaper articles (see attached to this letter), and so this opportunity to provide public comment is important to me. However, the first information I noticed about this process was in an article in The State published November 5th. This was after the initial public comment period had closed. While I am grateful that I can submit this later due to the extension of the public comment period, I am concerned that the window for public comments to be submitted is so short. I try to participate and provide input when asked on issues that affect me, such as the SC Public Service Commission and the City of Columbia 15-year plan. The PSC typically sends me an individual letter so that I am made aware of the request for my comments, while the city planning process has occurred over several years with several in-person or virtual meetings, surveys, etc. Being made individually aware and having

enough time to comment have both greatly helped my ability to provide input, but I do not feel either was the case for this input process to the NRC. (33-1 [Fleming, Jory])

Comment: I request that all points raised in the report concerning waste produced from TPBAR fabrication and management of that waste be addressed in the draft EIS record and that the record be left open until the draft EIS is supplemented with new information about TPBAR production. Though the NRC has initially determined that the WesDyne issue is "outside the scope" of the draft EIS, I think that determination is incorrect and the waste from TPBAR production and the regulation of TPBAR production must be addressed in the draft EIS, with allowance for the public to comment on that. (49-1-1 [Clements, Tom])

Comment: Thus, I request the comment period be extended beyond November 19, 2021 for a period of one month after a supplement on TPBAR fabrication is provided to the public as part of the draft EIS. (49-1-2 [Clements, Tom])

Comment: Of highest importance, the public must be allowed to comment in the draft EIS process about the management and impacts of waste streams from TPBAR production. (49-2-13 [Clements, Tom])

Response: *The NRC is committed to ensuring an open and transparent process that allows for meaningful public participation. As discussed in Section 1.3 of the EIS, during the NEPA environmental review process for the WEC's license renewal application, the NRC staff has provided several opportunities for public comment. In October 2019, the NRC staff published for public comment a draft EA and conducted a public meeting to gather oral comments. The comments provided during the October 2019 draft EA public comment period were considered when developing the EIS. In July 2020, the NRC staff began the EIS scoping process and invited the public, Federal, State, and Tribal government agencies, and other external stakeholders to provide input on the scope of the EIS. The Scoping Summary Report published in February 2021 summarized the comments received and described which topics raised in the comments were within or outside of the scope of the EIS. In July 2021, the NRC staff published the draft EIS public comment and conducted a public webinar to gather oral comments. The comments received during the draft EIS comment period are addressed in this appendix.*

The NRC staff finds that all these activities have provided sufficient and meaningful opportunity for the public to provide input throughout the NEPA environmental review process for WEC's license renewal application. Additional opportunities for public input, including public meetings, are not anticipated as part of the NEPA environmental review process. No changes to the EIS were made as a result of these comments.

D.27.8 Public Participation in the NEPA Process - Notice and Advertisement of Draft EIS Public Comment Period and Public Webinar

Comment: Yes, thank you so much for acknowledging me, and thank you all for the presentation. I just wanted to share just a few comments. I thought the presentation was a good presentation, however I am concerned about the reach, and whether, or not the advertisement of the public comments, and whether, or not the receipt of the advertisement reached the audience that it should have reached. So, I think the deadline was extended a little bit, but I'm asking that -- I don't know the schedule for a repeat of this webinar, but I'm requesting that it is repeated, and, or maybe sent out, maybe through social media, maybe through some of the public radio stations, public TV stations. Oftentimes when this kind of

information needs to be disseminated to our general audience, it seems to miss that mark. (1-1-1 [McDaniel, Annie E])

Comment: CHIEF MITCHUM: Thank you. First, I want to thank you all for putting this slide together, and having this meeting. I agree with Representative McDaniel, that there are a number of people who did not have enough notice to be able to participate in this, so I do hope that this is held again. (1-3-1 [Mitchum, Chief Michelle])

Comment: The other question is how could myself, and I guess anybody else on this call, receive a copy of the slide show that you all presented on, if that would be possible for me to receive? (1-5-2 [Johnson, Jermaine])

Response: *Consistent with the NRC regulations at 10 CFR 51.73, the NRC staff published the draft EIS for public review and comment. The 45-day public comment period began on August 6, 2021. In response to requests to extend the draft EIS public comment period, the NRC staff announced a 60-day extension and re-opening of the public comment period until November 19, 2021. The public and external stakeholders could provide written and oral comments through e-mail (WEC_CFFF_EIS@nrc.gov), by leaving a voicemail using a standard toll-free number, via US mail, and through the Federal rulemaking website at <https://www.regulations.gov>. A public webinar was conducted on August 26, 2021, to gather oral comments.*

The draft EIS was accessible via the NRC's ADAMS using Accession Number ML21209A213, and the NRC's public web site. The NRC staff also made hard copies of the draft EIS available to the public at the following locations: (1) Richland Public Library – Main: 1431 Assembly St., Columbia, SC 29201; (2) Richland Public Library – Lower Richland: 9019 Garners Ferry Road, Hopkins, SC 29061; and (3) Richland Public Library – Eastover: 608 Main Street, Eastover, SC 29044. In the Federal Register (86 FR 43236) and via NRC e-mail distribution, NRC listserv (<https://www.nrc.gov/public-involve/listserver/fuel-cycle-fac-correspondence.html>), local newspapers, and radio stations, the NRC staff provided notification of and advertised the publication of the draft EIS, indicated the public comment period for its review, the conduct of the August 26, 2021 public webinar on the draft EIS. As described in Section 1.3.4 of the EIS, the NRC staff also sent postcards via U.S. mail to residences in the immediate vicinity of the CFFF providing notification of the availability of the draft EIS, the public comment period, and public webinar; and issued a press release. A flyer (or informational sheet) containing information about the conclusions in the draft EIS, the public comment period, and the public webinar were distributed via email and through the NRC listserv. NRC social media were also used to advertise the draft EIS comment period.

Notification of the August 26, 2021 public meeting webinar was also provided in the NRC's public meeting notice system and a copy of the informational slides the NRC staff used during the public webinar was distributed ahead of the public webinar via email, and subsequently uploaded to the NRC's ADAMS and public web site (<https://www.nrc.gov/info-finder/fc/westinghouse-fuel-fab-fac-sc-lc.html>). The transcript of the public webinar was also made available via in NRC's ADAMS, the public web site, and distributed via e-mail. Additionally, the NRC published on its YouTube channel two videos related to the draft EIS. The first video provided an overview of the draft EIS (<https://youtu.be/96L91-HDXTE>) and the second video provided a summary of the potential environmental impacts on surface water and groundwater resources from the proposed action (<https://youtu.be/hBnHzYNCGTE>). The web links to these recorded presentations were distributed via email and uploaded to the NRC public web site. Section 1.3 of the EIS was updated to describe the outreach and advertisement used

to inform and engage the public in support of the publication of the draft EIS and associated public comment period.

D.27.9 Public Participation - Accessing the Public Webinar

Comment: Good evening, my name is Chris Judge, I'm a professional archaeologist residing in Richland County, South Carolina. I thank the panelists for opening up tonight, in particular Diana has been very responsive to my inquiries. I do want to point out that in the email contact tonight was a number of people who tried very hard to get into the Webex, and it was incredibly difficult to do that. I recommend that you have a follow up session on an easier platform, such as Zoom. (1-12-1 [Judge, Christopher])

Comment: Comments on the Webinar for draft EIS for the WFFF held on August 26, 2021. The webinar held on August 26, 2021 by NRC to solicit Public Comments was needlessly convoluted in its design and execution. I had great difficulty navigating into the webinar and four times the passcode published by NRC did not work. I finally made it in. However, at this point there was no audio, and I was subsequently alerted by a panelist that the audio was only available by phone. Thus, I joined the presentation well after it had begun. I was in email contact with several people during the webinar, including a Chief of an SC tribe, who were unable to gain access to the video portion of the webinar. NRC should hold another meeting using a more friendly platform such as Zoom with audio and video available in the same place. (12-8 [Judge, Christopher])

Comment: [Comments on the Webinar for draft EIS for the WFFF held on August 26, 2021...] I tried to use the Q&A chat to communicate my thoughts. As I typed, my comments were erased, overridden repeatedly by a message limiting the number of characters, and obliterated causing me to start over. Towards the end, one of the hosts, offered that the Q&A chat box was not a place to submit comments from the public. (12-11 [Judge, Christopher])

Comment: Comments on the Webinar for draft EIS for the WFFF held on August 26, 2021.

I restate in full all of my comments captured in the webinar held on August 26, 2021 by NRC to solicit Public Comments. Further, I recommend that it is the public's best interest for NRC hold another meeting using a more friendly platform such as Zoom with audio and video available in the same place to eliminate access problems experienced on August 26, 2021. (16-9 [Mitchum, Chief Michelle])

Response: *The NRC acknowledges the technical difficulties that some external stakeholders experienced during the August 26, 2021 public webinar. The NRC staff inadvertently included the incorrect webinar event number in the NRC's public meeting notice system. The NRC staff, however, did not solely rely on the NRC's public meeting notice system to advertise the public webinar. The public webinar event number was correctly included in all other advertisements, including the Federal Register Notice, local newspaper and radio station ads, postcards sent to residences in the vicinity of the CFFF, e-mails, and flyer. The NRC staff strives to provide reasonable means by which commenters can participate in public webinars and provide their input. All audio during the public webinar, including the portion where the public provided oral comments, was only accessible via a standard toll-free telephone number so that external stakeholders would not have to solely rely on internet access to provide oral comments.*

Additionally, the public and external stakeholders that were not able to participate in the public webinar, were able to access the transcript of the webinar and provide written or oral comments

via e-mail, by leaving a voicemail using a standard toll-free telephone number, U.S. mail, and through the Federal rulemaking web site from August 6 through November 19, 2021. No changes were made to the EIS as a result of these comments.

D.27.10 NRC's Environmental Impact Level Descriptions

Comment: MS. D'ARRIGO: Clear [Nuclear] Information and Resource Service, we're a national organization that is concerned with nuclear power, nuclear waste, radiation, and the thing about this EIS, and many other NRC documents like this is that I don't think I've ever seen one that had a large impact. Every EIS I've looked at around the country, they're considered, everything is small, maybe one, or two moderate. And it's just such a nonanswer, it can't be possible that you could have, as the previous speakers have mentioned, very toxic chemicals leaked into water, and that that is not a potentially very significant issue in years to come. (1-16-1 [D'Arrigo, Diane])

Comment: I note that the term "noticeable" was used in the draft -how does this fit into The NRC's small-moderate-large scale, or has this term now been discarded? (9-4-18 [Clements, Tom])

Comment: Since the EIS consistently uses the word "uncertainty", we - the directly affected party -ask that you quantify Small, Medium, and Large from a risk standpoint to include the margin of error. (35-15 [Irick, Karen] [Kirkland, Mary] [Reese, Robert] [Woods, Felicia])

Response: *To guide its assessment of environmental impacts for a proposed action or alternative actions, the NRC established standards of significance for environmental impacts using the CEQ's terminology and definition for "significantly" (see 40 CFR 1508.27). Because the significance and severity of an impact can vary with the setting of a proposed action, the NRC staff considers both "context" and "intensity" as defined in the Council on Environmental Quality regulations (40 CFR 1508.27). As discussed in the NRC guidance in NUREG-1748 (NRC 2003), the NRC established three levels of significance for potential impacts—SMALL, MODERATE, and LARGE—that provide a common framework for each of the resource areas assessed in this EIS.*

As discussed in NUREG-1748 and Section 2.5 of the EIS, a SMALL impact is determined when the environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource considered. A MODERATE impact consists of environmental effects that are found sufficient to alter noticeably but not destabilize important attributes of the resource considered. A LARGE impact is determined when environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource considered.

The NRC has relied on these impact levels to evaluate impact significance in other environmental licensing and relicensing actions. These significance levels provide a comparison tool that allows decision-makers and interested parties to understand the relative significance of various environmental impacts. Each impact level assigned in the EIS is supported by substantial NRC analysis. No changes were made to the EIS as a result of these comments.

D.28 Comments Concerning the No-Action Alternatives

D.28.1 No-Action Alternative Selection

Comment: So, considering all of the above, I am requesting the no action alternative, and I thank you for giving this opportunity to comment. (1-8-7 [Preston, Priscilla])

Comment: A 40-year license is far too long of a period of time, for the operation of this facility. This is an issue of public health. Considering all factors to date, and the uncertainty of the future, our position is to take NO ACTION and decommission this facility. (16-8 [Mitchum, Chief Michelle])

Comment: we request the No Action alternative until all of the problems stated can be resolved. (40-5 [Preston, Priscilla])

Response: *The EIS analyzes the environmental impacts of the proposed action, the no-action alternative, and an alternative analyzing a shorter license renewal period (20-year license renewal). The NRC staff has developed this EIS to provide information to the public and decision-makers to support making an informed decision about whether or not to grant the WEC's license renewal request. In Section 2.6 of the EIS, the NRC staff has recommended the 40-year license renewal. The license renewal decision, however, will be made after the NRC staff completes its safety evaluation, as documented in a Safety Evaluation Report. No changes were made to the EIS as a result of these comments.*

D.28.2 No-Action Alternative Impacts

Comment: The NRC stretches credulity when it concludes that the no-action alternative would result in environmental costs to society that would exceed these costs for the proposed action since the site would need to be cleaned up after decommissioning. (11-15 [Grego, John])

Response: *Section 3.18.4.2 of the EIS weighs the environmental and economic costs and benefits of continued operation of the CFFF against the no-action alternative. This section concludes that decommissioning and redevelopment of the CFFF site would impose environmental costs that would exceed those resulting from license extension. In particular, the EIS finds that demolition and new facility construction would result in increased ground disturbance. While these impacts also would occur at the end of the proposed renewed license period, they would occur 40 years further into the future. And, thus, the impacts/benefits (from the socioeconomics perspective) from the proposed renewed license period would not be realized under the no-action action alternative. No changes were made to the EIS as a result of this comment.*

D.29 General Editorial Comments

D.29.1 General Editorial Revisions

Comment: *Minor copy edits:*

Table 3-4: "Caroline heelsplitter" should be corrected to "Carolina heelsplitter." (21-27 [Stanley, Joyce])

Comment: 4. Many of the included maps and figures lack critical elements such as legends and/or scale bars (e.g., Fig 2-1, 2-2, 2-4, 2-7). Fig 2-10, while useful, has no orientation

information. For Fig 3-8 the reader must assume that in the Plan View, up is North. For the maps and figures that are missing critical elements include updates in the Final EIS. (34-1-15 [Fite, Mark])

Comment: Ammonia is shown in Table 3-9. Note, there is no NMQS for Ammonia. (41-1-12 [Taylor, Ken])

Comment:

Reference: Page: 3-69

Lines: 7-8

Comment: The regulations being referenced are South Carolina regulations and should be cited as "South Carolina Regulations" or "SC Regulations;" the citation range also has a typographical error. The sentence should read "... with South Carolina Regulations 61-62.1 through 61-62.99." (41-1-16 [Taylor, Ken])

Comment:

Reference: Page: 3-69

Line: 25

Comment: "MM" in this context represents the U.S. customary industry meaning of one million; not "metric million." (41-2-1 [Taylor, Ken])

Comment: Page: 2-11

Line: 11

Current Wording: "...levels were detected above the WEC-established residential cleanup standard. With the..."

Suggested Wording: "...levels were detected above the ~~WEC-established~~ residential cleanup standard. With the..."

Justification: WEC is using the most conservative clean-up standards from NRC NUREG 1757, Volume 2, Rev 1, Appendix H and USEPA Regional Screening Levels. WEC did not establish these standards. (42-1-8 [Malek, Elise])

Comment: Page: 2-21

Line: 13-16

Current Wording: Going forward, the WEC will sample these groundwater wells and analyze for uranium and Tc-99 to determine (1) whether the source of the current shallow groundwater contamination is leaks from plant operation and/or (2) if existing contamination of uranium or Tc-99, from a known or unknown source, is moving offsite."

Suggested Wording: "...uranium or Tc-99, from a known or unknown source, is ~~moving~~ **offsite migrating.**"

Justification: With the information collected during the remedial investigation, there is assurance that radionuclides are not moving offsite. (42-1-10 [Malek, Elise])

Comment: Page: xiii

Line: 13-15

Current Wording: "Shortly thereafter, in July 2018, there was a leak from equipment at the CFFF that resulted in uranium entering the subsurface under the facility building."

Suggested Wording: "Shortly thereafter, in July 2018, there was a leak from equipment at the CFFF that resulted in ~~uranium~~ **uranyl nitrate containing hydrofluoric acid** entering the subsurface under the facility building.

Justification: Metallic uranium (U) did not enter the subsurface. The chemical that would have entered the subsurface is uranyl nitrate with up to 5% hydrofluoric acid. (42-3-1 [Malek, Elise])

Comment: Page: xiii

Line: 14-17

Current Wording: "Additionally, the WEC initiated an investigation, under the purview of the South Carolina Department of Health and Environmental Control (SCDHEC), into a leak in 2011 from a buried pipe that also allowed uranium to enter the subsurface under the main facility building."

Suggested Wording: "Additionally, the WEC initiated an investigation, under the purview of the South Carolina Department of Health and Environmental Control (SCDHEC), into a leak in 2011 from a buried pipe that also allowed **process wastewaters containing** uranium to enter the subsurface under the main facility building."

Justification: Metallic uranium did not enter the subsurface. The material that contacted the soil was process wastewater containing uranium. (42-3-2 [Malek, Elise])

Comment: Page: xv

Line: 44

Current Wording: The NRC staff also considered as an alternative approving the WEC's a license renewal request

Suggested Wording: The NRC staff also considered as an alternative **to** approving the WEC's-a license renewal request

Justification: Missing word (42-3-3 [Malek, Elise])

Comment: Page: xvii

Line: 34

Current Wording: COC constituent of concern

Suggested Wording: ~~COC constituent of concern~~

Justification: Suggest using Contaminants of Potential Concern (COPC) throughout for consistency with other sections in the DEIS. COPC is also used in documents prepared by WEC and its consultants that are submitted to SCDHEC. (42-3-4 [Malek, Elise])

Comment: Page: 1-7

Line: 11

Current Wording: "into onsite water and soil contamination under q..."

Suggested Wording: "into onsite water and soil contamination under aq..."

Justification: Errant typo. The "q" should be an "a". (42-3-6 [Malek, Elise])

Comment: Page: 1-12

Line: 3-4

Current Wording: "Addendum 4 - Sediment Sampling Plan to Bound the Extent of Uranium Around SED-44 (WEC 2021-TN7006)."

Suggested Wording: "~~Addendum 4~~ - Sediment Sampling Plan to Bound the Extent of Uranium Around SED-44 (WEC 2021-TN7006)."

Justification: There are only 3 Addendums for the Consent Agreement Remedial Investigation. Addendum 1: Southern Storage Area Addendum 2: East Lagoon Addendum 3: Sanitary Lagoon There is no Addendum 4. The Sediment Sampling Plan to bound the Extent of Uranium Around SED-44 was an addendum to the Phase II RIWP scope of work. (42-3-9 [Malek, Elise])

Comment: Page: 2-1

Line: 34

Current Wording: "Figure 2-3 shows that the remaining property (approximately 441 ha [1,083 ac]) is mostly..."

Suggested Wording: "Figure **2-2 2-3** shows that the remaining property (approximately 441 ha

[1,083 ac]) is mostly..."

Justification: Figure 2-2 is a better depiction of the undeveloped property. (42-3-10 [Malek, Elise])

Comment: Page: 2-3

Line: 4

Current Wording: "The WEC manufactures nuclear fuel assemblies.."

Suggested Wording: "The ~~WEC~~ **CFFF** manufactures nuclear fuel assemblies.."

Justification: Clarification (42-3-11 [Malek, Elise])

Comment: Page: 2-3

Line: 5

Current Wording: "The WEC also produces.."

Suggested Wording: "The ~~WEC~~ **CFFF** also produces.."

Justification: Clarification (42-3-12 [Malek, Elise])

Comment: Page: 2-4

Line: 7

Current Wording: "...operations involving encapsulated and sealed materials for rod certification and storage,..."

Suggested Wording: "...operations involving encapsulated **uranium** and sealed **uranium** materials for rod certification and storage,..."

Justification: Suggest adding the word "uranium", as the reader may not deduce from the text what "encapsulated" and "sealed" materials are in reference to. (42-3-13 [Malek, Elise])

Comment: Page: 2-4

Line: 8

Current Wording: "The WEC receives cylinders.."

Suggested Wording: "The ~~WEC~~ **CFFF** receives cylinders..."

Justification: Clarification (42-3-14 [Malek, Elise])

Comment: Page: 2-4

Line: Note 1

Current Wording: "In 2011, the WEC replaced..."

Suggested Wording: "In 2011, the ~~WEC~~ **CFFF** replaced..."

Justification: Clarification

(42-3-15 [Malek, Elise])

Comment: Page: 2-5

Line: 23-25

Current Wording: "The gases given off during the burning of solid wastes are carbon, carbon dioxide (CO₂), and mineral acid hydrochlorides (HCLs) and HF due to the burning of rubber, plastics, and other chemicals."

Suggested Wording: "The gases given off during the burning of solid wastes **include** carbon, carbon dioxide (CO₂), and mineral acid hydrochlorides (HCLs) and HF due to the burning of rubber, plastics, and other chemicals."

Justification: Suggested edit for accuracy. (42-3-17 [Malek, Elise])

Comment: Page: 2-13

Line: 9-15

Current Wording: "...uranium prior to discharging effluents to the atmosphere."

Suggested Wording: "...uranium prior to discharging effluents to the atmosphere. (**WEC 2019-**

TN6510)"

Justification: The sentences are missing a citation for the source, which is the WEC 2019 Environmental Report (ER). (42-4-11 [Malek, Elise])

Comment: Page: 2-14

Line: 32

Current Wording: "...portions of the lagoon liners to identify degradation of the liners, such as holes and tears..."

Suggested Wording: "...portions of the lagoon liners to identify **potential** degradation of the liners, such as holes and tears..."

Justification: The inspections are to identify potential issues. (42-5-3 [Malek, Elise])

Comment: Page: 2-14

Line: 36

Current Wording: "...damage, such as rips, tears or punctures;; spillway integrity; and changes in the discharge of all..."

Suggested Wording: "...damage, such as rips, tears or punctures; ; spillway integrity; and changes in the discharge of all..."

Justification: Suggest removing the extra punctuation. (42-5-4 [Malek, Elise])

Comment: Page: 2-21

Line: 19

Current Wording: WEC 2020-TN6875

Suggested Wording: N/A

Justification: This reference is not included in Section 6.0, References of the DEIS. (42-6-2 [Malek, Elise])

Comment: Page: 2-21

Line: 29-30

Current Wording: "Based on previous groundwater assessment activities, COPCs in groundwater are chlorinated volatile..."

Suggested Wording: Suggest starting new paragraph with the sentence "Based on previous groundwater..."

Justification: These two sentences are general statements regarding COPCs at the site and should not be attached to the "area of impact" well description, as that designation only applies to radionuclide plumes. (42-6-8 [Malek, Elise])

Comment: Page: 2-25

Line: 34-35

Current Wording: "The NRC staff also considered as an alternative approving the WEC's a license renewal request for a shorter term..."

Suggested Wording: "The NRC staff ~~also considered as an alternative approving the WEC's a license renewal request for a shorter license renewal term, i.e., a renewal term of 20 years, as~~ **an alternative.**"

Justification: Sentence requires rewording (42-6-15 [Malek, Elise])

Comment: Page: 2-26

Line: 24

Current Wording: "Whether the ~~WEC~~ **CFFF** operates..."

Suggested Wording: "Whether the WEC CFFF operates..."

Justification: Clarification (42-6-16 [Malek, Elise])

Comment: Page: 3-2

Line: 10

Current Wording: "There is an electrical substation, owned by South Carolina Electric and Gas, on..."

Suggested Wording: "There is an electrical substation, owned by ~~South Carolina Electric and Gas~~**Dominion Energy**, on..."

Justification: Dominion Energy bought SCE&G. (42-7-1 [Malek, Elise])

Comment: Page: 3-4

Line: 6

Current Wording: "...Conceptual Site Model (CSM) that will be used by the WEC as a decision-making tool, for..."

Suggested Wording: "...Conceptual Site Model (CSM) that ~~will~~**is being** used by the WEC as a decision-making tool, for..."

Justification: The CSM is an active tool used by the WEC. (42-7-2 [Malek, Elise])

Comment: Page: 3-13

Line: 35

Current Wording: "The historical constituents of concern (COCs) released to the soils or the subsurface are nitrate;..."

Suggested Wording: "The historical constituents of **potential** concern (COPCs) released to the soils or the subsurface are nitrate;..."

Justification: Suggest using COPC throughout for consistency with other sections in the DEIS. COPC is also used in documents prepared by WEC and its consultants that are submitted to SCDHEC. (42-7-7 [Malek, Elise])

Comment: Page: 3-13

Line: 41

Current Wording: "...levels of COCs in soils outside of the building footprint and changes in facility operations that..."

Suggested Wording: "...levels of COPCs in soils outside of the building footprint and changes in facility operations that..."

Justification: Suggest using COPC throughout for consistency with other sections in the DEIS. COPC is also used in documents prepared by WEC and its consultants that are submitted to SCDHEC. (42-7-8 [Malek, Elise])

Comment: Page: 3-13

Line: 37

Current Wording: "[Tc-99]); volatile organic compounds (VOCs), primarily perchloroethylene (PCE), trichloroethene..."

Suggested Wording: "[Tc-99]); volatile organic compounds (VOCs), primarily perchloroethylene (PCE), trichloro**ethylene**..."

Justification: Consider using "trichloroethylene" in place of trichloroethene to be consistent with use of preceding "perchloroethylene" and subsequent "cis-1,2- dichloroethlyene". (42-7-9 [Malek, Elise])

Comment: Page: 3-19

Line: 7

Current Wording: "...operations comes from the City of Columbia, which obtains water from Murray Lake on the..."

Suggested Wording: "...operations comes from the City of Columbia, which obtains water

from **Lake** Murray Lake on the..."

Justification: Local and regional nomenclature for the water body is "Lake Murray", not "Murray Lake." (42-7-14 [Malek, Elise])

Comment: Page: 3-26

Line: 40-43

Current Wording: "Results from this monitoring show minor differences in activities at the entrance and exit locations for both gross alpha and gross beta (WEC 2019-TN6423), indicating that radionuclide releases from CFFF operations have a minor effect on water quality in Mill Creek and are unlikely to move beyond the CFFF site boundary at noticeable."

Suggested Wording: "Results from this monitoring show minor differences in activities at the entrance and exit locations for both gross alpha and gross beta (WEC 2019-TN6423), indicating that radionuclide releases from CFFF operations have a minor effect on water quality in Mill Creek and are unlikely to move beyond the CFFF site boundary at noticeable."

Justification: Suggest deleting extra words in the sentence. (42-8-14 [Malek, Elise])

Comment: Page/Line: 3-36/7; 3-36/12

Current Wording: "Beginning in late 2018, the WEC also started monitoring VOCs at the site's existing wells (WEC 2019-TN6510)."

Suggested Wording: "Beginning in late 2018, the ~~WEC~~ **CFFF** also started monitoring VOCs at the site's **other** existing wells (WEC 2019-TN6510)."

Justification: Prior to 2018, CFFF was monitoring VOCs in four site wells (W-26, W-41R, W-48, and W-RW2) as required by the site's NPDES permit issued by SCDHEC. Beginning in late 2018, the site began voluntarily sampling the remaining site wells to re-baseline VOC data at the facility. (42-9-8 [Malek, Elise])

Comment: Page: 3-38

Line: 1

Current Wording: "Recent well water from the nine new wells..."

Suggested Wording: "~~Recent~~ **October 2019** well water **sampling** from the nine new wells..."

Justification: Define "recent" as October 2019. (42-9-14 [Malek, Elise])

Comment: Page: 3-38

Line: 21

Current Wording: "...the highest concentration was 900 mg/L (at W-7) in 1981..."

Suggested Wording: "...the highest concentration was 900 mg/L (at W-7**A**) in 1981..."

Justification: The correct well designation is W-7A. (42-10-2 [Malek, Elise])

Comment: Page: 3-38

Line: 25-26

Current Wording: "...the maximum concentration was reported to be 126 mg/L in W-18 (WEC 2020-TN6526). Ammonia concentrations in wells W-32, W-22, and W-7 south of the WWTP appear to be..."

Suggested Wording: "...the maximum concentration was reported to be 126 mg/L in W-18**R** (WEC 2020-TN6526). Ammonia concentrations in wells W-32, W-22, and W-7**A** south of the WWTP appear to be..."

Justification: The correct well designation is W-18R. The correct well designation is W-7A. (42-10-3 [Malek, Elise])

Comment: Page: 3-38

Line: 41

Current Wording: "In the early 1980s, five lagoons (West, West II, East, North, and..."
Suggested Wording: "In the early 1980s, five lagoons (West I, West II, East, North, and..."
Justification: The proper designation for the lagoon is "West I." (42-10-4 [Malek, Elise])

Comment: Page: 3-39

Line: 5

Current Wording: "...results exceeding the screening levels for uranium, confirming the presence of uranium in the..."

Suggested Wording: "...results exceeding the **Residential Use sScreening lLevels (RUSLs)** for uranium, confirming the presence of uranium in the..."

Justification: The screening level should be specified. (42-10-5 [Malek, Elise])

Comment: Source: 2020/2021 Westinghouse Annual Groundwater Report

Page: 3-40

Line: 24-26

Current Wording: "Well W-45, located at the north end of the line of wells along the west side of the building has not been routinely sampled,..."

Suggested Wording: "Well W-45, located at the north end of the line of wells along the west side of the building ~~has~~**had** not been routinely sampled,..."

Justification: W-45 has been part of the site's routine monitoring program since 2018. (42-10-15 [Malek, Elise])

Comment: Page: 3-47

Line: 2-3

Current Wording: "Figure 3-17 Gross Beta (open circles) and Tc-99 (filled circles) Activity at the Well Pair W-32 (red) and W-6 (blue) (Source: WEC 2020-TN6875)."

Suggested Wording: "Figure 3-17 Gross Beta (open circles) and Tc-99 (filled circles) Activity at the Well Pair W-32 (red) and W-~~6~~**11** (blue) (Source: WEC 2020-TN6875)."

Justification: The text label underneath the figure references W-6 in error. W-11 is paired with W-32, as is properly depicted on the actual figure. (42-11-6 [Malek, Elise])

Comment: Page: 3-48

Line: 8

Current Wording: "As described in Section 0 of this EIS, the majority of groundwater supply wells..."

Suggested Wording:

Justification: Suggest replacing the "0" with the proper section of reference. (42-11-7 [Malek, Elise])

Comment: Page: 3-49

Line: 44

Current Wording: "...Investigation Report or within 5years of the license renewal,..."

Suggested Wording: "...Investigation Report or within 5 years of the license renewal,..."

Justification: Missing space between 5 and years. (42-11-9 [Malek, Elise])

Comment: Page: 3-51

Line: 17

Current Wording: "releases on future decommissioning activities. The WEC has also agreed to two new license..."

Suggested Wording: "releases on future decommissioning activities. The WEC has also agreed to ~~two~~**three** new license..."

Justification: To clarify that the future commitment in the license renewal application will be for three new license conditions. (42-11-10 [Malek, Elise])

Comment: Page: 3-52

Line: 5-6

Current Wording: "Sunset Lake was created by a man-made impoundment of Mill Creek."

Suggested Wording: "Sunset Lake was created by a man-made impoundment of Mill Creek **prior to CFFF construction.**"

Justification: For clarification that Sunset Lake was not constructed for the CFFF. (42-11-12 [Malek, Elise])

Comment: Page: 3-52

Line: 25

Current Wording: "...National Parks Service (NPS 2020- TN6543)."

Suggested Wording: "...National Parks Service (NPS 2020-TN6543)."

Justification: NPS is an acronym for National Park Service. (42-11-13 [Malek, Elise])

Comment: Page: 3-53

Line: 3-4

Current Wording: "...which is administered by the National Parks Service."

Suggested Wording: "...which is administered by the National Parks Service."

Justification: NPS is an acronym for National Park Service. (42-11-14 [Malek, Elise])

Comment: Page: 3-54

Line: 3

Current Wording: "This includes the treated effluent from fuel processing and for sanitary purposes..."

Suggested Wording: "This includes the treated effluent from ~~fuel processing~~ **manufacturing operations** and for sanitary purposes..."

Justification: Fuel processing, although not inaccurate could be misinterpreted by some readers. (42-11-15 [Malek, Elise])

Comment: Page: 3-54

Line: 28-29

Current Wording: "...and habitats would be limited given that the WEC would not directly obtain water from surface water bodies."

Suggested Wording: "...and habitats would be limited given that the WEC ~~would~~ **does** not directly obtain water from surface water bodies."

Justification: CFFF does not withdraw surface water. (42-12-1 [Malek, Elise])

Comment: Page: 3-54

Line: 32

Current Wording: "CFFF is not likely to adversely affect listed sturgeons species because..."

Suggested Wording: "CFFF is not likely to adversely affect listed sturgeons species because..."

Justification: Suggested correction for subject-verb agreement. (42-12-2 [Malek, Elise])

Comment: Page: 3-55

Line: 20

Current Wording: "in August 2019 of27..."

Suggested Wording: "in August 2019 of 27..."

Justification: Missing space between of and 27. (42-12-4 [Malek, Elise])

Comment: Page: 3-55

Line: 21-22

Current Wording: "...around the discharge pipe and concluded that both uranium..."

Suggested Wording: "...around the discharge pipe **into the Congaree River** and concluded that both uranium..."

Justification: For clarification. (42-12-5 [Malek, Elise])

Comment: Page: 3-55

Line: 31

Current Wording: "The NRCs radiation protection..."

Suggested Wording: "The NRC's radiation protection..."

Justification: In this use, NRC is showing possession and should have an apostrophe. (42-12-6 [Malek, Elise])

Comment: Page: 3-70

Line: 25

Current Wording: "and the WEC.."

Suggested Wording: "and the ~~WEC~~ **CFFF**"

Justification: Clarification. (42-12-10 [Malek, Elise])

Comment: Page: 3-73

Line: 1

Current Wording: "...sensitive receptors (e.g., schools, hospitals, etc.) in nearby."

Suggested Wording: "...sensitive receptors (e.g., schools, hospitals, etc.) ~~in~~ nearby."

Justification: Extra word. (42-12-13 [Malek, Elise])

Comment: Page: 3-74

Line: 4

Current Wording: "...South Carolina Electric and Gas, on approximately 2.8 ha..."

Suggested Wording: "...South Carolina Electric and Gas Dominion Energy, on approximately 2.8 ha..."

Justification: Dominion Energy bought SCE&G. (42-13-1 [Malek, Elise])

Comment: Page: 3-79

Line: 40

Current Wording: "The WEC has established procedures and..."

Suggested Wording: "The ~~WEC~~ **CFFF** has established cultural resources procedures and..."

Justification: For clarification. (42-13-5 [Malek, Elise])

Comment: Page: 3-96

Line: 30

Current Wording: "..held by the WEC.."

Suggested Wording: "..held by the WEC **for CFFF**"

Justification: Clarification. (42-13-10 [Malek, Elise])

Comment: Page: 3-100

Line: 14

Current Wording: "The WEC has approximately.."

Suggested Wording: "The ~~WEC~~ **CFFF** has approximately.."

Justification: Clarification. (42-13-12 [Malek, Elise])

Comment: Page: 3-101

Line: 24

Current Wording: "..generated by the WEC.."

Suggested Wording: "..generated by the WEC **at CFFF**.."

Justification: Clarification. (42-13-13 [Malek, Elise])

Comment: Page: 3-102

Line: 37-38

Current Wording: "The WEC is a large-quantity generator of hazardous wastes that include degreasing solvents, lubricating and cutting oils, spent plating solutions, and zirconium-laden wastes."

Suggested Wording: "The ~~WEC~~ **CFFF** is a large-quantity generator of hazardous wastes that include degreasing solvents, lubricating and cutting oils, ~~spent plating solutions~~, and zirconium-laden wastes."

Justification: On-site plating operations were discontinued in February 2020. (42-14-4 [Malek, Elise])

Comment: Page: 3-103

Line: 43

Current Wording: "The WEC has seen.."

Suggested Wording: "The ~~WEC~~ **CFFF** has seen..."

Justification: Clarification. (42-14-6 [Malek, Elise])

Comment: Finally, line 33 on page 3-65 should read "During October 2015 flooding event..." (43-3 [Stangler, Bill])

Response: *Suggested editorial changes or suggestions for clarification have been reviewed and incorporated, as appropriate, in the EIS.*

Table D-4 provides an index of the comment category, and commenters that had a comment specific to that category. Comments by commenters are listed here with correspondence ID as identified in Table D-1, and the corresponding and the comment number identified within that correspondence.

Table D-4 Index of Comment Categories with Associated Commenters and Comment IDs

Comment Category	Commenter (Comment ID)
Accidents-Severe	<ul style="list-style-type: none"> • Clements, Tom (9-3-19) (9-5-16) • Irick, Karen (35-6) • Kirkland, Mary (35-6) • Reese, Robert (35-6) • Singleton, Raymond (24-2) • Taylor, Ken (41-1-3) • Woods, Felicia (35-6)
Alternatives	<ul style="list-style-type: none"> • Anderson, Shirle (48-3-1) • Anonymous, Anonymous (18-1) • Blackwell, Majken (5-1) • Brawley, Wendy (25-1) • Brown, Andre (48-4-1) • Brown, Erniko (1-20-7) • Clements, Tom (1-10-2) (1-10-3) (9-1-17) (9-1-19) (9-1-20) (9-2-2) (9-2-3) (9-2-4) (9-2-5) (9-2-11) (9-2-19) (9-3-9) (9-4-13) (9-4-14) (9-6-7) • Cooper, Ira (36-1) • Cothran, Penny (7-1) • Fite, Mark (34-2-1) • Fleming, Jory (33-4) • Ghanem, Sahar (39-2) (39-4) • Gifford, Grace (32-4) • Gossett, Charles (46-1) • Greenlaw, Pamela (1-7-2) (1-7-4) (1-7-7) (1-7-11) (17-2) (17-9) (17-10) (17-11) (17-12) • Grego, John (11-1) (11-14) (11-16) • Hendley, Viola (45-1) • Hutchinson, Marc (8-1) • Irick, Karen (1-19-1) (1-19-2) (35-3) (35-4) (35-14) • Johnson, Jermaine (1-5-1) (1-5-3) (1-5-4) • Judge, Christopher (1-12-6) (12-7) • Kirkland, Mary (1-22-3) (1-22-4) (1-22-5) (35-3) (35-4) (35-14) • Lee, Rick (26-1) (26-3) • McRant, Ella (48-16-1) • Mitchum, Chief Michelle (1-3-8) • Newton, Chakisse (1-6-1) • Parnell, Claudia (27-1) • Plauche, Mary (39-2) (39-4) • Reese, Robert (1-17-6) (1-17-8) (35-3) (35-4) (35-14) • Singleton, Raymond (24-3) • Stangler, Bill (19-1) (19-2) (19-3) (19-4) • Stanley, Joyce (21-2) • Volskay, Ted (30-1) (30-2) (30-4)

Comment Category	Commenter (Comment ID)
	<ul style="list-style-type: none"> Weems, Elizabeth (28-1) Wilson, Carletta (48-2-1) Witter, Patricia (48-1-1) (6-1) (6-2) Woods, Felicia (31-1) (31-11) (35-3) (35-4) (35-14) (50-1) (50-12)
Alternatives-No-Action	<ul style="list-style-type: none"> Grego, John (11-15) Mitchum, Chief Michelle (16-8) Preston, Priscilla (1-8-7) (40-5)
Benefit-Cost Balance	<ul style="list-style-type: none"> Fleming, Jory (33-2) (33-3) Ghanem, Sahar (39-14) Plauche, Mary (39-14)
Cumulative Impacts	<ul style="list-style-type: none"> Anonymous, Anonymous (48-10-3) Clements, Tom (1-10-5) (1-10-6) (49-2-1) (49-2-2) (49-2-3) (49-2-4) (49-2-5) (49-2-6) (49-2-7) (49-2-9) (49-2-10) (49-2-11) (49-2-12) (49-2-14) (49-2-16) (49-2-17) (49-2-18) (49-2-21) (49-2-23) (49-2-24) (49-3-1) (49-3-2) (9-1-1) (9-1-2) (9-1-3) (9-1-4) (9-1-5) (9-1-6) (9-1-9) (9-1-10) (9-1-11) (9-1-12) (9-1-15) (9-3-5) (9-3-6) (9-4-20) (9-5-18) (9-5-19) (9-6-1) (9-6-2) (9-6-3) (9-6-4) (9-6-5) (9-6-6) (9-6-8) Cothran, Penny (7-4) (7-10) Fite, Mark (34-1-1) (34-1-7) (34-1-8) Fleming, Jory (33-10) Fralix, Cassandra (4-1) Ghanem, Sahar (39-16) Gifford, Grace (1-11-1) (32-2) Greenlaw, Pamela (1-15-4) Hendley, Viola (45-3) Irick, Karen (35-5) (35-16) Kirkland, Mary (35-5) (35-16) Malek, Elise (42-1-6) McDaniel, Annie E (1-1-3) Mitchum, Chief Michelle (1-9-9) Plauche, Mary (39-16) Preston, Priscilla (1-8-4) (1-8-6) (40-4) Reese, Robert (1-17-3) (1-2-1) (1-2-2) (35-5) (35-16) Sanders, Virginia (1-13-4) (1-13-6) Stangler, Bill (43-1) Stanley, Joyce (21-5) Weems, Elizabeth (28-3) Williams, Joanne (3-1) Woods, Felicia (35-5) (35-16)
Decommissioning	<ul style="list-style-type: none"> Ghanem, Sahar (39-6) Malek, Elise (42-4-3) Mitchum, Chief Michelle (1-9-6) Overly, David (1-14-3) Plauche, Mary (39-6)
Ecology-Aquatic	<ul style="list-style-type: none"> Fleming, Jory (33-7) Ghanem, Sahar (39-13) Grego, John (11-13) Malek, Elise (42-11-11) (42-12-3) (42-12-7) Mitchum, Chief Michelle (1-9-3)

Comment Category	Commenter (Comment ID)
	<ul style="list-style-type: none"> • Plauche, Mary (39-13) • Riggin, Lorianne (47-1) (47-5) (47-6) • Stanley, Joyce (21-4) (21-6) (21-7) (21-18) (21-19) (21-20)
Ecology-Terrestrial	<ul style="list-style-type: none"> • Clements, Tom (9-3-7) (9-3-10) • May, Stephen (29-5) • Riggin, Lorianne (47-4) (47-7) (47-8) (47-9) • Stanley, Joyce (21-21)
Editorial Comments	<ul style="list-style-type: none"> • Fite, Mark (34-1-15) • Malek, Elise (42-1-8) (42-1-10) (42-10-2) (42-10-3) (42-10-4) (42-10-5) (42-10-15) (42-11-6) (42-11-7) (42-11-9) (42-11-10) (42-11-12) (42-11-13) (42-11-14) (42-11-15) (42-12-1) (42-12-2) (42-12-4) (42-12-5) (42-12-6) (42-12-10) (42-12-13) (42-13-1) (42-13-5) (42-13-10) (42-13-12) (42-13-13) (42-14-4) (42-14-6) (42-3-1) (42-3-2) (42-3-3) (42-3-4) (42-3-6) (42-3-9) (42-3-10) (42-3-11) (42-3-12) (42-3-13) (42-3-14) (42-3-15) (42-3-17) (42-4-11) (42-5-3) (42-5-4) (42-6-2) (42-6-8) (42-6-15) (42-6-16) (42-7-1) (42-7-2) (42-7-7) (42-7-8) (42-7-9) (42-7-14) (42-8-14) (42-9-8) (42-9-14) • Stangler, Bill (43-3) • Stanley, Joyce (21-27) • Taylor, Ken (41-1-12) (41-1-16) (41-2-1)
Environmental Justice	<ul style="list-style-type: none"> • Brown, Erniko (1-20-2) (1-20-6) (1-20-8) (1-20-9) • Clements, Tom (9-5-7) (9-5-8) (9-5-9) (9-5-10) (9-5-20) • Cothran, Penny (7-5) (7-6) • Fite, Mark (34-1-11) • Fleming, Jory (33-8) (33-9) • Greenlaw, Pamela (17-17) (17-18) (17-19) (17-20) • Grego, John (11-18) • Johnson, Alan (48-7-2) • Mitchum, Chief Michelle (1-18-3) (1-3-7) • Preston, Priscilla (40-6) (40-7) (40-8) • Reese, Robert (1-17-5) • Sanders, Virginia (1-13-5) (37-2) • Stanley, Joyce (21-26) • Woods, Felicia (31-8) (31-9) (50-9) (50-10)
Geology	<ul style="list-style-type: none"> • Fite, Mark (34-2-17) • Gifford, Grace (32-3) • Greenlaw, Pamela (17-14) • Malek, Elise (42-7-3) (42-7-4) (42-7-5) • Taylor, Ken (41-1-6)
Health-Nonradiological	<ul style="list-style-type: none"> • Greenlaw, Pamela (17-16) • Irick, Karen (35-9) • Kirkland, Mary (35-9) • Reese, Robert (35-9) • Woods, Felicia (35-9)
Health-Radiological	<ul style="list-style-type: none"> • Anonymous, Anonymous (48-10-2) • Brawley, Wendy (25-5) • Clements, Tom (9-5-21) • Fite, Mark (34-1-17) • Gifford, Grace (1-11-2) • May, Stephen (29-4)

Comment Category	Commenter (Comment ID)
Historic and Cultural Resources	<ul style="list-style-type: none"> • Clements, Tom (9-3-2) (9-3-3) (9-5-5) (9-5-6) • Cothran, Penny (7-7) (7-8) (7-9) • Fite, Mark (34-1-9) (34-1-10) • Greenlaw, Pamela (17-21) • Grego, John (11-12) • Haire, Wenonah G. (13-2) (13-3) (13-4) (13-5) • Irick, Karen (35-11) (35-12) (35-13) • Johnson, Elizabeth M (20-1) (20-2) (20-3) (20-4) (20-5) (20-6) • Judge, Christopher (1-12-2) (1-12-3) (1-12-4) (1-12-5) (12-2) (12-3) (12-4) (12-5) (12-6) (12-9) (12-10) • Kirkland, Mary (35-11) (35-12) (35-13) • Malek, Elise (42-12-14) (42-13-2) (42-13-3) (42-13-4) (42-13-6) • Martin, Tracy (10-1) (10-2) (10-3) (10-4) (10-5) (10-6) (10-7) • Mitchum, Chief Michelle (1-18-2) (1-3-2) (1-3-3) (1-3-4) (1-3-5) (1-3-6) (1-3-10) (1-3-11) (16-3) (16-4) (16-5) (16-6) (16-7) (16-10) (16-11) • Preston, Priscilla (1-8-5) (40-3) • Reese, Robert (35-11) (35-12) (35-13) • Shepherd, Rebecca (10-1) (10-2) (10-3) (10-4) (10-5) (10-6) (10-7) • Stanley, Joyce (21-23) (21-24) (21-28) • Stewart, James (10-1) (10-2) (10-3) (10-4) (10-5) (10-6) (10-7) • Woods, Felicia (31-7) (35-11) (35-12) (35-13) (50-7)
Hydrology-Groundwater	<ul style="list-style-type: none"> • Clements, Tom (1-10-1) (1-10-4) (9-2-7) (9-2-8) (9-2-10) (9-4-6) (9-4-7) (9-4-8) (9-4-9) (9-4-10) (9-4-12) (9-4-16) (9-4-17) (9-5-1) (9-5-3) (9-5-4) (9-5-12) (9-5-13) • Fite, Mark (34-1-4) (34-1-12) (34-1-13) (34-1-14) (34-1-19) (34-2-4) (34-2-5) (34-2-7) (34-2-8) (34-2-9) (34-2-10) (34-2-11) (34-2-12) (34-2-14) (34-2-15) (34-2-16) • Fleming, Jory (33-5) (33-6) • Ghanem, Sahar (39-1) (39-7) (39-11) • Gossett, Charles (46-2) • Greenlaw, Pamela (17-15) • Grego, John (11-3) (11-4) (11-10) (11-11) • Harrison, James (23-5) • Malek, Elise (42-1-3) (42-1-4) (42-1-14) (42-1-15) (42-10-1) (42-10-6) (42-10-7) (42-10-10) (42-10-11) (42-10-12) (42-10-13) (42-10-14) (42-11-1) (42-11-2) (42-11-3) (42-11-4) (42-11-5) (42-11-8) (42-2-1) (42-2-2) (42-2-3) (42-2-4) (42-3-8) (42-4-9) (42-4-10) (42-5-10) (42-6-1) (42-6-9) (42-6-10) (42-6-11) (42-6-12) (42-6-13) (42-6-14) (42-9-2) (42-9-3) (42-9-4) (42-9-5) (42-9-6) (42-9-7) (42-9-9) (42-9-10) (42-9-11) (42-9-12) (42-9-13) (42-9-15) • May, Stephen (29-3) (29-8) • Mitchum, Chief Michelle (1-9-7) (1-9-8) • Overly, David (1-14-1) (1-4-2) (1-4-3) • Plauche, Mary (39-1) (39-7) (39-11) • Preston, Priscilla (1-8-2) • Sanders, Virginia (1-13-2) • Stanley, Joyce (21-1) (21-3) (21-11) (21-15) (21-16) (21-17) • Taylor, Ken (41-1-4) (41-1-5) • Volskay, Ted (30-3) • Weems, Elizabeth (28-2) • Woods, Felicia (31-3) (50-2)

Comment Category	Commenter (Comment ID)
Hydrology-Surface Water	<ul style="list-style-type: none"> • Fite, Mark (34-1-3) (34-1-5) (34-1-16) (34-1-18) (34-2-3) (34-2-6) (34-2-13) • Ghanem, Sahar (39-10) (39-12) • Grego, John (11-5) (11-6) • Harrison, James (23-2) (23-4) • Hendley, Viola (45-2) • Irick, Karen (35-10) • Kirkland, Mary (35-10) • Malek, Elise (42-1-11) (42-1-12) (42-1-13) (42-5-14) (42-7-6) (42-7-10) (42-7-11) (42-7-12) (42-7-13) (42-7-15) (42-8-1) (42-8-2) (42-8-3) (42-8-4) (42-8-5) (42-8-6) (42-8-7) (42-8-8) (42-8-9) (42-8-12) (42-8-13) (42-8-15) (42-8-16) (42-9-1) • Martin, Joy (22-2) • May, Stephen (29-2) • Overly, David (1-4-1) • Plauche, Mary (39-10) (39-12) • Reese, Robert (35-10) • Riggin, Lorianne (47-3) • Sanders, Virginia (1-13-1) • Stangler, Bill (43-2) • Stanley, Joyce (21-9) (21-10) (21-12) (21-13) (21-14) (21-22) • Taylor, Ken (41-1-2) • Woods, Felicia (35-10) (50-3)
Land Use	<ul style="list-style-type: none"> • Riggin, Lorianne (47-2) • Stanley, Joyce (21-8)
Meteorology and Air Quality	<ul style="list-style-type: none"> • Clements, Tom (9-3-20) • D'Arrigo, Diane (1-16-4) (1-16-5) • Malek, Elise (42-12-8) (42-12-9) (42-12-11) (42-14-2) (42-2-5) • Riggin, Lorianne (47-10) (47-11) (47-12) (47-13) • Taylor, Ken (41-1-7) (41-1-8) (41-1-9) (41-1-10) (41-1-11) (41-1-13) (41-1-14) (41-1-15) (41-1-17) (41-1-18) (41-1-19) (41-1-20) (41-2-2) (41-2-3) (41-2-4) (41-2-5) (41-2-6) (41-2-7) (41-2-8) (41-2-9) (41-2-10) (41-2-11) (41-2-14) (41-2-15)
Opposition-Licensing Action	<ul style="list-style-type: none"> • Alexander, Evelyn (48-20-1) • Anonymous, Anonymous (48-10-1) (48-10-4) • Anonymous, James (48-19-1) • Brawley, Wendy (25-2) (25-4) • Brown, Edward (48-17-1) • Brown, Erniko (1-20-1) • Carroll, Vivian (14-1) (14-2) • Clements, Tom (9-1-16) • Cothran, Penny (7-3) (7-11) • Eddy, Rosetta (48-11-1) • Gifford, Grace (32-1) • Grant, Rena (48-5-1) • Gray, Ellen (48-18-1) (48-18-2) • Greenlaw, Pamela (1-15-5) (17-4) (17-22) • Harrison, James (23-1) • Hightower, Louis (48-9-1) • Johnson, Alan (48-7-1)

Comment Category	Commenter (Comment ID)		
Outside Scope-Miscellaneous	<ul style="list-style-type: none"> • Martin, Joy (22-1) (22-3) • May, Stephen (29-7) (29-9) • Mayo, Michael (48-13-1) • Mitchum, Chief Michelle (1-18-4) (1-9-11) • Mosley, Johnny (48-8-1) • Preston, Priscilla (1-8-1) (1-8-3) (40-1) (40-2) • Raynor, Luby (48-12-1) • Reese, Robert (1-17-2) (1-17-7) • Sanders, Virginia (1-13-7) (37-1) (37-3) • Singleton, Raymond (24-1) (24-4) • Williams, Kathle (48-15-1) • Woods, Felicia (31-5) (31-6) (31-10) (50-5) (50-6) (50-11) 		
	<ul style="list-style-type: none"> • Anonymous, James (48-19-2) • Clements, Tom (49-2-15) (49-2-19) (49-2-20) (9-2-14) (9-2-15) (9-2-16) (9-2-18) (9-4-21) • D'Arrigo, Diane (1-16-2) • Davis, Ethel Lee (48-14-1) • Fralix, Cassandra (48-6-1) (48-6-2) (48-6-3) • Ghanem, Sahar (39-3) (39-5) • Greenlaw, Pamela (1-7-6) (1-7-8) (1-7-10) (17-7) (17-8) • Love, Sophia (44-1) • May, Stephen (29-6) • Mitchum, Chief Michelle (1-9-1) • Plauche, Mary (39-3) (39-5) • Reese, Robert (1-2-3) • Woods, Felicia (31-2) (31-4) (50-14) (50-15) 		
	Outside Scope-NRC Oversight	<ul style="list-style-type: none"> • Brawley, Wendy (25-3) • Clements, Tom (9-5-17) • Cothran, Penny (7-2) • D'Arrigo, Diane (1-16-3) • Greenlaw, Pamela (1-15-3) (17-3) (17-5) • Sanders, Virginia (1-13-3) 	
		Process-Licensing	<ul style="list-style-type: none"> • Brown, Erniko (1-20-3) (1-20-4) (1-20-5) • Clements, Tom (9-2-6) (9-2-9) (9-2-17) (9-3-4) (9-3-8) (9-3-18) (9-4-4) (9-4-19) (9-5-14) (9-5-15) • Ghanem, Sahar (39-8) (39-15) • Greenlaw, Pamela (1-15-1) (1-21-1) (1-7-3) (1-7-5) (1-7-9) (17-1) (17-6) (17-13) • Grego, John (11-2) (11-8) (11-9) (11-17) • Irick, Karen (35-1) (35-2) (35-7) (35-8) • Kirkland, Mary (1-22-1) (35-1) (35-2) (35-7) (35-8) • Malek, Elise (42-1-2) • May, Stephen (29-1) • Mitchum, Chief Michelle (1-18-1) • Newton, Chakisse (1-6-2) (1-6-3) • Overly, David (1-14-2) • Plauche, Mary (39-8) (39-15) • Reese, Robert (1-17-1) (1-17-4) (1-17-9) (35-1) (35-2) (35-7) (35-8) • Woods, Felicia (35-1) (35-2) (35-7) (35-8) (50-4) (50-8)

Comment Category	Commenter (Comment ID)
Process-NEPA	<ul style="list-style-type: none"> • Brawley, Wendy (15-1) • Clements, Tom (49-1-1) (49-1-2) (49-2-13) (9-1-7) (9-1-13) (9-1-14) (9-1-18) (9-2-1) (9-2-12) (9-2-20) (9-3-1) (9-4-11) (9-4-15) (9-4-18) (9-5-2) (9-5-11) (9-6-9) • D'Arrigo, Diane (1-16-1) • Fite, Mark (34-1-2) (34-1-6) • Fleming, Jory (33-1) • Ghanem, Sahar (39-9) • Gifford, Grace (32-5) • Greenlaw, Pamela (1-15-2) (1-7-1) (17-23) • Grego, John (11-7) • Haire, Wenonah G. (13-1) • Irick, Karen (35-15) • Johnson, Alan (48-7-3) • Johnson, Jermaine (1-5-2) • Judge, Christopher (1-12-1) (12-1) (12-8) (12-11) • Kirkland, Mary (1-22-2) (35-15) • McDaniel, Annie E (1-1-1) (1-1-2) • Mitchum, Chief Michelle (1-3-1) (1-9-2) (16-2) (16-9) • Newton, Chakisse (1-6-4) • Plauche, Mary (39-9) • Reese, Robert (35-15) • Woods, Felicia (35-15)
Site Layout and Design	<ul style="list-style-type: none"> • Clements, Tom (9-2-13) (9-3-14) (9-3-15) (9-3-16) (9-4-1) (9-4-2) • Lee, Rick (26-2) • Malek, Elise (42-1-1) (42-1-7) (42-1-9) (42-10-8) (42-10-9) (42-12-12) (42-13-7) (42-13-8) (42-13-9) (42-13-11) (42-14-1) (42-3-5) (42-3-7) (42-3-18) (42-3-19) (42-4-1) (42-4-2) (42-4-4) (42-4-5) (42-4-6) (42-4-8) (42-4-12) (42-4-13) (42-4-14) (42-5-1) (42-5-2) (42-5-5) (42-5-6) (42-5-7) (42-5-8) (42-5-9) (42-5-11) (42-5-12) (42-5-13) (42-5-15) (42-6-3) (42-6-4) (42-6-5) (42-6-6) (42-6-7) (42-8-10) (42-8-11)
Socioeconomics	<ul style="list-style-type: none"> • Harrison, James (23-3) • Mitchum, Chief Michelle (1-3-9) (1-9-10)
Soils	<ul style="list-style-type: none"> • Clements, Tom (9-4-5) • Fite, Mark (34-1-20) (34-2-2) • Mitchum, Chief Michelle (1-9-5)
Support-Licensing Action	<ul style="list-style-type: none"> • Lee, Rick (26-4) (26-5) • Malek, Elise (42-1-5) • McPherson, Susan (38-1) • Plowden III, Henry (2-1) • Taylor, Ken (41-1-1)
Transportation	<ul style="list-style-type: none"> • Clements, Tom (9-3-21) • Stanley, Joyce (21-25)
Waste Management	<ul style="list-style-type: none"> • Clements, Tom (49-2-8) (49-2-22) (9-1-8) (9-3-11) (9-3-12) (9-3-13) (9-3-17) (9-4-3) • Malek, Elise (42-14-3) (42-14-5) (42-3-16) (42-4-7) • Mitchum, Chief Michelle (1-9-4) (1-9-12) • Taylor, Ken (41-2-12) (41-2-13)

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BIBLIOGRAPHIC DATA SHEET

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8. PERFORMING ORGANIZATION - NAME AND ADDRESS (If NRC, provide Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)

Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above", if contractor, provide NRC Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address.)

Same as above

10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

The U.S. Nuclear Regulatory Commission (NRC) prepared this environmental impact statement (EIS) as part of its environmental review of the Westinghouse Electric Company, LLC (WEC) license renewal application to continue operating the Columbia Fuel Fabrication Facility (CFFF) for an additional 40 years. The CFFF is located in Hopkins, South Carolina, and has been operating since 1969. This EIS provides the NRC staff's evaluation of the potential environmental impacts of the proposed action, the no-action alternative, and a 20-year license renewal alternative. The proposed action is the renewal of the special nuclear material license SNM-1107 to allow the WEC to continue licensed operations and activities at the CFFF site for an additional 40 years. On June 5, 2020, the NRC staff decided to prepare an EIS because new information related to the WEC's remedial investigations being conducted under a Consent Agreement (CA) with South Carolina Department of Health and Environmental Control (SCDHEC) revealed uncertainty related to the source and extent of contamination onsite and the potential future migration pathways offsite and precluded the NRC staff from making a finding of no significant impact through the environmental assessment process. Based on its environmental review, the NRC staff recommends that the WEC's special nuclear material license SNM-1107 be renewed to allow WEC to continue operating the CFFF in Hopkins, South Carolina, for a term of 40 years.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

environment, environmental impact, cumulative, impacts, nuclear fuel fabrication facility, nuclear fuel, CFFF, license renewal, Westinghouse,

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**Environmental Impact Statement for the License Renewal of the Columbia
Fuel Fabrication Facility in Richland County, South Carolina**

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