RECORD OF DECISION
U.S. NUCLEAR REGULATORY COMMISSION
DOCKET NO. 50-382
LICENSE RENEWAL APPLICATION FOR
WATERFORD STEAM ELECTRIC STATION, UNIT 3

December 27, 2018

BACKGROUND

The U.S. Nuclear Regulatory Commission (NRC or Commission) received an application dated March 23, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML16088A331, ML16088A332, and ML16088A325), from Entergy Louisiana, LLC and Entergy Operations, Inc. (collectively referred to as Entergy) filed pursuant to Section 103 of the Atomic Energy Act of 1954, as amended, Title 10 of the *Code of Federal Regulations* (10 CFR) Part 51, "Environmental Protection Regulations For Domestic Licensing And Related Regulatory Functions," and 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," to renew the operating license for Waterford Steam Electric Station, Unit 3 (Waterford). As part of the Waterford license renewal application, Entergy submitted an environmental report (ADAMS Accession Nos. ML16088A326, ML16088A327, ML16088A328, ML16088A329, ML16088A333, and ML16088A335). The renewed operating license would authorize Entergy to operate Waterford for an additional 20-year period beyond that specified in the current operating license, until December 18, 2044.

Waterford is a two-loop pressurized-water reactor designed by Combustion Engineering. The plant is located on the west bank of the Mississippi River between Baton Rouge and New Orleans, near the communities of Killona and Taft, LA. Waterford began commercial operation in March 1985. The current operating license expires on December 18, 2024. The NRC issued the plant's original operating license on March 16, 1985, for a reactor core power level less than 3,390 megawatts thermal (MWt). In March 2002, the NRC amended Waterford's operating license to raise the reactor core power level to 3,441 MWt (ADAMS Accession No. ML020910734). In April 2005, the NRC amended the operating license again to raise the reactor core power level from 3,441 MWt to 3,716 MWt (ADAMS Accession No. ML051030082).

On April 14, 2016, the NRC published a notice of receipt of the license renewal application in the *Federal Register* (FR) (81 FR 22128). The NRC accepted Entergy's license renewal application for detailed technical and environmental review on May 31, 2016 (81 FR 34379). Section 102 of the National Environmental Policy Act of 1969, as amended (NEPA), directs that a detailed statement be prepared prior to taking major Federal actions significantly affecting the quality of the human environment. In accordance with the NRC's regulations in 10 CFR Part 51, the NRC prepares an environmental impact statement (EIS) for all nuclear power reactor license renewal applications, regardless of the action's environmental impact significance (10 CFR 51.20(b)(2)). In this instance, the NRC's major Federal action is to decide whether to renew the Waterford operating license for an additional 20 years.

The NRC staff published a notice of intent to prepare a supplemental environmental impact statement (SEIS) and to conduct scoping in the *Federal Register* (81 FR 36354) on June 6, 2016. In addition, Federal, State, and local agencies as well as Tribal governments were notified and asked to provide comment on and to participate in the environmental scoping process and review. On June 8, 2016, the NRC held a public scoping meeting at the St. Charles Parish Emergency Operations Center in Hahnville, LA to obtain public input on the

proper scope of the NRC's environmental review for the Waterford license renewal application. No comments from members of the public were presented at the scoping meeting. Additionally, the NRC received no written comments during the scoping period.

ENVIRONMENTAL IMPACT STATEMENT

In accordance with 10 CFR 51.95(c), "Operating License Renewal Stage," the NRC staff documents its environmental review for a license renewal application and publishes it as a site-specific supplemental environmental impact statement (called the SEIS) to NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (usually called the GEIS). The GEIS documents the results of the NRC's systematic approach to evaluating the environmental consequences of issuing renewed operating licenses of nuclear power plants authorizing an additional 20 years of operation beyond the end of the current license term.

The GEIS serves to facilitate the NRC's environmental review process for license renewal by identifying and evaluating environmental impacts that are considered generic and common to all nuclear power plants (Category 1 issues). For Category 1 issues, no additional site-specific analysis is required in the site-specific SEIS unless new and significant information is identified that would change the conclusions in the GEIS. The GEIS also identifies site-specific issues (Category 2 issues). For Category 2 issues, an additional site-specific review is required, and the NRC staff documents the results in the SEIS.

The NRC established a standard of significance for each NEPA issue evaluated in the GEIS based on the Council on Environmental Quality regulations on how to evaluate significance (see Title 40, "*Protection of Environment*," of the *Code of Federal Regulations* (40 CFR) 1508.27, "Significantly"). Since the significance and severity of an impact can vary with the setting of the proposed action, the NRC considered both "context" and "intensity" as defined in Council on Environmental Quality regulations at 40 CFR 1508.27. Context is the geographic, biophysical, and social context in which the effects will occur. In the case of license renewal, the context is the environment surrounding the nuclear power plant. Intensity refers to the severity of the impact in whatever context it occurs. Based on this, the NRC established a three-level standard of significance for potential impacts, SMALL, MODERATE, and LARGE, as defined below.

> SMALL: Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
>
> MODERATE: Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
>
> LARGE: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Entergy submitted its license renewal application and environmental report under the NRC's 2013 revised rule governing license renewal environmental reviews, as codified in 10 CFR

Part 51.[1] The 2013 GEIS[2] provided the technical bases for the list of NEPA issues and associated environmental impact findings for license renewal that were contained in Table B–1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants," in Appendix B to subpart A of 10 CFR Part 51.

The NRC issued a draft SEIS as draft Supplement 59, "Regarding Waterford Steam Electric Station, Unit 3," to NUREG-1437 for public comment on August 15, 2018 (ADAMS Accession No. ML18227A028). A 45-day comment period began on August 23, 2018, when the U.S. Environmental Protection Agency (EPA) published a Notice of Availability in the *Federal Register* (83 FR 42892) of the draft SEIS to allow members of the public and agencies time to comment on the results of the environmental review. The NRC did not hold a public meeting to discuss the draft SEIS. Appendix A to the final SEIS (Supplement 59 to NUREG-1437) contains a discussion of the comments that the NRC received during the comment period.

During the Waterford license renewal process, neither Entergy nor the NRC staff identified information that is both new and significant related to Category 1 issues (generic issues common to all nuclear power plants) that would call into question the conclusions in the GEIS. This conclusion of no new and significant information is supported by the NRC staff's review of Entergy's environmental report and other documentation relevant to Entergy's activities; consideration of public comments received during the draft SEIS comment period; consultation with Federal, State, and local agencies as well as Tribal representatives; and the findings from the NRC staff's environmental site audit at Waterford. The NRC received no public comments during the scoping period.

The NRC issued the site-specific final SEIS in support of the Waterford license renewal application on November 20, 2018 as Supplement 59 to NUREG-1437 (ADAMS Accession No. ML18323A103). In the final SEIS, the NRC staff concluded that the adverse environmental impacts of issuing a renewed operating license for Waterford are not so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable.

On November 23, 2018, the U.S. Environmental Protection Agency (EPA) issued the Notice of Availability for the final SEIS for the Waterford license renewal application (83 FR 59377). During the 30 days following publication of the notice, the NRC received no comments on the final SEIS.

Pursuant to 10 CFR 51.102(b) and 51.103(a)(1)–(5), the NRC staff has prepared this concise public Record of Decision to document its action on the Waterford license renewal application. In accordance with 10 CFR 51.103(c), this record of decision incorporates by reference the materials contained in the final SEIS.

DECISION

Pursuant to 10 CFR 54.29, "Standards for Issuance of a Renewed License," the Commission may issue a renewed license if the Commission finds that the license renewal application

[1] 78 FR 37281. U.S. Nuclear Regulatory Commission. Final Rule, "Revisions to Environmental Review for Renewal of Nuclear Power Plant Operating Licenses." Federal Register 78 Fed. Reg. 37,281. June 20, 2013

[2] U.S. Nuclear Regulatory Commission. 2013. NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," Rev. 1, Vols. 1-3 (ADAMS Accession Nos. ML13106A241, ML13106A242, and ML13106A244). June 2013.

satisfies the requirements in 10 CFR Part 54, and the applicable requirements of Subpart A—"National Environmental Policy Act—Regulations Implementing Section 102(2)," of 10 CFR Part 51 have been satisfied.

In making its final decision on the Waterford license renewal application, the NRC must make a favorable safety finding. The purpose of the NRC's safety review of a license renewal application is to determine if the applicant has adequately demonstrated that the effects of aging will not adversely affect any safety structures or components as specified in 10 CFR 54.4, "Scope," and 10 CFR 54.21. "Contents of Application—Technical Information." The applicant must demonstrate that the effects of aging will be adequately managed so that the intended functions of systems, structures and components within the scope of license renewal will be maintained in accordance with the plant's current licensing basis throughout the license renewal period. The NRC staff documented the results of its safety review of the Waterford license renewal application in "Safety Evaluation Report Related to the License Renewal of Waterford Steam Electric Station Unit 3," issued in August 2018 (ADAMS Accession No. ML18228A668). By letter dated November 21, 2018, the Advisory Committee on Reactor Safeguards (ACRS) notified the Commission of the ACRS's recommendation to approve the Waterford license renewal application (ADAMS Accession No. ML18325A080).

This Record of Decision and the final SEIS (Supplement 59 to NUREG-1437), which is incorporated by reference herein, document the NRC's final decision for the environmental review of the Waterford license renewal application that the adverse environmental impacts of license renewal for Waterford are not so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable (see 10 CFR 51.103(a)(5)). The renewed operating license (ADAMS Accession No. ML18275A133) authorizes Entergy to continue operating Waterford for an additional 20 years beyond the expiration of the current operating license, as requested in the license renewal application.

PURPOSE AND NEED

As identified in Section 1.2, "Purpose and Need for Proposed Federal Action," of the final SEIS (Supplement 59 to NUREG-1437), the purpose and need for the proposed action (issuance of a renewed license) is to provide an option that allows for power generation capability beyond the term of the current Waterford operating license in order to meet future system generating needs. Such needs may be determined by energy-planning decisionmakers, such as States, utilities, and, where authorized, Federal agencies (other than the NRC). This definition of purpose and need reflects the NRC's recognition that, unless there are findings in the safety review required by the Atomic Energy Act of 1954, as amended, or findings in the NEPA environmental analysis that would lead the NRC to reject a license renewal application, the NRC does not have a role in the energy-planning decisions as to whether a particular nuclear power plant should continue to operate.

Ultimately, the appropriate energy-planning decisionmakers and Entergy will decide whether Waterford will continue to operate based on the need for power or other factors within the State's jurisdiction or under the purview of the owners (Entergy).

NRC EVALUATON OF THE PROPOSED ACTION AND ALTERNATIVES

In license renewal environmental reviews, the NRC staff considers the environmental consequences of the proposed action, the no-action alternative, and various alternatives for replacing the nuclear power plant's generating capacity. Section 102(2)(C)(iii) of NEPA and the

NRC's regulations require the NRC to consider alternatives to the proposed action (license renewal) and to document this in an EIS. The proposed action is issuance of a renewed operating license for Waterford, which will authorize Entergy to operate the plant for an additional 20-year period beyond the expiration date of the current license. In the final SEIS, Chapter 2, "Alternatives Including the Proposed Action," and Chapter 4, "Environmental Consequences and Mitigating Actions," present the NRC staff's evaluation and analysis of the environmental impacts of the proposed action and alternatives to license renewal. The evaluation considered environmental impacts of each alternative across the following impact areas: land use and visual resources, air quality and noise, geologic environment, water resources, terrestrial resources, aquatic resources, special status species, historic and cultural resources, socioeconomics, human health, environmental justice, and waste management.

As explained in the purpose and need for the proposed Federal action, outside of the safety and environmental reviews the NRC does not have a role in the energy planning decisions as to whether a particular nuclear power plant should continue to operate. Should the operating license not be renewed and the nuclear plant shuts down at the end of its current license, the appropriate energy planning decisionmakers will decide how best to replace the nuclear power plant's generating capacity.

In evaluating alternatives to license renewal, the NRC considered energy technologies or options currently in commercial operation, as well as technologies not currently in commercial operation but likely to be commercially available by the time the current Waterford operating license expires. The current operating license for Waterford expires on December 18, 2024, and, therefore, to be considered in this evaluation, reasonable alternatives must be available (i.e., constructed, permitted, and connected to the grid) by that time.

The NRC staff initially considered 17 various alternatives to license renewal and continued operation of Waterford. The staff eliminated 13 of these alternatives from detailed study because of technical, resource availability, or commercial limitations that currently exist and that the NRC staff believes are likely to continue to exist when the current Waterford license expires in December 2024. These limitations render the 13 alternatives not feasible or commercially viable. The 13 alternatives considered and eliminated from detailed study include the following:

- solar power
- wind power
- biomass
- demand-side management
- hydroelectric power
- geothermal power
- fuel cells
- wave and ocean energy
- municipal solid waste
- petroleum-fired power
- coal-integrated gasification combined-cycle

- delayed retirement
- purchased power

Chapter 2 of the final SEIS (Supplement 59 to NUREG-1437) briefly describes each of the alternatives eliminated from detailed study and the basis for its removal.

The NRC staff analyzed in detail four alternatives to license renewal as well as the no-action alternative (not renewing the Waterford operating license). Table 2–1 of the final SEIS summarizes the impacts of all the alternatives that the NRC staff considered in detail. The alternatives the NRC staff considered in-depth include the following:

- new nuclear
- supercritical pulverized coal
- natural gas combined cycle
- combination alternative (natural gas combined cycle, biomass, and demand side management)

The impacts of each of these replacement power alternatives are discussed in Chapter 4 and summarized in Table 2-2 of the final SEIS. Table 2-2 of the final SEIS is reproduced later in this ROD. In the final SEIS, the NRC staff evaluated the environmental impacts of each of the alternatives considered in depth and compared those impacts to the environmental impacts of the proposed license renewal action.

ALTERNATIVE EVALUATION

i. No-Action Alternative

The no-action alternative, in which the NRC decides not to issue a renewed operating license for Waterford, refers to a scenario that allows the current operating license to expire at the end of the current license term in 2024. Under the no-action alternative, the nuclear plant will shut down at or before the end of the current license. For the no-action alternative, the NRC staff evaluated the impacts that arise directly from plant shutdown. After shutdown, the plant operators will initiate decommissioning in accordance with 10 CFR 50.82, “Termination of License.” The separate environmental impacts from decommissioning and related activities are addressed in other NRC NEPA documents, which either directly address or bound the environmental impacts of decommissioning whenever Entergy ceases to operate Waterford, whether at the end of the current license term or at the end of the renewed license term.

Assuming that a need currently exists for the power generated by Waterford, the no-action alternative would require the appropriate energy-planning decisionmakers (a group which does not include the NRC) to rely on alternatives to replace the capacity of Waterford, to rely on energy conservation or power purchases to offset the Waterford capacity, or to rely on some combination of measures to offset and replace the generation provided by the facility. Therefore, the no-action alternative, by itself, does not satisfy the purpose and need for the proposed action of Waterford license renewal, as it neither provides power-generation capacity nor meets the needs currently met by Waterford or that the alternatives evaluated in detail would satisfy. Therefore, the environmental review includes a comparison of the environmental impacts of license renewal with impacts of the range of energy sources that may be chosen in the case of not renewing the Waterford operating license.

ii. Alternative Energy Sources

This section describes the four alternatives considered in detail in the final SEIS (Supplement 59 to NUREG-1437).

New Nuclear Alternative

For the new nuclear alternative, the NRC staff assumes that a new nuclear reactor would be constructed and operated on the Entergy Louisiana, LLC, property, allowing for the maximum use of existing ancillary facilities at those locations, such as support buildings and transmission infrastructure. This analysis assumes the replacement reactor would be a pressurized water reactor of the Westinghouse AP1000 reactor design with an approximate net electrical output of 1,200 MWe. The analysis assumes that the heat rejection demands of a new nuclear reactor would be similar to those of the current Waterford plant and, unlike Waterford's existing once-through cooling system, the new reactor would use a mechanical draft closed-cycle cooling system. The NRC staff has determined that the environmental impacts for this alternative would be SMALL for land use, visual resource, air quality, noise, geologic environment, surface water resource, groundwater resource, terrestrial resource, aquatic resource, human health, and waste management and pollution prevention.

The environmental impacts on socioeconomic resources would range from SMALL to LARGE. Given the number of workers needed for construction, socioeconomic impacts in local communities could range from MODERATE to LARGE. Given the number of operations workers and economic benefits from increased income and tax revenue generated by the purchase of goods and services required to operate the nuclear power plant, socioeconomic impacts during NGCC power plant operations on local communities could range from SMALL to MODERATE.

The environmental impacts on transportation would range from SMALL to LARGE. Traffic-related transportation impacts during construction could range from MODERATE to LARGE, while traffic-related transportation impacts during operations would be SMALL to MODERATE.

Supercritical Pulverized-Coal Alternative

For this alternative, the NRC staff evaluated the construction and operation of two supercritical pulverized coal (SCPC) units, each with a net capacity of 600 MWe. The hypothetical SCPC alternative would be located at a site other than Waterford because of space constraints. If constructed, the NRC assumes that the SCPC site would be located within the Southeast Electric Reliability Corporation region of Louisiana, and that the site would have sufficient previously disturbed land, be located adjacent to a rail line or waterway capable of supporting delivery of coal, and at or near a geologic formation capable of storing carbon emissions. The NRC staff determined that the environmental impacts for this alternative would be SMALL for noise, geologic environment, groundwater, and human health.

The environmental impacts for land use would be SMALL to MODERATE for both construction and operation. Construction impacts on land uses could range from SMALL, if the chosen site has enough previously disturbed industrial-use land, to MODERATE if additional non-industrial areas are cleared and converted to industrial use. During operation, offsite land uses could be altered as a result of coal mining and waste disposal resulting in impacts ranging from SMALL to MODERATE.

The environmental impacts on visual resources could range from SMALL to MODERATE because of the uncertainty regarding the exact location of the alternative and the corresponding sensitivity of the surrounding viewshed.

The environmental impacts on air quality would be SMALL to MODERATE as a result of the significant criteria air emissions (nitrogen oxides and particulate matter) and greenhouse gas (GHG) emissions associated with operation of this alternative.

The environmental impacts on surface water would be SMALL to MODERATE based on the potential for additional hydrologic alteration and potential water quality impacts from coal and ash handling and management and high makeup water demand for operations.

The environmental impacts on terrestrial resources would be SMALL to MODERATE depending on site-specific species and habitat impacts of constructing and operating this alternative

The environmental impacts on aquatic resources would be SMALL to MODERATE. Construction impacts would be SMALL if the new facility is built in a manner and location that avoids aquatic habitats and minimizes habitat degradation but could be MODERATE if the new units or the associated infrastructure result in direct mortality of aquatic organisms or noticeably degrade aquatic habitats. Without knowing the location of the SCPC plant, the aquatic impacts due to the operation of this alternative could range from SMALL to MODERATE.

The environmental impacts on the socioeconomic resources would range from SMALL to LARGE. Given the number of workers needed for construction, socioeconomic impacts in local communities could range from MODERATE to LARGE. Given the number of workers during operation, socioeconomic impacts on local communities could range from SMALL to MODERATE.

The environmental impacts on transportation would range from SMALL to LARGE. Traffic-related transportation impacts during construction could range from MODERATE to LARGE. Traffic-related transportation impacts during operations could range from SMALL to MODERATE.

The environmental impacts on waste management and pollution prevention would be MODERATE. Based on the large volume of waste generated and its toxicity, the impacts from waste generated at a coal-fired plant would be MODERATE.

Natural Gas Combined-Cycle Alternative

For the natural gas-fired combined-cycle alternative, the NRC staff evaluated the construction and operation of an NGCC facility with two units each with a capacity of 600 MWe. The NRC staff assumed the combined-cycle units would use a closed-cycle cooling system with mechanical draft cooling towers. Compared to simple-cycle combustion turbines, combined-cycle plants are significantly more efficient, and thus provide electricity at lower costs. Because of the high overall thermal efficiency of this type of plant, the NGCC alternative would require less cooling water than Waterford. The NRC staff determined that the environmental impacts for this alternative would be SMALL for land use, visual resource, noise, geologic environment, surface water resource, groundwater resource, aquatic resource, human health, and waste management and pollution prevention.

The environmental impacts on air quality would range from SMALL to MODERATE. Based on the air emission estimates, nitrogen oxide and GHG emissions would be noticeable and significant. Carbon dioxide emissions would be much larger than the threshold in the U.S. Environmental Protection Agency's GHG Tailoring Rule, and nitrogen oxide emissions

would exceed the threshold for major sources subject to Title V permitting. Therefore, the overall air quality impacts associated with operation of an NGCC alternative would be SMALL to MODERATE.

The environmental impacts on terrestrial resources would be SMALL to MODERATE. For construction, the industrialized nature of the proposed site for this alternative and the low likelihood for wetlands or other previously undisturbed habitats to be affected, the terrestrial impacts would be SMALL.

The environmental impacts on socioeconomic resources would range from SMALL to LARGE. Given the number of workers needed for construction, socioeconomic impacts in local communities could range from MODERATE to LARGE. Given the number of operations workers, socioeconomic impacts during NGCC power plant operations on local communities could range from SMALL to MODERATE.

The environmental impacts on transportation would range from SMALL to LARGE. Traffic-related transportation impacts during construction could range from MODERATE to LARGE. Given the relatively small number of operations workers, transportation impacts would be SMALL during power plant operations.

Combination Alternative (Natural Gas Combined Cycle, Biomass, and Demand-Side Management)

This alternative combines natural gas and biomass replacement power generation with energy efficiency measures. The NRC staff assumes that this alternative would be composed of approximately 600 MWe from a natural gas combined-cycle facility, 160 MWe from biomass-fired units, and 440 MWe of energy savings from energy efficiency initiatives (i.e., demand-side management) within the region of influence. The NRC staff assumes that both the natural gas combined-cycle and biomass-fired portions of this alternative would be located on previously disturbed land within Entergy Louisiana, LLC property, and would use existing available site infrastructure to the extent practicable.

The NRC staff determined that the environmental impacts for this alternative would be SMALL for land use, visual resource, noise, geologic resource, surface water resource, groundwater resource, aquatic resource, socioeconomics, human health, and waste management and pollution prevention.

The environmental impacts on air quality would be SMALL to MODERATE. Construction-related impacts on air quality from the NGCC and biomass portion of the combination alternative would be SMALL. Based on the air emission estimates for operations, nitrogen oxide, carbon monoxide, and GHG emissions would be noticeable and significant. Carbon dioxide emissions would be much larger than the threshold in EPA's GHG Tailoring Rule, and nitrogen oxide emissions would exceed the threshold for major sources subject to Title V permitting. The air quality impacts associated with operation of the combination alternative would be MODERATE.

The environmental impacts on terrestrial resources would be SMALL to MODERATE. For construction, due to the industrialized nature of the proposed site for this alternative and the low likelihood for wetlands or other previously undisturbed habitats to be affected, the terrestrial impacts would be SMALL.

The environmental impacts on transportation would be SMALL to MODERATE. Transporting heavy and oversized components on local roads could have a noticeable impact over a large area. Traffic-related transportation impacts during construction could range from SMALL to MODERATE in the vicinity of the NGCC power plant and biomass power plant units, depending on current road capacities and average daily traffic volumes. During operations, transportation impacts from the NGCC and biomass portions of the combination alternative would be less noticeable than during construction and would be SMALL.

Summary

In the final SEIS for the Waterford license renewal (Supplement 59 to NUREG-1437), the NRC staff considered the environmental impacts associated with license renewal and with alternatives to license renewal. Alternatives to license renewal include alternate methods of replacement power generation and not renewing the Waterford operating license (the no-action alternative). The final SEIS concluded that the continued operation of Waterford during the license renewal term would have SMALL environmental impacts in all areas. The final SEIS concluded that the environmental impacts of issuing a renewed operating license for Waterford would be smaller than those of the feasible and commercially viable replacement power alternatives considered. The final SEIS concludes that under the no-action alternative, the act of shutting down Waterford would have SMALL impacts, except socioeconomic impacts would be SMALL to MODERATE. However, the no action alternative shutdown would necessitate the implementation of one or a combination of alternatives in order to make up for the loss of power generation. Therefore, the NRC staff concluded that continued operation of Waterford is the environmentally preferred alternative.

Summary of Environmental Impacts of the Proposed Action and Alternatives

Impact Area (Resource)	WF3 License Renewal (Proposed Action)	No-Action Alternative	New Nuclear Alternative	SCPC Alternative	NGCC Alternative	Combination Alternative (NGCC, Biomass, and DSM)
Land Use	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL
Visual Resources	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL
Air Quality	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Noise	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Geologic Environment	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Surface Water Resources	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL
Groundwater Resources	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Terrestrial Resources	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Aquatic Resources	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL

Summary of Environmental Impacts of the Proposed Action and Alternatives

Special Status Species & Habitats	SEE NOTE[a]	SEE NOTE[b]	SEE NOTE[b]	SEE NOTE[b]	SEE NOTE[b]	SEE NOTE[b]
Historic and Cultural Resources	SEE NOTE[c]	SEE NOTE[d]	SEE NOTE[e]	SEE NOTE[f]	SEE NOTE[e]	SEE NOTE[e]
Socioeconomics	SMALL	SMALL to MODERATE	SMALL to LARGE	SMALL to LARGE	SMALL to LARGE	SMALL
Transportation	SMALL	SMALL	SMALL to LARGE	SMALL to LARGE	SMALL to LARGE	SMALL to MODERATE
Human Health	SMALL[g]	SMALL[g]	SMALL[g]	SMALL[g]	SMALL[g]	SMALL[g]
Environmental Justice	SEE NOTE[h]	SEE NOTE[i]	SEE NOTE[j]	SEE NOTE[j]	SEE NOTE[j]	SEE NOTE[j]
Waste Management and Pollution Prevention	SMALL[k]	SMALL[k]	SMALL	MODERATE	SMALL	SMALL

[a] The NRC staff concludes that the proposed WF3 license renewal may affect, but is not likely to adversely affect, the pallid sturgeon. The proposed action would have no effect on essential fish habitat.

[b] The types and magnitudes of adverse impacts to species listed in the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.); designated critical habitat; and essential fish habitat would depend on shutdown activities, the proposed site, plant design, and operation, as applicable, and on listed species and habitats present when the alternative is implemented. Therefore, the NRC cannot forecast a particular level of impact for this alternative.

[c] Based on (1) the location of NRHP-eligible historic properties within the area of potential effect, (2) tribal input, (3) Entergy's cultural resource protection plans, (4) the fact that no license renewal-related physical changes or ground-disturbing activities would occur, (5) State Historic Preservation Office input, and (6) cultural resource assessment, license renewal would not adversely affect any known historic properties (36 CFR 800.4(d)(1)).

[d] Until the Post-Shutdown Decommissioning Activities Report is submitted, the NRC staff cannot determine whether land disturbance would occur outside the existing operational areas after the nuclear plant is shut down.

[e] This alternative would not adversely affect known historic properties.

[f] The extent of impact on historic and cultural resources would depend on the resource richness of the land acquired for an SCPC power plant, and would depend on the specific location, plant design, and operational characteristics of the new SCPC power plant. Therefore, it cannot be determined whether this alternative would result in adverse impacts to historic properties.

[g] The impacts on human health from chronic effects of electromagnetic fields are categorized as UNCERTAIN.

[h] There would be no disproportionately high and adverse impacts to minority and low-income populations.

[i] The reduction in tax revenue resulting from the no-action alternative would decrease the availability of public services in St. Charles Parish. This could disproportionately affect minority and low-income populations that may have become dependent on these services.

[j] Based on the analysis of human health and environmental impacts presented in this SEIS, this alternative would not likely have disproportionately high and adverse human health and environmental effects on minority and low-income populations. However, this determination would depend on the location, plant design, and operational characteristics of the alternative. Therefore, it cannot be determined whether this alternative would result in disproportionately high and adverse human health and environmental effects on minority and low-income populations.

[k] The environmental impact of spent fuel storage for the timeframe beyond the licensed life for reactor operations is discussed in NUREG–2157, *Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel* (NRC 2014).

Endangered Species Act (ESA) Section 7 Consultation

As discussed in Appendix C, "Consultation Correspondence," Section C.3, "Chronology of ESA Section 7 Consultation," of the final SEIS, the NRC staff conducted consultation under Section 7 of the Endangered Species Act (ESA) of 1973, as amended, with the U.S. Fish and Wildlife Service (FWS). The NRC staff prepared a biological evaluation to address potential impacts to three federally listed species: gulf subspecies of Atlantic sturgeon (*Acipenser oxyrinchus desotoi*), pallid sturgeon (*Scaphirhynchus albus*), and West Indian manatee (*Trichechus manatus*). In its evaluation, the staff concluded that license renewal would have no effect on the gulf subspecies of Atlantic sturgeon and West Indian manatee and that license renewal may affect, but is not likely to adversely affect the pallid sturgeon. The NRC staff requested the FWS's concurrence with its "not likely to adversely affect" determination for pallid sturgeon in a letter dated July 5, 2017 (ADAMS Accession No. ML17163A168). By letter dated November 20, 2017 (ADAMS Accession No. ML17331A541), the FWS concurred with the staff's determination. The FWS's concurrence letter concluded consultation, and the letter documents that the NRC staff has fulfilled its ESA Section 7(a)(2) obligations with respect to the proposed Waterford license renewal.

As discussed in Appendix C, "Consultation Correspondence," Section C.3, "Chronology of ESA Section 7 Consultation," no Federally listed species or critical habitats under National Marine Fisheries Service's jurisdiction occur within the action area. Therefore, the NRC did not engage the National Marine Fisheries Service pursuant to ESA Section 7 for the proposed Waterford license renewal.

MITIGATION MEASURES

The NRC has taken all practicable measures within its jurisdiction to avoid or minimize environmental harm from the proposed action (license renewal). As stated in Chapter 5 of the final SEIS, the NRC staff considered mitigation measures for each applicable Category 2 issue, and concluded that no additional mitigation measures are warranted.

The NRC is not imposing any license conditions beyond the standard conditions for renewed licenses (i.e., that the Updated Final Safety Analysis Report (UFSAR) Supplement will be updated in accordance with 10 CFR 50.71(e) to reflect the revisions and commitments associated with renewal of the license, and that the UFSAR Supplement describes the programs and activities to be implemented prior to the period of extended operation). As stated in the final SEIS (p. 4-57), the Waterford operating license contains an Environmental Protection Plan, which includes a requirement to report any "unusual or important environmental events," such as "mortality or unusual occurrence" of a federally listed species; these requirements will continue in effect in any renewed license for Waterford. In addition, Waterford is subject to requirements imposed by other Federal, State, and local agencies. Thus, while the NRC is not requiring any mitigation measures for the continued operation of Waterford, Appendix B continues in effect, and the Waterford National Pollutant Discharge Elimination System (NPDES) permit imposes effluent limitations and monitoring requirements as well as best management practices to ensure that the impacts to water quality and aquatic life are minimal.

DETERMINATION

Based on the NRC staff's independent review, analysis, and evaluation as documented in the license renewal final SEIS; careful consideration of all identified social, economic, and environmental factors, as well as input received from other agencies, organizations and the

public; and consideration of mitigation measures, the NRC has determined that the standards for the issuance of a renewed operating license, with respect to environmental matters, as described in 10 CFR 54.29(b), have been met and the requirements of Section 102 of NEPA have been satisfied. The NRC has determined that the adverse environmental impacts of issuing a renewed operating license for Waterford are not so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable.

APPROVED BY:

/RA Joseph E. Donoghue for/

George A. Wilson Jr., Director
Division of Materials and License Renewal
Office of Nuclear Reactor Regulation