June 9, 2022

L-2022-076
10 CFR 54.23

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
11545 Rockville Pike
One White Flint North
Rockville, MD 20852-2746

Turkey Point Units 3 and 4
Dockets 50-250 and 50-251
Renewed Facility Operating Licenses DPR-31 and DPR-41

SUBSEQUENT LICENSE RENEWAL APPLICATION – APPENDIX E ENVIRONMENTAL REPORT SUPPLEMENT 2

References:

1. FPL Letter L-2018-082 dated April 10, 2018, Turkey Point Units 3 and 4 Subsequent License Renewal Application – Revision 1 (ADAMS Accession No. ML18113A134)
2. FPL Letter L-2018-086 dated April 10, 2018, Turkey Point Units 3 and 4 Subsequent License Renewal Application – Appendix E Environmental Report Supplemental Information (ADAMS Accession Nos. ML18102A521 and ML18113A132)
3. NUREG-1437 Revision 1 dated June 2013, Final Generic Environmental Impact Statement for License Renewal of Nuclear Plants (ADAMS Accession Nos. ML13106A241, ML13106A242, ML13106A244)
4. NUREG-1437 Supplement 5 dated October 2019 – Final Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 5, Second Renewal, Regarding Subsequent License Renewal for Turkey Point Nuclear Generating Unit Nos. 3 and 4 (ADAMS Accession No. ML19290H346)
5. NRC Letter dated December 4, 2019, Subsequent Renewed Facility Operating License Nos. DPR-31 and DPR-41 for Turkey Point Nuclear Generating Unit Nos. 3 and 4 (ADAMS Accession No. ML19305C879)
6. Commission Memorandum and Order CLI-22-02 dated February 24, 2022 ADAMS Accession No. ML22055A496)
7. Commission Memorandum and Order CLI-22-03 dated February 24, 2022 ADAMS Accession No. ML22055A527)

In 2018, Florida Power & Light Company (FPL) submitted a subsequent license renewal application (SLRA) for Turkey Point Units 3 and 4 (Reference 1), that included an Environmental Report (ER) and later an ER supplement (Reference 2). Relying on the NRC's license renewal regulations and its Generic Environmental Impact Statement (GEIS) for license renewal (Reference 3), the NRC Staff published a site-specific Supplement

to the GEIS for Turkey Point (Reference 4) and issued the subsequently renewed Facility Operating Licenses (Reference 5). Neither the FPL ER nor the NRC Supplemental GEIS identified any new and significant information related to the Turkey Point SLRA that would change any impact finding in the NRC's GEIS for the subsequent period of extended operation or otherwise render the analyses in the GEIS inapplicable to an evaluation of the Turkey Point subsequent period of extended operation.

Earlier this year in Commission Order CLI-22-02 (Reference 6), the Commission determined that the GEIS for license renewal does not specifically apply to SLRAs. In Commission Order CLI-22-03 (Reference 7), the Commission directed the NRC Staff to prepare a new GEIS applicable to subsequent license renewal but provided applicants the option of supplementing their ERs and proceeding in a site-specific manner. Accordingly, FPL elected and completed a site-specific SLR environmental review of Turkey Point Units 3 and 4 operation, with the enclosed SLRA ER supplement addressing each previously generically addressed issue on a site-specific basis. This review confirmed that the environmental impact conclusions in NRC's 2013 GEIS for license renewal continue to bound operation of Turkey Point during the subsequent period of extended operation.

FPL's review did not identify any information materially changing the impact assessments provided in the NRC's Supplemental GEIS for the Turkey Point SLRA. Therefore, we expect that upon independent review of the site-specific information provided in the enclosed ER supplement, the NRC can expeditiously supplement its Final GEIS for the Turkey Point SLRA to address the Commission's direction in CLI-22-02 and restore the additional twenty years of operation provided by the 2019 subsequent renewed Facility Operating Licenses.

Should you have any questions regarding this submittal, please contact me at (561) 304-6256 or William.Maher@fpl.com.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on the 9th day of June 2022.

Sincerely,

William Maher

Digitally signed by William Maher
DN: cn=William Maher, o=Nuclear, ou=Nuclear Licensing Projects, email=william.maher@fpl.com, c=US
Date: 2022.06.09 09:41:07 -04'00'

William D. Maher
Licensing Director - Nuclear Licensing Projects

Cc: Regional Administrator, USNRC, Region II
Project Manager, USNRC, Turkey Point Plant
Senior Resident Inspector, USNRC, Turkey Point Plant
Chief, Bureau of Radiation Control, Florida Department of Health

Enclosure

Table 1: Category 1 Issues Applicable to PTN SLR

Issue No.	Issue	PTN SLRA ER Section	New or Existing Section
Land Use			
1	Onsite Land Uses	4.1.1	Existing
2	Offsite Land Uses	4.1.2	Existing
Visual Resources			
4	Aesthetic Impacts	4.1.4	Existing
Air Quality			
5	Air Quality Impacts (all plants)	4.2.1	Existing
6	Air Quality Effects of Transmission Lines	4.2.2	Existing
Noise			
7	Noise Impacts	4.3	Existing
Geologic Environment			
8	Geology and Soils	4.4	Existing
Surface Water Resources			
9	Surface Water Use and Quality (non-cooling system impacts)	4.5.6	New
11	Altered Salinity Gradients	4.5.7	New
13	Scouring Caused by Discharged Cooling Water	4.5.8	New
14	Discharge of Metals in Cooling System Effluent	4.5.9	New
15	Discharge of Biocides, Sanitary Wastes, and Minor Chemical Spills	4.5.10	New
17	Effects of Dredging on Surface Water Quality	4.5.11	New
Groundwater Resources			
19	Groundwater Contamination and Use (non-cooling system impacts)	4.5.12	New
21	Groundwater Quality Degradation Resulting from Water Withdrawals	4.5.13	New
22	Groundwater Quality Degradation (plants with cooling ponds in salt marshes)	4.5.14	New
Terrestrial Resources			
23	Exposure of Terrestrial Organisms to Radionuclides	4.6.7	New

Issue No.	Issue	PTN SLRA ER Section	New or Existing Section
24	Cooling System Impacts on Terrestrial Resources (plants with once-through cooling systems or cooling ponds	4.6.8	New
26	Bird Collisions with Plant Structures and Transmission Lines	4.6.9	New
27	Transmission Right-of-Way Management Impacts on Terrestrial Resources	4.6.10	New
28	Electromagnetic Fields on Flora and Fauna (plants, agricultural crops, honeybees, wildlife, livestock)	4.6.11	New
Aquatic Resources			
30	Entrainment of Phytoplankton and Zooplankton (all plants)	4.6.12	New
32	Infrequently Reported Thermal Impacts (all plants)	4.6.13	New
33	Effects of Cooling Water Discharge on Dissolved Oxygen, Gas Supersaturation, and Eutrophication	4.6.14	New
34	Effects on Non-Radiological Contaminants on Aquatic Organisms	4.6.15	New
35	Exposure of Aquatic Organisms to Radionuclides	4.6.16	New
36	Effects of Dredging on Aquatic Organisms	4.6.17	New
37	Effects on Aquatic Resources (non-cooling system impacts)	4.6.18	New
38	Impacts of Transmission Line Right-of-Way Management on Aquatic Resources	4.6.19	New
39	Losses from Predation, Parasitism, and Disease Among Organisms Exposed to Sub-Lethal Stresses	4.6.20	New
Socioeconomics			
40	Employment and Income, Recreation, and Tourism	4.8.1	Existing
41	Tax Revenues	4.8.2	Existing
42	Community Services and Education	4.8.3	Existing
43	Population and Housing	4.8.4	Existing
44	Transportation	4.8.5	Existing

Issue No.	Issue	PTN SLRA ER Section	New or Existing Section
Human Health			
45	Radiation Exposures to the Public	4.9.3	New
46	Radiation Exposures to Plant Workers	4.9.4	New
47	Human Health Impact from Chemicals	4.9.5	New
48	Microbiological Hazards to Plant Workers	4.9.6	New
49	Physical Occupational Hazards	4.9.7	New
Postulated Accidents			
50	Design-Basis Accidents	4.15.1	Existing
Waste Management			
51	Low-level Waste Storage and Disposal	4.11.1	Existing
52	Onsite Storage of Spent Nuclear Fuel	4.11.2	Existing
53	Offsite Radiological Impacts of Spent Nuclear Fuel and High-Level Waste Disposal	4.11.3	Existing
54	Mixed-Waste Storage and Disposal	4.11.4	Existing
55	Nonradioactive Waste Storage and Disposal	4.11.5	Existing
Uranium Fuel Cycle			
56	Offsite Radiological Impacts - Individual Impacts from other than the Disposal of Spent Fuel and High-Level Waste	4.13.1	Existing
57	Offsite Radiological Impacts - Collective Impacts from other than the Disposal of Spent Fuel and High-Level Waste	4.13.2	Existing
58	Non-Radiological Impacts of the Uranium Fuel Cycle	4.13.3	Existing
59	Transportation	4.13.4	Existing
Termination of Nuclear Power Plant Operations and Decommissioning			
60	Termination of Plant Operations and Decommissioning	4.14	Existing

Supplemental Information for Category 1 Issue No. 1 (Onsite Land Uses)

PTN SLRA ER Section (Page): 4.1.1.4 'Analysis' (4-11)

Supplemental Information

In the 2013 license renewal Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants (NUREG-1437) (GEIS), the U.S. Nuclear Regulatory Commission (NRC) reviewed the onsite land use impacts of continued operation and refurbishment and found that operational activities at a nuclear plant during the license renewal term would be similar to those occurring during the current license term, in that onsite land use conditions would remain unchanged. The NRC notes that construction activities that could alter onsite land use, such as additional spent nuclear fuel and low-level radioactive waste generated during the license renewal term, would be addressed in separate licensing actions. Therefore, the NRC concluded onsite land use impacts to be SMALL. (NRC 2013a)

As discussed in the Turkey Point Nuclear Plant (PTN) subsequent license renewal (SLR) environmental report (ER) Section 3.2.1, PTN is located on approximately 9,460 acres of Florida Power and Light (FPL) owned land in the southeastern corner of Miami-Dade County (FPL 2018a). All of Miami-Dade County is zoned, including the unincorporated portions. The PTN site includes two zones, including the IU-3 (e.g., industrial districts – unlimited manufacturing) for the generating station area, and GU (e.g., interim district) for the remaining portions of the site (MCIT 2019). FPL conducted a review of on-site construction activities to identify projects that might have impacts to onsite and offsite land uses. The review included evaluating completed and planned projects between 2019 and 2026 and considered what changes, if any, would occur to existing land uses. There were several planned projects identified, with the largest project being the development of a Clean Water Recovery Center (CWRC). The CWRC involves the use of up to 15MGD of water from Miami-Dade's Water and Sewer Department which will be pumped 8-miles through an underground waterline to the new CWRC onsite. The majority of the waterline route (approximately 73%) is located within existing FPL transmission right-of-way. While this project could potentially be considered for both on and offsite impacts, the use of the water will be for Unit 5 cooling which is not connected to the operation of PTN Units 3 and 4. All other identified future projects are separate actions and are planned for areas of the site that are already developed and changes to existing land uses are not anticipated. Additionally, it is not anticipated that future projects beyond the reviewed period of 2019 to 2026, including those that may occur during the second 20-year renewal, will change existing land uses during the proposed SLR term. Continued operations of Units 3 and 4 during the proposed SLR term are not expected to change and no refurbishment activities are anticipated, and therefore no changes to onsite land use are projected.

Conclusion

Given that no land use changes associated with Units 3 and 4 are anticipated during second 20-year renewal and no refurbishment activities are planned, FPL finds that onsite land use

impacts for the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to the SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 2 (Offsite Land Uses)

PTN SLRA ER Section (Page): 4.1.2.4 'Analysis' (4-12)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the offsite land use impacts of continued operation and refurbishment. The NRC found that operational activities at a nuclear plant during the license renewal term would be similar to those occurring during the current license term and would not affect offsite land use beyond what has already been affected. With no increases in the number of full-time or outage workers, there were no increases in housing, infrastructure, or demand for services beyond what had already occurred. Similarly, no significant tax revenue changes were identified that would indicate an offsite land use impact. The State of Florida has determined PTN to be consistent with their CZM program. Therefore, the GEIS found onsite land use impacts to be SMALL. (NRC 2013a)

Since the PTN SLR ER was written, PTN operational staff and general number of non-outage and outage workers has remained within the ranges provided in Section 2.5. PTN has no plans to add workers to support plant operations during the proposed SLR term (FPL 2018a, Section 2.5), nor are any significant changes to tax payments anticipated (see Issue No. 41). No license renewal-related refurbishment activities have been identified. Furthermore, PTN has fulfilled the regulatory requirement to certify to the licensing agency that the proposed activity would be consistent with the state's federally approved CZM program (FPL 2018a, Section 9.5.10).

Conclusion

Given that no changes to employment, taxes or onsite land uses associated with Units 3 and 4 are anticipated during operation, no refurbishment activities are planned, and PTN has ensured consistency with the state CZM program, FPL finds that offsite land use impacts for the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 4 (Aesthetic Impacts)

PTN SLRA ER Section (Page): 4.1.4.4 'Analysis' (4-14)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the aesthetic impacts of continued operation and refurbishment on visual resources and found that existing visual profiles of nuclear power plants were not expected to change during the license renewal term. After the containment building and cooling towers, transmission line structures are probably the most frequently observed structures associated with nuclear power plants. The NRC noted that the visual appearance of transmission lines is not expected to change during the license renewal term. Furthermore, transmission lines from nuclear power plants are generally indistinguishable from those from other power plants. The NRC noted that construction activities that could alter onsite land use, such as additional spent nuclear fuel and low-level radioactive waste generated during the license renewal term, would be addressed in separate licensing actions. Therefore, the GEIS concluded that the aesthetic impacts of continued plant operations during the license renewal term, refurbishment, and transmission lines on visual resources would be SMALL. (NRC 2013a, Section 4.2.1.2)

As discussed in the PTN SLR ER Section 3.2.3, PTN is located in an unincorporated area in southeastern Miami-Dade County, Florida. The plant's containment structures, the tallest structures on the site, are screened by vegetation on the landward side. Site buildings are visible from SW 344th Street/Palm Drive and SW 328th Street/North Canal Street at opportunistic places along the road. The site is visible from Biscayne Bay. The in-scope transmission lines do not extend beyond the PTN site. At night, light from PTN is visible from several points in the vicinity and in Biscayne Bay. (FPL 2018a, Section 3.2.3)

FPL conducted a review of on-site construction activities that could result in a noticeable change in the appearance characteristics of the site when viewed from offsite. Based on available data, the review included evaluating completed and planned projects between 2019 and 2026 as a representative dataset for past, present, and reasonably foreseeable projects. The review considered construction activities that would be large enough to be observed in the vicinity of PTN and in Biscayne Bay. Except for lighting projects identified, no construction activity was identified that would noticeably alter the aesthetic impacts of the site on the vicinity and from Biscayne Bay. However, the lighting projects implemented changes to the lighting systems that are visible from several points in the vicinity and Biscayne Bay. The review also considered vegetation that screens the site. There have been no noticeable changes in the vegetation that screens the site.

As of 2016, LED lighting on US street and roadways lights has grown from 0.3 percent in 2010 to 28.3 percent in 2016. Continued growth is virtually certain. (IES 2022) These findings in 2016 indicate that LED lighting adoption has increased across all categories of LED lighting products resulting in significant energy and cost saving benefits (USDOE 2022).

The lighting projects at PTN, completed in 2021, were conducted to repair damage to the lighting system caused by Hurricane Irma. In addition to repairing damage to the lighting system, the projects resulted in energy savings and optimized light patterns that reduce light

trespass, and the lighting projects also provide for 0% up-lighting (AEL 2022). Note that the need for the lighting projects is independent of PTN's SPEO and is similar to many other projects described in the report Adoption of LEDs in Common Lighting Applications (2017) (USDOE 2022).

At the time of its replacement, the original lighting system at PTN used a mixture of high-pressure sodium lights that ranged from 200 to 400 watts. The high-pressure sodium lights exhibited a traditional yellow shade at night. The lumens produced by the 200-to-400-watt high pressure sodium bulbs ranged from 19,000 to 50,000 lumens (Sylvania 2022).

The design of the new lighting projects were similar in location and luminosity to the existing lighting. The luminosity of the replacement fixtures ranged from 6,285 to 23,844 lumens with an average of approximately 15,550 lumens per fixture. In addition to replacement fixtures, some fixtures were added as needed. Overall, approximately 400 lamps and fixtures were replaced with LED lamps and fixtures.

From a visual perspective, there is a noticeable difference between the color of the existing lighting system and the color of the replacement lighting system. Because most of the lighting was replaced, there remains no material color contrast between the original high-pressure sodium (yellow) lights and the new LED (white) lights. Since completion of the lighting projects, there have been no complaints regarding the appearance of the replacement lighting system. Except for lighting, no refurbishment or construction activities have been identified that would change the visual characteristics of PTN during the proposed SLR term.

Conclusion

No changes to the visual characteristics of plant structures or transmission lines are expected from continued operations as no refurbishments are planned, and the differences in the lighting systems, while noticeable, are not sufficient to substantially alter the visual characteristics of the site at night and have been implemented totally independent of the SPEO. FPL finds that aesthetic impacts for the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to one SLR term for PTN as supplemented here.

Supplemental Information for Category 1 Issue No. 5 (Air Quality Impacts) (All Plants)

PTN SLRA ER Section (Page): 4.2.1.4 'Analysis' (4-16)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed air quality impacts from continued operations and refurbishment activities and found they would be SMALL and that any emissions associated with refurbishment would be temporary (NRC 2013a). Furthermore, the GEIS noted that implementation of best management practices (BMPs) and the application of permit conditions in state and local air emissions permits would ensure conformity with applicable state or tribal implementation plans. Additionally, emissions from emergency diesel generators and fire pumps, and routine operations of boilers used for space heating, would not be a concern, even for plants located in or adjacent to nonattainment areas. The NRC further identified no new and significant information for this issue, and as such, concluded impacts of this issue would be SMALL (NRC 2019a).

A site-specific evaluation is summarized here to determine the anticipated air quality impact level associated with the operation of fossil fuel-fired equipment required for normal operations at PTN. For PTN, in the initial license renewal environmental review, the Southeast Florida Intrastate Air Quality Control Region was designated as in attainment or unclassified for all criteria air pollutants, although Miami-Dade and Broward counties were formally maintenance areas for 1-Hour Ozone (1979). The 1-Hour Ozone (1979) NAAQS was revoked on June 15, 2005. Regional air quality in the area where PTN is located is in attainment with the national ambient air quality standards, including ozone [40 CFR 81.347] (FPL 2018a, Section 3.3.3, EPA 2022).

PTN air pollutant emissions sources consist of smaller sources operated on an intermittent basis. These air emission sources are related to the testing of emergency diesel generators and diesel pumps, which are covered by the Title V permit described below. There were no notices of violation associated with PTN air emissions from 2012–2022 (3/22/2022) (FPL 2018a, Section 9.5.2.1). However, PTN reported two instances of permit deviations since 2018. A permit deviation was self-reported in January 2020. This deviation was related to the late submission of the semi-annual monitoring report (SAMR) for the period from January 2019 to June 2019. The late submission was due to an oversight associated with employee turnover. An additional permit deviation was self-reported in May 2020. This deviation was related to an emergency engine emissions unit (EU 007) operating for more hours than allowed by the air permit. The cause of the deviation was due to COVID-19 social distancing measures reducing the number of workers within a small work area affecting the schedule, extending the time required to complete maintenance. The issue was resolved by taking action to minimize the risk of exceedance at the planning stage. PTN is subject to annual inspections; no violations have been reported in a 5-year inspection history with the latest inspection recorded on November 29, 2021.

The Turkey Point Title V facility is composed of two separate co-located power plants: the fossil plant (Unit 5) and the nuclear plant (Units 3 and 4). For source classification purposes, both sites are considered a single facility; however, each has a separate Title V operating permit.

The non-nuclear operations of PTN Units 3 and 4 are permitted by a Title V air emissions permit (Permit No. 0250003-028-AV), which was renewed on April 26, 2018, and a Title V air emissions permit revision (Permit No. 0250003-033-AV), which was revised on May 19, 2020. Florida Department of Environmental Protection. (FDEP 2018a, FDEP 2022a)

PTN Units 3 and 4 consists of two nuclear generating units; multiple diesel emergency generators; a diesel engine-driven emergency fire pump; miscellaneous emergency diesel engines used to support plant equipment; three propane emergency generators; and miscellaneous unregulated and insignificant emissions units and/or activities (FDEP 2018a, FDEP 2022a). This permit covers the following emissions units (EUs):

EU No.	Brief Description
Regulated Emissions Units	
007	Five emergency diesel engines used to support plant equipment
023	One emergency diesel generator engine for South Dade meteorological tower
024	One emergency diesel fire pump
028	Switchyard – Underground Cable Emergency Generator 3C
029	Switchyard – Underground Cable Emergency Generator 4C
030	Radio Tower Emergency Generator
Unregulated Emissions Units and Activities	
005	Four diesel engine-driven emergency generators
006	Two emergency diesel engines used to support plant equipment

The PTN air permit contains conditions established by the Florida Department of Environmental Protection (FDEP) to protect Florida's ambient air quality standards and ensure impacts are maintained at acceptable levels.

No refurbishment or future upgrades have been identified for PTN Units 3 and 4. No significant increase or decrease of air emissions is expected over the SLR term. In addition, as noted in the GEIS, BMPs, including fugitive dust controls and the imposition of permit conditions in FDEP air emissions permits, would ensure conformance with applicable state implementation plans. FPL's review did not identify any future upgrade or replacement activities necessary for plant operations (e.g., diesel generators, diesel pumps) that would affect PTN's air emissions program.

Conclusion

During the proposed SLR term, appropriate permit conditions would regulate and mitigate any potential PTN activities that could increase air pollutants. Furthermore, no temporary impacts associated with refurbishment activities are expected. Therefore, FPL finds that due to compliance with current air emissions regulatory requirements, applicable emissions control

measures, and reporting requirements, air quality impacts for the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to one SLR term for PTN as supplemented here.

Supplemental Information for Category 1 Issue No. 6 (Air Quality Effects of Transmission Lines)

PTN SLRA ER Section (Page): 4.2.2.4 'Analysis' (4-17)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the air quality effects of transmission lines and found that the production of ozone and oxides of nitrogen associated with transmission is insignificant and does not measurably contribute to ambient levels of those gases. Therefore, the GEIS assessed the impact as SMALL. (NRC 2013a)

Transmission lines subject to evaluation of environmental impacts for license renewal are those that connect the nuclear power plant to the switchyard where electricity is fed into the regional power distribution system and power lines that feed the plant from the grid during outages (NRC 2013b, Section 2.2). At PTN, Units 3 and 4 are connected to the 240-kilovolt (kV) switchyard through an approximately 590-foot-long transmission line (FPL 2021a, Section 8.2.1).

Studies have shown the amount of ozone generated by even the largest transmission lines in operation (765 kV) would be insignificant. Two years of monitoring near the Bonneville Power Administration's 1,200-kV prototype line resulted in no increase in ambient ozone levels caused by the line (NRC 2013a, Section 4.3.1.1). Furthermore, because transmission line emissions associated with corona discharge are so small when compared with emissions from other sources of air pollution, these emissions are not a regulated source of air pollution in the United States (NRC 2013a). As PTN's in-scope transmission lines are 240 kV, the amount of ozone generated from the in-scope transmission lines is anticipated to be minimal.

Conclusion

Research considered by the NRC is supported by evidence that the production of ozone and oxides of nitrogen is insignificant and does not measurably contribute to ambient levels of those gases. Further, the PTN in-scope transmission lines are confined to the site. Therefore, the amount of these gases generated from the in-scope transmission lines is anticipated to be minimal. FPL finds that air quality effects from continued plant operations during the proposed SLR term are SMALL.

Comparing the 2013 GEIS analysis of the incremental effects of a 20-year renew Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to one SLR term for PTN as supplemented here.

Supplemental Information for Category 1 Issue No. 7 (Noise Impacts)

PTN SLRA ER Section (Page): 4.3.4 'Analysis' (4-18)

Supplemental Information

In the 2013 GEIS for license renewal, the NRC reviewed the noise impacts of continued operation and refurbishment. For operational noise, the NRC found that given the industrial nature of the plant and the number of years the plant had already been operating, noise is generally nothing more than a continuous minor nuisance. Furthermore, the NRC states that operational noise levels at the site boundary are expected to remain well below regulatory standards for offsite residents. In regard to refurbishment, the NRC evaluated noise impacts associated with construction-related activities and equipment. The GEIS identifies these impacts as temporary and not expected to be distinguishable from other operational noises at the site boundary nor create an adverse impact on nearby residents. Therefore, the GEIS assessed the impact as SMALL. (NRC 2013a)

The proposed action is the continued operation of PTN Units 3 and 4, and no refurbishment activities have been identified, although minor construction may occur onsite due to operational maintenance activities. Ambient noise sampling and analysis for the impacts of noise estimated for the proposed construction of PTN Units 6 and 7 was performed in June 2008 as part of preparation of the combined license application ER. The survey indicated peak noise from the construction of the proposed units was estimated to be below the 65-decibels (dBA) acceptance limit at the nearest residence, a level considered to be of small significance (NRC 2016, Sections 4.4.1.1, 4.12, and 5.4.1.1). PTN Units 6 and 7 are in close proximity to PTN Units 3 and 4; therefore, the noise study is considered applicable to SLR of PTN Units 3 and 4 as a combination of construction and operational noise. There are no applicable state or local environmental noise regulations for unincorporated areas of Miami-Dade County, where PTN Units 3 and 4 are located.

The adopted 2020–2030 Miami-Dade County comprehensive development master plan shows the land surrounding PTN is designated as environmentally protected, with the Turkey Point Wilderness Preserve located along PTN's eastern border. (MDC 2016a; MDC 2016b) These land use designations are not anticipated to change during the SLR term, and, as such. no additional sensitive receptors (e.g., residences, schools, churches, etc.) would be added.

PTN has not received any noise complaints from 2016 to 2021. To date, no noise complaints have been received in 2022.

Conclusion

People living in the vicinity of PTN Units 3 and 4 would not experience any changes in noise levels during the proposed SLR term beyond what is currently being experienced. Therefore, the impact of continued reactor operations during the proposed SLR term would not exceed the noise impacts predicted in the GEIS. Given that PTN has not received any noise complaints from the public; that land use surrounding PTN is projected to maintain its status as protected lands; that no refurbishment activities are anticipated; and that no anticipated changes in noise levels associated with continued operations, FPL finds that noise impacts during the proposed

SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 8 (Geology and Soils)

PTN SLRA ER Section (Page): 4.4.4 'Analysis' (4-20)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the potential impacts from continued operations and refurbishment associated with license renewal on geologic and soil resources. The NRC considered soil disturbance, including sediment and/or any associated bedrock, for projects such as replacing or adding buildings, roads, parking lots, and belowground and aboveground utility structures. The NRC took into account that implementing BMPs required by the National Pollutant Discharge Elimination System (NPDES) permit and construction stormwater pollution prevention plans (SWPPPs) would reduce soil erosion and subsequent impacts on surface water quality. The NRC considered BMPs that included minimizing the amount of disturbed land; stockpiling topsoil before ground disturbance; mulching and seeding in disturbed areas; covering loose materials with geotextiles; using silt fences to reduce sediment loading to surface water; using check dams to minimize the erosive power of drainages; and installing proper culvert outlets to direct flows in streams or drainages. Plant-specific environmental reviews conducted by the NRC did not identify any significant impact issues related to geology and soils. Therefore, the NRC concluded that impact of continued operations during the license renewal term and refurbishment activities relative to the geologic environment would be SMALL for all nuclear plants. (NRC 2013a, Section 4.4.1) In the supplemental environmental impact statement (SEIS), the NRC also agreed with the findings in the GEIS and stated that the impacts of continued operation on geology and soil resources would be SMALL. (NRC 2019a, Section 4.4.1)

Ground-disturbing activities and stormwater runoff could result from routine infrastructure, renovation, and maintenance that would be expected during continued operation at PTN. PTN has not proposed any refurbishment activities related to SLR and the proposed action does not include construction of new facilities (FPL 2018a, Sections 2.3 and 4.6.5.4). Land disturbance for continued operations at PTN would be related to routine infrastructure maintenance and renovation activities to maintain and upgrade or replace infrastructure and structures as needed to support PTN operations. Stabilization measures are in place at PTN to prevent erosion and sedimentation impacts to the site and vicinity because PTN has been operational since the early 1970s (FPL 2018a, Section 3.5.3.2).

The Industrial Wastewater (IWW)/NPDES permit for PTN requires implementation of additional measures to further protect the environment from ground-disturbing activities at the site. Conditions of the permit include specific requirements regarding development and implementation of a Best Management Practices (BMP) Plan covering both industrial wastewater and stormwater management actions, Impoundment Design, Construction, Operation, and Maintenance conditions, and Impoundment Inspection requirements. At a minimum, FPL must inspect the dams of the cooling canal system (CCS), dikes, and toe areas for erosion, corrosion, cracks or bulges, seepage, wet or soft soil, changes in geometry, the depth and elevation of the impounded water, sediment or slurry, freeboard, changes in vegetation such as overly lush, dead, or unnaturally tilted vegetation, and any other changes that may indicate a potential compromise to impoundment integrity (FDEP 2022b).

FPL's Administrative Procedure No. 0-ENV-601 addresses construction activities, which include any clearing of land, excavation, or other actions that would alter the physical environment or ecology of the site, thereby encompassing maintenance activities that involve land disturbance. The procedure includes the state required BMPs, including SWPPPs applicable to construction sites. PTN maintenance activities that could require a construction stormwater permit would obtain the required permit and comply with the stormwater management and BMP requirements. The SWPPP must be prepared prior to the initiation of ground-disturbing activities at the site. The FDEP generic permit for stormwater discharge from large and small construction activities (62-621.300 (4)(a)) is a general permit requiring preparation of a SWPPP that identifies BMPs to minimize erosion and sediment resulting from stormwater runoff. (FPL 2018b, RAI T-6, FDEP 2022b) PTN's compliance with the comprehensive regulatory controls and permits in place, guided by its internal procedures, would mitigate impacts to the land from PTN's continued operations during the proposed SLR term.

Additional conditions concern soil storage and runoff controls. Plans to be developed must identify areas that, due to topography, activities, or other factors, have a high potential for soil erosion, and identify structural, vegetative, and/or stabilization measures to be used to limit erosion (FDEP 2022b). Soil disturbance would be conducted in accordance with PTN's construction activities procedure mentioned above (FPL 2018b, RAIs T-1 and T-6). PTN also conducts sediment removal maintenance activities within the confines of the CCS. Soil disturbance for CCS maintenance is conducted under FPL internal procedures. Canal sediment removal maintenance support package (EC-282844) and a terrestrial vegetation plan are used to achieve the objectives of the FDEP-required Thermal Efficiency Plan and Nutrient Management Plans specified in the 2016 FDEP-FPL Consent Order and the IWW/NPDES Permit (FDEP 2022b). These guidance documents minimize the potential for ground-disturbing actions associated with CCS maintenance from impacting geology and soils at the site. Should any additional soil disturbance activities be required during the SLR term, the IWW/ NPDES permit and FPL procedures direct staff to implement BMPs and obtain stormwater permits if required.

Conclusion

Only routine infrastructure, renovation, and maintenance projects would be expected during PTN's continued operation. Compliance with current IWW/NPDES regulatory requirements and permit conditions, and implementation of a SWPPP, implementation of BMPs, and adhering to internal procedures will ensure that geology and soil impacts from continued plant operations over the SLR term would be SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS and the NRC's previous discussion of this issue in the PTN SEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 9 (Surface Water Use and Quality) (Non-Cooling System Impacts)

PTN SLRA ER Section (Page): 4.5.6.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed surface water use and quality and concluded that the impacts from non-cooling systems on surface water use and quality would be SMALL. The NRC considered water use during refurbishment activities for concrete production, dust control, washing stations, facility and equipment cleaning, and soil compaction and excavation backfilling. Surface water consumption for non-cooling water-related operational activities is limited to such uses as facility and equipment cleaning. The use of public domestic water would reduce the direct consumptive use impacts on surface water resources. The impacts due to the volume of water consumed from a surface water source would be insignificant when compared with that used and consumed by a plant's cooling system. No surface use conflicts would be expected. (NRC 2013a, Section 4.5.1.1)

The NRC considered the potential impacts of land disturbing activities, IWW, stormwater, residual chlorine due to domestic water runoff, and inadvertent spills resulting from nuclear plants' operations on surface water quality in its GEIS for license renewal. The NRC considered the mitigation measures of NPDES permits, SWPPPs, BMPs, and pollution control structures such as detention and infiltration basins. The NRC concluded that nuclear power plants' operation under NPDES permits and the implementation of BMPs would mitigate surface water quality impacts from non-cooling systems to SMALL. (NRC 2013a, Section 4.5.1.1)

As discussed in the NRC's 2019 supplemental environmental impact statement (SEIS) for PTN license renewal, the NRC considered whether there is any new and significant information that might alter the conclusions reached in the 2013 GEIS for each Category 1 issue. The NRC did not identify any new and significant information for Category 1 surface water issues and concluded that impacts of continued operation on surface water resources would be SMALL. (NRC 2019a)

Regarding PTN's site-specific assessment of the surface water use component of the issue, the water source at PTN for its systems other than the cooling water system is municipal supply, i.e., domestic water (FPL 2018a, Section 2.2.3.1) and treated groundwater for process water. The site does not use nor has plans to access surface water for non-cooling purposes. Given this current configuration, there is no surface water use impact. Should the need for use of surface water arise during the proposed SLR term, PTN would obtain all the necessary state and local permits. The permit process would be designed to mitigate impacts to surface water use during the proposed SLR 20-year renewal period.

Regarding the second component under this issue, surface water quality, it is important to understand that all of PTN's discharges, both industrial and stormwater, are routed into the closed-loop CCS, which does not discharge through a point source to adjacent surface water. Treated domestic wastewater generated at the site is discharged to non-potable groundwater in accordance with the conditions of the subsurface injection well permit (No. 0355186-001-UO/5W) or by septic systems. (FPL 2018a, Section 2.2.3.1; FPL 2019a)

The following discussions address the non-cooling system flows into the CCS and the pollution controls in place prior to the flow reaching the CCS.

With the exception of treated domestic wastewater, effluents for all other systems, including stormwater runoff and equipment and containment area drains, are routed to the closed-loop CCS, an IWW facility (Permit No. FL0001562). Stormwater runoff collects in drainage channels and floor drains, then typically flows through a series of stormwater catch basins before being discharged to the CCS. Equipment and containment area drains are routed to oil/water separators prior to being routed to the CCS. (FPL 2018a, Sections 2.2.3 and 3.6.1.4.2; FPL 2022a) In summary, with the exception of treated domestic wastewater, both industrial and stormwater from PTN are discharged to the CCS. The CCS surface waters are contained within a closed-loop system that does not discharge to surface waters of the state through a point source (FPL 2018a, Section 3.6.1.4.1; FDEP 2022b).

The IWW/NPDES permit for PTN does not authorize surface water discharges from the CCS through a point source to waters of the state and contains monitoring and reporting requirements to ensure unauthorized discharges do not occur. Conditions of the permit include requirements for PTN to institute programs targeting industrial wastewater and stormwater in order to prevent or minimize the generation and the potential for release of pollutants from facility operations to the CCS and stormwater. The IWW BMPs program requires each facility component or system to be examined for waste minimization opportunities and determine and implement actions to reduce waste loadings and chemical losses to all wastewater and stormwater streams. Whenever there is a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g., precipitation), or other circumstances to result in pollutants reaching the CCS, the BMP must include a prediction of the direction, rate of flow, and the total quantity of pollutants which could be discharged to the CCS as a result of each condition or circumstance. Stormwater BMPs must include a preventive maintenance program that involves timely inspection and maintenance of stormwater management devices (e.g., cleaning oil/water separators, catch basins) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems. (FDEP 2022b)

PTN has a spill prevention, control, and countermeasure (SPCC) plan (0-ADM-034.1 Rev. 6) that addresses storage, secondary containment, and inspections. In addition, all aboveground storage tanks are equipped with secondary containment and, as appropriate, automated spill and overfill detection systems. For containers less than 55 gallons, PTN implements BMPs for storage and handling. No reportable spills were associated with PTN from 2012–March 2022 (FPL 2018a, Sections 9.5.3.7 and 9.5.3.8; FPL 2018b, RAI WM-1 and WM-2).

PTN has not proposed any refurbishment activities related to SLR and the proposed action does not include construction of new facilities (FPL 2018a, Sections 2.3 and 4.6.5.4). Land disturbance for continued operations at PTN would be related to routine infrastructure maintenance and renovation activities to maintain and upgrade or replace infrastructure and structures as needed to support PTN operations. PTN's administrative procedure addressing construction activities, which includes any clearing of land, excavation, or other action which would alter the physical environment or ecology of the site, therefore encompasses

maintenance activities which involve land disturbance. The procedure specifies stormwater permitting requirements and includes the state required BMPs, including SWPPPs applicable to construction sites. PTN maintenance activities that could require a construction stormwater permit would obtain the required permit and comply with the stormwater management and BMPs requirements. The FDEP generic permit for stormwater discharge from large and small construction activities permit (62-621.300(4)(a), F.A.C.) is a general permit for construction activities that would require preparation of a construction SWPPP that identifies BMPs that would be installed to minimize erosion and sediment resulting from stormwater runoff. (FPL 2018b, RAI T-6)

Surface water quality and environmental data collected from an extensive monitoring network, designed and approved by a multiagency effort including, FDEP, Miami-Dade County Department of Environmental Resource Management, and the South Florida Water Management District, was implemented in 2010, and has demonstrated there has been no violations of state or federal surface water quality standards attributed to the PTN site. These findings were confirmed by an independent review of the record by Administrative Law Judge Cathy M. Sellers in 2022, who concluded, “Pursuant to the foregoing Findings of Fact and Conclusions of Law, it is concluded that FPL has provided reasonable assurance that continued operation of the CCS, pursuant to the Renewal Permit, will meet all applicable requirements of chapters 403, 62-4, 62-302, 62-520, and 62-620.” (FDEP 2022c)

Conclusion

As discussed above, PTN does not use surface water and does not currently plan to use surface water during the proposed SLR term. However, if a need for surface water use occurred during the proposed SLR term, PTN would obtain all necessary permits. Compliance with water use permits and regulations would ensure an insignificant (i.e., SMALL) impact on surface water use. In addition, compliance with the current IWW/NPDES and stormwater regulatory requirements and permit conditions, and implementation of the SWPPP, BMPs, and the SPCC plan will ensure an insignificant (i.e., SMALL) impact on surface water quality during the proposed SLR operating term. Based on the site-specific analyses presented above, FPL finds that impacts to surface water use and quality during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 11 (Altered Salinity Gradients)

PTN SLRA ER Section (Page): 4.5.7.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed altered salinity gradients. It defined this issue as relating to plants located on estuaries and addressed changes in salinity caused by cooling system water withdrawals and discharges. The NRC determined that this issue is of SMALL impact for all plants. (NRC 2013a, Section 4.5.1.1)

For PTN, the NRC determined that this issue is not applicable in the SEIS for SLR because PTN's intake and discharge structures are located within the closed loop CCS, which does not discharge through a point source to the surface waters of an estuary such as Biscayne Bay (NRC 2019a, Section 4.5.1.1). There are no construction or refurbishment plans related to the proposed action (FPL 2018a, Sections 2.3 and 4.6.5.4); therefore, no alterations in the cooling system that could affect this issue are anticipated.

Conclusion

As discussed above, the NRC determined this issue is not applicable to PTN because PTN's intake and discharge structures do not withdraw from or discharge through a point source to the surface waters of an estuary (i.e., the Biscayne Bay). The proposed action does not include alterations to the cooling water system; therefore, PTN's operations during the proposed SLR term would also not impact salinity gradients in the estuary. FPL finds that NRC's determination that this issue is not applicable to PTN remains valid.

Supplemental Information for Category 1 Issue No. 13 (Scouring Caused by Discharged Cooling Water)

PTN SLRA ER Section (Page): 4.5.8.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the impacts of scouring caused by discharged cooling water and found the impacts would be SMALL. The high flow rate of water from a cooling system discharge structure has the potential to scour sediments and redeposit them elsewhere. The scouring will remove fine-grained sediments, resulting in turbidity, and leave behind coarse-grained sediments. Scouring is expected to occur only in the vicinity of the discharge structure where flow rates are high. While scouring is possible during reactor startup, operational periods would typically have negligible scouring. Natural sediment transport processes could bring fresh sediment into the discharge flow area. These processes include transport due to ocean currents, tides, river meandering, and storm events. Scouring has been observed at only three nuclear power plants and the effects were localized and minor. Impacts from scouring caused by discharged cooling water during the license renewal term would be SMALL for all plants. (NRC 2013a, Section 4.5.1.1)

For PTN, the NRC determined that this issue is not applicable in the SEIS for SLR because all surface water discharges from PTN flow into the CCS. The NRC considered whether there was any new and significant information that might alter the conclusions reached in the GEIS for scouring caused by discharged cooling water and did not identify any new and significant information that would change the conclusion in the GEIS.

Conclusion

As discussed above, the NRC determined that this issue is not applicable to PTN, because all surface water discharges from PTN flow into the CCS. FPL finds that NRC's determination that this issue is not applicable to PTN remains valid.

Supplemental Information for Category 1 Issue No. 14 (Discharge of Metals in Cooling System Effluent)

PTN SLRA ER Section (Page): 4.5.9.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the discharge of metals in cooling system effluents and found it to have a SMALL impact. Heavy metals such as copper, zinc, and chromium can be leached from condenser tubing and other components of the heat exchange system by circulating cooling water. These metals are normally addressed in NPDES permits because high concentrations of them can be toxic to aquatic organisms. During normal operations, concentrations are normally below laboratory detection levels. At the Robinson plant in South Carolina, the gradual accumulation of copper in its reservoir resulted in impacts on the bluegill (*Lepomis macrochirus*) population. However, plants occasionally undergo planned outages for refueling with stagnant water remaining in the heat exchange system. During an outage at the Diablo Canyon plant in California, the longer residence time of water in the cooling system resulted in elevated copper levels in the discharge when operations resumed; abalone (*Haliotis* spp.) deaths were attributed to the increased copper. In both cases, copper condenser tubes were replaced with titanium ones, and the problem was eliminated. Impacts from the discharge of metals in cooling system effluent during the license renewal term would be SMALL for all plants. (NRC 2013a, Section 4.5.1.1)

Distribution system infrastructure and appurtenances, including piping, linings, fixtures, and solders, can react with the water they supply as well as the external environment. These interactions can result in degradation of the distributed water. Permeation of plastic pipes and leaching from linings and metal appurtenances are known pathways for water quality degradation. (EPA 2002)

At PTN, circulating water is withdrawn from and discharged to a closed system of cooling canals (CCS). Traveling screens and strainers remove debris from the cooling water intake flow, and plastic foam (Amertap) balls minimize biological growth and other fouling inside the condenser tubes. CCS waters, which include authorized chemicals used in plant systems, are not authorized to discharge to non-CCS surface waters through a point source. The closed-loop CCS is a permitted IWW facility (Permit No. FL0001562) and not "waters of the U.S." or "waters of the state" (FPL 2000). The cooling canals are closed to the public. (FPL 2018a, Section 2.2.3). Corrosion inhibitors, authorized by PTN's IWW/NPDES permit (FPL 2022a), are used to minimize system degradation and release of metals to the CCS. Discharge of any waste resulting from the combustion of toxic, hazardous, or metal cleaning wastes to any waste stream which ultimately reaches the CCS or waters of the state is prohibited, unless specifically authorized in the IWW/NPDES permit (FPL 2022a). The IWW/NPDES permit requires sampling within the CCS to maintain compliance with permit conditions, including reporting zinc, copper, and iron levels (FPL 2022a). Compliance with the IWW/NPDES permit would ensure that impacts are SMALL during the proposed SLR 20-year renewal period.

Mean pH of the CCS from June 2010 to December 2017 was reported at 8.24 with 10^{th} and 90^{th} percentiles of the pH readings being 7.78 and 8.72, respectively (FPL 2018c, Table 3). More

recently, the mean pH of the CCS from June 2020 to March 2021 was reported at 8.22. At the reported pH range of the CCS, the solubility of copper and iron is below 1.0 mg/l, and the solubility of zinc is approximately 10 mg/l. These lower solubility rates at the CCS's pH range minimize metal dissolution and the chances of them entering groundwater (Hoffland 2019).

The comprehensive regulatory controls and permits in place and PTN's compliance with them, guided by their internal procedures, would mitigate impacts to surface waters from PTN's continued operations during the proposed SLR 20-year renewal period.

Conclusion

PTN discharges to the CCS, a permitted IWW facility, and does not discharge to any surface waters of the state. PTN operates the CCS under IWW/NPDES Permit No. FL0001562. The permit includes monitoring for copper, iron, zinc, and other constituents in the CCS. Metals are monitored and metal constituents are controlled by use of BMP instructions developed to minimize metal discharges to the CCS. Compliance with the IWW/ NPDES regulatory requirements, permit conditions, and BMPs will ensure the impact of metals in PTN's cooling system effluent continues to be limited to a SMALL impact. Based on the site-specific analyses presented above, FPL finds that impacts from the discharge of metals in cooling system effluent during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 15 (Discharge of Biocides, Sanitary Wastes, and Minor Chemical Spills)

PTN SLRA ER Section (Page): 4.5.10.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the discharge of biocides, sanitary wastes, and minor chemical spills and concluded it would have a SMALL impact. The use of biocides is common and is required to control biofouling and nuisance organisms in plant cooling systems. However, the types of chemicals, their amounts or concentrations, and the frequency of their use may vary. The discharge of treated sanitary waste also occurs at plants. Discharge may occur via onsite wastewater treatment facilities, via an onsite septic field, or through a connection to a municipal sewage system. Minor chemical spills collected in floor drains are associated with industry in general and are a possibility at all plants. Each of these factors represents a potential impact on surface water quality. The NRC considered the potential impacts of these factors resulting from nuclear plant operations of surface water quality in its GEIS for license renewal. The NRC concluded that nuclear power plant operation under NPDES permits would mitigate impacts from biocides, sanitary wastes, and minor chemical spills to SMALL significance. (NRC 2013a, Section 4.5.1.1)

As discussed in Issue 9, PTN's cooling water and non-cooling water discharges are directed to the CCS with the exception of treated domestic wastewater which are authorized to discharge to non-potable groundwater. The closed-loop CCS is a permitted IWW facility (Permit No. FL0001562) and not a surface water body (i.e., "waters of the state"). The cooling canals are closed to the public and do not discharge to surface waters through a point source in violation of state and federal rules. (FPL 2018a, Section 2.2.3)

PTN's sanitary wastewater is discharged to non-potable groundwater via a septic system under the Florida Department of Health (FDOH) permit No. AP998256 (FDOH 2022) and to a subsurface injection well (Permit No. 0355186-001-UO/5W) after treatment (FDEP 2018b; FPL 2018a, Section 2.2.3.1). Sanitary wastewater is not discharged to the CCS or other surface water bodies; therefore, sanitary wastewater discharge effects on surface water are not applicable to PTN.

The IWW/NPDES permit authorizes the use of specific biocides and requires FDEP approval prior to use of any non-permitted biocide or chemical additive in the CCS or any other portion of the IWW system. (FDEP 2022b) The IWW/NPDES permit also prohibits the discharge of any waste resulting from the combustion of toxic, hazardous, or metal-cleaning wastes to any waste stream that ultimately reaches the CCS or waters of the state, unless specifically authorized in the IWW/NPDES permit. (FDEP 2022b) Sampling within the CCS and surrounding areas is required to maintain compliance with permit conditions (FDEP 2022b).

As discussed in Issue 9 (PTN SLR ER Section 4.5.6), effluents for all other systems, stormwater runoff, and equipment and containment area drains are routed to the closed-loop CCS, an IWW facility (Permit No. FL0001562). Stormwater runoff collects in drainage channels and floor drains, then typically flows through a series of stormwater catch basins before being discharged

directly to the CCS. Equipment and containment area drains are routed to oil/water separators prior to being discharged to the CCS. (FDEP 2022b; FPL 2018a, Sections 2.2.3 and 3.6.1.4.2)

PTN has an SPCC plan that addresses storage, secondary containment, and inspections per 40CFR 112. In addition, all aboveground storage tanks are equipped with secondary containment and, as appropriate, automated spill and overfill detection systems. For containers less than 55 gallons, PTN implements BMPs for storage and handling. There were no reportable spills associated with PTN during the period from 2012–March 2022 (FPL 2018a, Sections 9.5.3.7 and 9.5.3.8; FPL 2018b, RAI WM-1 and WM-2.

PTN has a comprehensive environmental protection program for the non-radiological hazards of plant operations guided by compliance with state, district, and local environmental permits and requirements. The comprehensive regulatory controls and permits in place and PTN's compliance with them, guided by their internal procedures, would prevent, or minimize impacts to surface waters from PTN's continued operations during the proposed SLR 20-year renewal period.

Conclusion

PTN discharges to the closed-loop cooling canals of the IWW facility (PTN's CCS) and does not discharge through a point source to any surface waters of the state. PTN operates the CCS under IWW/NPDES Permit No. FL0001562. The permit includes specific biocides and chemicals allowed to be used and requires any changes to be approved by FDEP. Discharges are monitored and constituents are controlled in compliance with the permit. Compliance with IWW/ NPDES regulatory requirements and permit conditions and the SPCC plan will ensure the impact of biocides and minor chemical spills continues to be limited to a SMALL impact.

PTN's sanitary wastewater is discharged to a septic system and to a permitted deep subsurface injection well after treatment. Sanitary wastewater is not discharged to the CCS or other surface water bodies; therefore, sanitary wastewater discharge effects on surface water are not applicable to PTN. Based on the site-specific analyses presented above, FPL finds that impacts from the discharge of biocides, sanitary wastes, and minor chemical spills during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 17 (Effects of Dredging on Surface Water Quality)

PTN SLRA ER Section (Page): 4.5.11.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the potential impacts to surface water quality from dredging operations to support nuclear power plant operations and found the issue to have SMALL impacts to all plants. In general, the NRC found maintenance dredging affects localized areas for a brief period of time. The NRC also recognized that dredging operations are performed under permits issued by the U.S. Army Corps of Engineers (USACE), and possibly from state or local agencies. (NRC 2013a, Section 4.5.1)

For PTN, the proposed action does not include dredging activities in surface waters of the state or those under federal jurisdiction (FPL 2018a, Section 9.5.3.1; NRC 2019a, Section 4.8.1.1). PTN's cooling water intake and discharge structures are located within the closed-loop CCS/permitted IWW facility (not waters of the US) and maintenance dredging activities within the CCS are not within the scope of this issue. Barge deliveries during the proposed SLR 20-year renewal period would be infrequent and any maintenance dredging, if required, would be conducted under federal, state, and local permits.

FPL conducts PTN operations in compliance with FDEP and USACE regulatory and permitting requirements of the Clean Water Act (CWA) Section 404 (FPL 2018a, Section 9.5.3.1). Restoration activities at Turtle Point and the barge basin, completed in 2020, involved fill activities requiring a CWA Section 404 permit (No. SAJ-2016-02462 [SP-MLC]). These non-recurring restoration activities were completed during the current license term. (FPL 2018b, Requests for Additional Information A-4 and WR-9; NRC 2019a, Section 3.5.1)

Conclusion

Given that PTN operations are conducted in compliance with regulatory and permitting requirements, should the need for dredging arise, the potential impacts would be mitigated to SMALL by adherence to any permits. Based on the site-specific analyses presented above, FPL finds that impacts from dredging on surface water quality during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 19 (Groundwater Contamination and Use) (Non-Cooling System Impacts)

PTN SLRA ER Section (Page): 4.5.12.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the use of groundwater for purposes other than cooling and the potential for groundwater contamination from plant operations other than discharges from the plant's cooling water system. Among common groundwater uses other than withdrawals for the cooling system is extraction or draining of groundwater for dewatering purposes and groundwater extraction for contaminant plume control. Contamination of groundwater and soil can result from leaks or spills of solvents, diesel fuel, gasoline, and other industrial chemicals; heavy metals deposited to soils from industrial activities; leaching of contaminants from wastewater ponds or lagoons; and other sources. The NRC considered the issue as associated with the programs and procedures commonly implemented at nuclear plants, including proper chemical and waste storage and handling; secondary containment and leak detection; use of BMPs and SPCC plans; compliance with federal and state regulations and permits; and groundwater monitoring programs. The NRC concluded that implementation of such programs and procedures would serve to mitigate any effects to groundwater use or quality to those of a SMALL impact. (NRC 2013a, Section 4.5.1.2)

PTN has five groundwater withdrawal systems: CCS freshening wells, CCS marine upset wells, Unit 5 production wells, Recovery Well System (RWS) extraction wells, and UIC test extraction wells and two groundwater disposal wells: Two of these systems, the freshening wells, and the marine wells, directly support the CCS. The remaining three systems support Unit 3, 4, and 5 process water needs and groundwater remediation objectives. PTN Unit 5 extracts groundwater from three permitted production wells, for Unit 5 blowdown water replacement and for PTN Units 3 and 4 as process water authorized by the conditions of certification in the Turkey Point site certification. The recovery well system and the UIC test extraction wells withdraw hypersaline groundwater from 10 production wells, located along the western edge and north of the CCS, and from two wells located beneath the center of the CCS respectively, for remediation purposes as further described in Issue 22. All five groundwater withdrawal systems and the potential of their withdrawals to degrade groundwater quality are assessed under Issue 21 (PTN SLR ER Section 4.5.13). As discussed in Issue 21 (PTN SLR ER Section 4.5.13), PTN operates all groundwater withdrawal wells that require permits as authorized by state or water management district permits. Evaluations for impacts to water availability and groundwater degradation were conducted prior to permit issuance, showing that impacts comport with state and district water use rules and criteria (FPL 2018d; SFWMD 2017). The marine wells and the UIC test extraction wells that withdraw groundwater with chloride concentrations greater than 19,000 mg/L, do not require consumptive use permits by rule. Use of groundwater extraction wells within the permitted limits and regulatory criteria will improve Biscayne Aquifer groundwater quality north, west, and beneath the PTN facility.

There are no construction or refurbishment plans related to the proposed action (FPL 2018a, Section 2.3 and 4.6.5.4); therefore, no dewatering activities would be needed for new construction or refurbishment. Also, there are no dewatering activities associated with current

Units 3 and 4 operations and none are anticipated for the proposed SLR term. In accordance with the Conditions of Certification, PTN is required to conduct dewatering for construction projects in accordance with Florida Administrative Code (F.A.C.) Rule 62-621.300(2) and submit a detailed plan for the proposed dewatering activities for review and approval. (FDEP 2022c)

A Class V, Group 3 gravity injection well (IW-1; underground injection control Permit No. 0355186-001-UO/5W) is located at the plant site and used to dispose of up to 35,000 gallons per day of treated domestic sanitary wastewater at the Units 3 and 4 wastewater treatment plant. As a permit condition, PTN monitors discharge volume and permit parameters and reports results to FDEP in monthly operating reports. (FDEP 2018b; FPL 2019a) A non-hazardous Class I injection well system (DIW-1; Permit No. 0293962-005-UO/MM) is located approximately 1.1 miles southwest of the plant site and is used to dispose of hypersaline groundwater extracted by the recovery well system. As a permit condition to ensure no degradation occurs to potable groundwater, PTN monitors permit specified water quality parameters using a monitoring well and reports results to FDEP in monthly operating reports. (FDEP 2018c; FDEP 2019)

PTN also has stormwater catch basins as part of its stormwater conveyance system. The stormwater management system for the plant is described in the PTN Units 3 and 4 SLR ER, Section 3.6.1.4.2. Stormwater runoff collects in drainage channels and floor drains, then typically flows through a series of stormwater catch basins before being routed to the CCS. Equipment and containment area drains are routed to oil/water separators then to the solids settling basins prior to being discharged to the CCS. (FPL 2018a, Sections 2.2.3 and 3.6.1.4.2) The IWW/NPDES permit requires PTN to implement programs targeting IWW and stormwater in order to prevent or minimize the generation of and the potential for release of pollutants from facility operations to groundwater (FDEP 2022b). The IWW BMPs program requires PTN to examine each facility component or system for waste minimization opportunities and determine and implement actions to reduce waste loadings and chemical losses to all wastewater and stormwater streams. Stormwater BMPs must include a preventive maintenance program that involves timely inspection and maintenance of stormwater management devices (e.g., cleaning oil/water separators, catch basins) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems. (FDEP 2022b) Implementation of these programs would also serve to protect groundwater.

Industrial practices at PTN that involve the use of chemicals are those activities typically associated with painting, cleaning parts/equipment, refueling onsite vehicles/generators, fuel oil and gasoline storage, and the storage and use of water treatment additives. Wherever there is a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g., precipitation), or other circumstances to result in amounts of pollutants reaching surface waters, the program must include a prediction of the direction, rate of flow, and the total quantity of pollutants which could be discharged from the facility as a result of each condition or circumstance. The use and storage of chemicals at PTN are controlled in accordance with FPL's chemical control procedure. PTN has an SPCC plan that addresses storage, secondary containment, and inspections. In addition, all aboveground storage tanks are equipped with secondary containment and, as appropriate, automated spill and overfill detection systems. For

containers less than 55 gallons, PTN implements BMPs for storage and handling. PTN also has waste management programs to oversee the storage and handling of its waste streams (FPL 2018a, Section 4.11). There were no reportable spills associated with PTN during the period from 2012–March 2022 (FPL 2018d, Sections 9.5.3.7 and 9.5.3.8; FPL 2018b, RAI WM-1 and WM-2.

As mentioned in the description of this issue, the scope of the groundwater contamination component of this issue does not include inadvertent releases of liquids containing radioactive materials into groundwater. The issue of radionuclides released into groundwater is addressed in the PTN Units 3 and 4 SLR ER and the NRC's SEIS.

Conclusion

Compliance with current water withdrawal and injection permits, IWW/NPDES permits, and stormwater regulatory requirements will ensure insignificant (i.e., SMALL) impacts on groundwater use and quality from non-cooling systems during the proposed SLR operating term. Based on the site-specific analyses above, FPL finds that impacts from groundwater contamination and use during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 21 (Groundwater Quality Degradation Resulting from Water Withdrawals)

PTN SLRA ER Section (Page): 4.5.13.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed groundwater drawdown due to water withdrawals, which can draw water into the aquifer. If the water is of lower quality, this poses the possibility of groundwater degradation. Further, wells in a coastal setting (e.g., ocean shore or estuary) have the potential to cause saltwater intrusion into the aquifer. The degree of saltwater intrusion depends on the cumulative pumping rates of wells, their screen depths, and hydrogeologic conditions. (NRC 2013a, Section 4.5.1.2)

The NRC recognized that nuclear power plants are not the large-volume groundwater users that would be a leading driver for saltwater intrusion in the plant's locale. The NRC concluded that groundwater withdrawals by nuclear power plants would have a SMALL impact on groundwater quality. (NRC 2013a, Section 4.5.1.2)

Hydrogeology and groundwater quality local to PTN is discussed in the SEIS, Section 3.5.2.1 (NRC 2019a).

The aquifers underlying Turkey Point are the Biscayne Aquifer and the Upper and Lower Floridan aquifers. Detailed descriptions of the aquifers are found in the SEIS Section 3.5.2.1 (NRC 2019a). The Biscayne Aquifer underlying PTN contains hypersaline water and is classified as G-III non-potable water use (Rule 62-520.410 Florida Administrative Code). The Upper Floridan Aquifer contains brackish water and is classified as G-II potable water use; and the Lower Floridan includes the Boulder Zone and contains saltwater classified as G-III non-potable water use. Saltwater intrusion in the Biscayne aquifer underneath and west of Turkey Point has been documented over 4 miles inland prior to the construction of the CCS. The water in this region of the Biscayne Aquifer was (at that time and continues to be) non-potable. (FPL 2021b)

PTN operations are supported by five sets of groundwater withdrawal wells as shown in Table 2.

Table 2: PTN Groundwater Wells

Name	Permit #	# Of wells	Identifiers	Aquifer	Purpose	Withdrawal Limit
Freshening wells	PA03-45	7	F1 through F7	Upper Floridan (brackish)	F1/Flex Well: Primary: Provide make-up water to the Condensate Storage Tank (CST) during Beyond Design Basis External Event (BDBEE) F1 alternate and F2-F7 primary: Cooling canals freshening	10,950 MGY with a maximum monthly withdrawal of 1,033.6 MG (permit limit)
Marine wells	No consumptive use permit required	3 (2 with pumps, 1 capped and on standby)	PW-1, SW-1, and SW-2	Biscayne (saline)	Supplemental water for CCS under “extraordinary circumstances” or “upset recovery”	Not Applicable
Recovery well system	13-06251-W	10	RW-1 through RW-10	Biscayne (hyper-saline)	Hypersaline groundwater removal	5,475 MG annual 15 MGD 465 MG month (permit limit)
Unit 5 Production wells	PA03-45	3	PW-1, PW-3, and PW-4	Upper Floridan (brackish)	PTN process water and Unit 5 cooling with blowdown to the CCS	14.06 MGD (permit limit)
UIC test extraction wells	No consumptive use permit required	4 (2 active, 2 capped on standby)	PW-1, PW-2, PW-3, and PW-4	Biscayne (hyper-saline)	Extraction for groundwater remediation	3.5 MGD (based on the UIC rated capacity of 18.64 MGD)

(FPL 2018a; FPL 2018d; FPL 2018e, RAI WR-2-a, IR RFI 4.5-004)

More details and annual pumping volumes for these wells (2015 to 2018) are presented in the SEIS Section 3.5.2.3, Table 3-7 (NRC 2019a). Recent annual pumping volumes for these wells (2019 to 2021) are presented in Table 3.

Table 3 Groundwater Withdrawals at the Turkey Point Site Withdrawals (mgy)

Year	UFA Site Production Well System (PW-1, PW-3, PW-4)	Biscayne Aquifer Marine Well System (PW-1 (test), SW-1, and SW-2) [a]	UFA Freshening Well System (F-1 – F7)	Biscayne Aquifer Testing and Recovery Well System (RW-1–RW-10)
2019	2,407.77	-	4,391.02 [b]	4,673.21[c]
2020	3,243.33	-	4,847.00 [b]	5,258.91[c]
2021	3,362.85	-	4,459.58 [b]	5,144.13[c]

Key: mgy=million gallons per year, UFA=Upper Floridan aquifer.

[a] Well PW-1 (test) and marine wells were not operated during the period January 2018 through December 2022. Well PW-1 (test) was capped on March 28, 2022.

[b] (SFWMD 2022a)

[c] (SFWMD 2022b)

The withdrawals from the Upper Floridan Aquifer for freshening were initially authorized in 2016 by Turkey Point Site Certification PA03-45E (FDEP 2016a) through a modification to the 2014 site certification. Although freshening actions were effective in moderating CCS salinity, the 14 mgd freshening allocation was not sufficient to offset evaporative losses from the CCS during drought periods and maintain low CCS salinities during below-normal rainfall periods. Therefore, FPL filed an application to modify Turkey Point Site Certification PA03-45E on October 9, 2020, to increase allowed withdrawal volumes and add additional freshening wells. (FPL 2020a) Turkey Point Site Certification PA03-45F was issued by FDEP on October 19, 2021, increasing the UFA annual allocation to 10,950 million gallons (average daily rate of 30 million gallons) with a maximum monthly allocation of 1,033.6 million gallons. (FDEP 2021) Two additional authorized upper Floridan aquifer (UFA) production wells (F2 and F7) began operations in January 2021 and November 2021, respectively.

The site certification process provides a certification that encompasses most licenses and permits needed from applicable Florida State, regional, and local agencies, including the South Florida Water Management District (SFWMD) water use review. During the SFWMD's review, the impact of the proposed water uses on existing land uses, pre-existing water rights, potential to cause saltwater intrusion, and the environment were fully evaluated and subject to public review and challenge prior to the water use allocation being granted. (FPL 2018d)

PTN conducted a technical evaluation in 2014 to support the proposed use of the Upper Floridan Aquifer for CCS freshening and again in 2020 to support a modification to the allocation. The evaluations used the ECFAS2 and ECFASV2 models respectively, developed for the SFWMD for water use permitting. The models were adapted to site-specific conditions

and re-calibrated using two aquifer performance tests conducted at PTN. The resulting regional calibrated groundwater flow models assess drawdown at nearby existing Upper Floridan Aquifer water users. The models demonstrated that the additional withdrawal from the Upper Floridan Aquifer would not interfere with existing permitted water users or harm the water resources of the area, consistent with SFWMD permit criteria. (NRC 2019a, Section 4.5.1.2, p4-32, and 4-33, FPL 2020a, page 12)

Prior to issuing a permit, the SFWMD reviews modeling conducted by the applicant regarding the proposed withdrawal to assess the potential impacts of the proposed extraction on local water resources and environmental features. For the recovery well system (Permit 13-06251-W), the SFWMD concluded that the potential for saline water intrusion or up-coning to occur in areas of the Biscayne Aquifer not already affected by saltwater intrusion as a result of the withdrawal of the recommended allocation is considered minimal. The SFWMD also looked at known sources of contamination in the area for potential of induced movement of contaminants from known sources of pollution to occur as a result of the withdrawal, concluding that the closest known source was outside of the cone of depression, and thus the potential for impact was minimal. (FPL 2018d; SFWMD 2017) Modeling conducted and presented in the 2020 application to modify the Turkey Point Site Certification (PA03-45E) demonstrate that the proposed increased allocation for freshening met all SFWMD consumptive use permit rules and Turkey Point Site Certification PA03-45F was issued on October 19, 2021.

The other systems withdrawing from the Biscayne Aquifer indicated in the table above are three marine wells and the UIC test extraction wells. These systems do not require a consumptive use permit due to chloride concentrations greater than 19,000 mg/l (i.e., saline water). The marine wells are only used under “extraordinary circumstances” or “upset recovery” conditions. The UIC test extraction wells are also used for groundwater remediation. Sustained withdrawals from the two operational UIC Test Extraction Wells (UICPW-1 and 2) were initiated in February 2020 at rates up to 3.5 mgd to remove hypersaline groundwater from beneath the CCS in conjunction with the 15 mgd RWS withdrawals. The rated capacity of the existing Underground Injection Control (UIC) non-hazardous Class I industrial wastewater disposal well (Permit No. 0293962-004- UO/MM) was modified (from 15.59 mgd to 18.64 mgd).

As presented above, PTN operates groundwater withdrawal wells authorized by state and water management district permits and as allowed under Florida regulations. Impact evaluations were conducted prior to permitting, showing minimal to no impacts were projected. Therefore, use of permitted wells within approved limits is not anticipated to result in groundwater degradation. Use of the marine wells and the UIC test extraction wells would also not lead to groundwater degradation given that the groundwater at the sites of the marine wells has an ambient salinity of seawater and the water produced from the UIC test extraction wells removes hypersaline groundwater as part of an approved groundwater remediation program. This assessment considers currently authorized or allowed withdrawals. The withdrawals of the freshening wells, marine wells, and RWS wells are associated with PTN’s remediation and restoration projects which are designed to reduce salinity levels in the CCS and retract the hypersaline plume to the PTN site border in accordance with the timeline required in the FDEP Consent Order, which is prior to the start of the proposed SLR term. Thus, the withdrawals would likely be less during the proposed SLR term and designed to maintain the restored and remediated conditions.

FPL performs ongoing monitoring and reporting on multiple aspects of its water use. This includes monitoring and reporting water use via a SFWMD-approved accounting system to ensure FPL's use is within its permitted allocation and therefore within the scope of potential impacts assessed during permitting. Monitoring is also required to ensure water quality is appropriate for its intended use (e.g., freshening), water use is having the anticipated impact (e.g., reducing, and moderating salinity within the CCS and underlying Biscayne Aquifer), and water use is not harming existing legal uses, natural resources, and off-site land uses (FDEP 2022c, SFWMD 2017).

Conclusion

Saltwater intrusion in the aquifers underneath PTN has been documented prior to construction of the CCS. PTN operates groundwater withdrawal wells authorized by state and district permits and as allowed under Florida regulations. Impact evaluations were conducted prior to permitting, showing that no impacts were projected, or impacts would be minimal. Therefore, use of permitted wells within approved limits is not anticipated to result in groundwater degradation. Use of the marine wells for "extraordinary conditions" or "upset recovery" and use of the UIC test extraction wells for groundwater remediation would also not lead to groundwater degradation. Withdrawal volumes during the proposed SLR term would change to correspond with improved conditions in the CCS and the Biscayne Aquifer and would be in accordance with current state and district authorizations. Compliance with current groundwater use regulatory requirements and permit conditions would ensure that groundwater quality would not be degraded due to groundwater withdrawals. Based upon the site-specific analyses above, FPL finds that impacts from groundwater quality degradation resulting from water withdrawals during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 22 (Groundwater Quality Degradation) (Plants with Cooling Ponds in Salt Marshes)

PTN SLRA ER Section (Page): 4.5.14.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed that the waters a nuclear power plant discharges to unlined cooling ponds can interact with the underlying shallow groundwater system and may create a groundwater mound. In this case, groundwater below the pond can flow radially outward, and this groundwater would have some of the characteristics of the cooling system. In salt marsh locations, the groundwater is naturally brackish (i.e., with a total dissolved solids concentration of about 1,000 to more than 10,000 milligrams per liter [mg/L]) and thus is already limited in its uses. The NRC limited its concern under this issue to only the potential for changing the groundwater use category of the underlying shallow and brackish groundwater due to the introduction of cooling water contaminants. Plants relying on water cooling systems located relatively near or constructed in salt marshes would not further degrade the quality of the shallow aquifer relative to its use classification. This is because groundwater quality beneath salt marshes is already too poor for human use (i.e., it is non-potable water) and is only suitable for industrial use. Plants relying on cooling ponds in salt marsh settings are expected to have a SMALL impact on groundwater quality. (NRC 2013a, Section 4.5.1.2)

For PTN, this issue was addressed in the SEIS. The NRC considered whether there was any new and significant information that might alter the conclusions reached in the GEIS to potentially change the groundwater use category of the underlying shallow and brackish groundwater. Based on the information identified, the NRC staff has concluded that the site-specific impacts for this issue at the Turkey Point site are MODERATE for current operations but will be SMALL during the subsequent license renewal term. New information, described in more detail below, continues to support the determination that the impact is SMALL.

In accordance with requirements imposed by FDEP and Miami-Dade County DERM (including the FDEP CO, FDEP IWW permit, FDEP COC, and MDC CA), FPL continues to implement CCS salinity and nutrient management programs (including adding lower salinity water to the CCS, improving CCS thermal efficiency, and vegetation management); a remediation project to recover hypersaline water from groundwater; and a monitoring and reporting program. (MDC 2015, FDEP 2016a, FDEP 2020, FDEP 2022b, FDEP 2022d, FPL 2019a, FPL 2020b, FPL 2021b, FPL 2021c, FPL 2021d)

Salinity and Nutrient Management

FPL's salinity management program continues to be effective in reducing the annual average salinity of the CCS from the high of 82.5 psu that occurred during the period from June 2014 through May 2015 to 39.2 PSU for the period from June 2020 through May 2021. (EEI 2016a, FPL 2021b). This year's annual average (calculated using June 2021 through April 2022 data) is trending to be one of the lowest annual average values on record at 35.8 PSU, very near the average salinity of seawater. For example, the daily average salinity in Biscayne Bay east and south of Turkey Point, fluctuates throughout the year and has ranged from a low of 12.3 PSU at monitoring station TPBBSW-3B on December 8, 2015 (EEI 2016b), to a high value of 47.5 PSU

at monitoring station TPBBSW-5B on August 13, 2014 (EEI 2016a), since bay monitoring adjacent to Turkey Point began in September of 2010. The reduced CCS salinity has beneficial groundwater impacts by reducing hypersaline groundwater production. As the annual average CCS salinity continues to trend toward 34 PSU (~19,000 mg/L), CCS salinity trends more saline than hypersaline.

A critical component of FPL's salinity management program is strategic utilization of the dedicated CCS Upper Floridan Aquifer (UFA) freshening water allocation, authorized most recently by a modification to state of Florida PPSA site license, PA 03-45F. This modification, issued by FDEP in October 2021, increased the UFA annual allocation to 10,950 million gallons (average daily rate of 30 million gallons) with a maximum monthly allocation of 1,033.6 million gallons (average of 34 million gallons per day). The site certification modification process solicits input from applicable Florida State, regional, and local agencies, including the South Florida Water Management District (SFWMD). During the SFWMD's water use review, the impact of the proposed water use on existing land uses, pre-existing water rights, potential to cause saltwater intrusion, induce movement of pollutants, and the environment, were modeled and fully evaluated and subject to public review and challenge prior to the water use allocation being granted. (FPL 2020a) FPL only uses the amount of water needed to achieve the 34 PSU annual average salinity target within the FDEP Consent Order (FDEP 2016b). FPL uses a conservation plan required by the site license to minimize water use while maximizing its effectiveness on freshening the CCS (FDEP 2022c.).

Improving and maintaining CCS thermal efficiency is another component of CCS salinity management. The FDEP Consent Order requires FPL to maintain a thermal efficiency of at least 70%. FPL uses thermal imagery to identify areas within the CCS where improved water flow or sediment removal is needed and strategically dredges portions of the CCS to achieve at least this level of efficiency. Average annual CCS thermal efficiency for each of the last three reporting periods was at least 85% (FPL 2019b, FPL 2020d, FPL 2021c).

FPL also implements a nutrient management plan required as part of the FDEP Consent Order (FDEP 2016b). The plan includes extensive vegetation management on CCS berms to reduce nutrient inputs to the CCS and incorporates berm sediment best management practices to prevent nutrients in berm sediment from entering the cooling canals. FPL also has implemented a nutrient rich foam capture and effluent disposal system and planted approximately 7 acres of seagrass, which serves to naturally sequester nutrients in the cooling canals.

Recovery of Hypersaline Water from Groundwater

FPL's recovery well system (RWS) has continued to operate since May 2018. As reported in the most recent 2021 Remedial Action Annual Status Report (RAASR Year 3), data demonstrate the net westward migration of the hypersaline groundwater has been halted, and hypersaline groundwater from the cooling canal system is being intercepted, captured, contained, and retracted by the RWS. (FPL 2021c)

The 2021 continuous surface electromagnetic mapping survey (Year 3 CSEM), compared to the 2018 baseline survey results, indicate the volumetric extent of the hypersaline groundwater has been reduced by 42% after 3 years of RWS operation. Groundwater monitoring data also indicate declining trends. The Year 3 monitoring data show the net number of monitoring wells

with declining trends in chloride, salinity, and/or tritium have increased in all three depth intervals, indicating positive signs of remediation vertically in the aquifer. In total, 20 of 23 monitoring wells showed a statistically significant declining trend in one or more parameters (quarterly chloride, quarterly tritium, and weekly average automated salinity), and at least one or more parameters were the lowest this reporting period compared to the 2018 baseline and Years 1 and 2. Based on CSEM data, the greatest reduction in percent hypersalinity volume is occurring in the lower portion of the aquifer, while the more significant reductions in groundwater monitoring well salinities are being measured in the upper portion of the aquifer as the plume shrinks from top to bottom. (FPL 2021c) This is due to the design of the remediation system which considers the fluid density of the plume. Accordingly, the extraction wells are open to the base of the aquifer, focusing on the removal of higher volumes of dense hypersaline groundwater in the deeper portion of the aquifer while causing the top of the plume to “sink” toward extraction points along the base of the aquifer. This results in measured salinity levels dropping first in the shallow monitoring wells and progressing to middle and deep monitoring wells as the plume continues to diminish (FPL 2021d).

Monitoring and Reporting Program

FPL monitors and reports water quality data and remediation progress to state, regional, and local agencies through multiple mechanisms, including the PTN site license, FDEP Consent Order, Miami-Dade County Consent Agreement, and the recently updated IWW permit (issued May 10, 2022). This data is reported to the agencies through Annual Monitoring Reports, Remedial Action Annual Status Reports, and routine uploads of daily, monthly, quarterly, and semi-annual data to an electronic data management system that the agencies can access.

FDEP issued a Notice of Intent in April 2020 to issue Turkey Point’s proposed Industrial Wastewater/National Pollutant Discharge Elimination System Permit Renewal (No. FL001562-012-IW1N) (IWW permit). The proposed renewal was challenged by third parties claiming, among other things, groundwater impairment and degradation by the CCS. A Florida administrative law judge adjudicated the challenge to FDEP’s intent to issue during a two-week hearing in January 2021. Substantial information, data, and conclusions related to water quality and remediation progress were presented and reviewed as part of the hearing, including much of the information provided to agencies in the above-referenced reports. In a February 2022 Order, the Judge recommended the Department enter a final order granting the IWW permit to FPL for renewal of its Turkey Point Cooling Canal System. The ALJ concluded FPL provided reasonable assurances that continued operation of the CCS under the IWW permit will meet all the applicable requirements of Florida Administrative Code chapters 62-4 (Permits), 62-302 (Surface Water Quality Standards), 62-520 (Ground Water Classes, Standards, and Exemptions), and 62-620 (Wastewater Facilities and Activities Permitting), and all applicable requirements of Florida Statutes Chapter 403 (Environmental Control). On April 29, 2022, FDEP adopted the Judge’s Order in its entirety and granted the IWW permit. (FDEP 2022c) FDEP issued the IWW permit May 10, 2022. (FDEP 2022b) The IWW permit term cannot exceed five years and therefore FDEP must review and renew the permit in five-year cycles for the life of the facility (Clean Water Act 33 U.S.C.1342).

In the PTN SEIS, the NRC identified a new site-specific Category 2 issue, “Water Quality Impacts on Adjacent Water Bodies (Plants with Cooling Ponds in Salt Marshes)” and concluded

that for this new site-specific issue, the impacts on adjacent surface water bodies via the groundwater pathway from the CCS during the subsequent license renewal term would be SMALL (NRC 2019a). Because this was considered previously as a site-specific issue, this issue does not need to be reassessed.

Conclusion

As discussed above, the NRC concluded in the SEIS that the impacts on groundwater quality from operations are MODERATE for the current operations but would be SMALL during the subsequent license renewal term. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS and the NRC's previous discussion of this issue in the PTN SEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN as supplemented here.

Supplemental Information for Category 1 Issue No. 23 (Exposure of Terrestrial Organisms to Radionuclides)

PTN SLRA ER Section (Page): 4.6.7.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the potential for radionuclides from normal operations to impact terrestrial organisms and concluded that impacts on terrestrial biota would be SMALL. In its review, the NRC considered the various pathways that radionuclides may be released from nuclear power plants into the environment. Releases into terrestrial environments often result from deposition of small amounts of radioactive particulates released from power plant vents during normal operations. These releases typically include krypton, xenon, and argon (which do not contain radioactive particles), tritium, isotopes of iodine, and cesium, and they may also include strontium, cobalt, and chromium. Radionuclides may also be released into the aquatic environment from the liquid effluent discharge line. Radionuclides that enter shallow groundwater from cooling ponds can be taken up by terrestrial plant species, including both upland species and wetland species, where wetlands receive groundwater discharge. Terrestrial biota may be exposed to ionizing radiation from radionuclides through direct contact with water or other media, inhalation, or ingestion of food, water, or soil. (NRC 2013a, Section 4.6.1.1)

As part of the 2013 GEIS analysis, the NRC conducted a review of all operating nuclear power plants to evaluate the potential impacts of radionuclides on terrestrial biota from continued operations. The NRC selected 15 representative plants to calculate estimated dose rates for terrestrial biota from nuclear plants. The maximum estimated dose rate calculated for any of the nuclear power plants was 0.0354 rad per day (rad/d) (3.54×10^{-4} Gray per day [Gy/d]) (riparian animal at the Browns Ferry plant), which is below the guideline value of 0.1 rad/d (0.001 Gy/d) for a riparian animal receptor. On the basis of these calculations and a review of the available literature, the NRC concluded that the impact of routine radionuclide releases from past and current operations and refurbishment activities on terrestrial biota would be SMALL for all nuclear plants and would not be expected to appreciably change during the proposed SLR term. (NRC 2013a, Section 4.6.1.1)

The NRC conducted a site-specific analysis of potential impacts to non-human biota for the proposed PTN Units 6 and 7 from both the proposed units and the existing PTN Units 3 and 4. The analysis showed that the total cumulative dose from gaseous and liquid effluent from all four units was well below guideline values for protection of biota populations. The International Atomic Energy Agency concluded that chronic dose rates of 1 mGy/d (100 mrad/d) or less do not appear to cause observable changes in terrestrial animal populations. The NRC concluded that the cumulative radiological impact on biota would not be significant. (NRC 2016, Section 5.9.5.3, and Appendix G.2.5)

Experience with the design, construction, and operation of nuclear power reactors indicates that compliance with the design objectives of Appendix I to 10 CFR Part 50 will keep average annual releases of radioactive material in effluents at small percentages of the limits specified in 10 CFR Part 20 and 40 CFR Part 190. No aspect of future operation has been identified that would

substantially alter this situation. (NRC 2013a, Section 4.9.1.1.1) The proposed action is to continue operations as currently designed; no refurbishment activities are proposed, so radioactive effluents would be similar to current operations.

The PTN REMP is designed to provide representative measurements of radiation and of radioactive materials through various media exposure pathways. The most recent available REMP sampling verifies that the levels of radiation and concentrations of radioactive materials in environmental samples are not increasing. The 2018, 2019, and 2020 REMP reports state that the measured exposure rates and air particulate/radioiodine samples are consistent with exposure rates observed during the pre-operational surveillance program. In addition, there were no indications of any other nuclides that could be attributed to plant effluents and there were no indications of any nuclides in waterborne sediment or food products attributed to plant effluents (FPL 2019b, Section III.C, FPL 2020c, FPL 2021e). Sampling by the Florida Department of Health for inclusion in the 2021 REMP also does not show adverse trends in levels of radiation (FPL 2022b).

Conclusion

Given (1) the previously issued environmental impact statement (EIS) conclusion based on site-specific analysis of cumulative impacts for the PTN site and continued operations expected to result in similar radioactive effluents; and (2) continued compliance with NRC radiological effluent limits and implementation of the REMP will ensure that the exposure of terrestrial organisms to radionuclides is well within guidelines and adverse trends are detected to implement corrective actions, the impacts to terrestrial organisms from radionuclides resulting from normal operations of PTN during the proposed SLR term would be SMALL. FPL finds that impacts from the exposure of terrestrial organisms to radionuclides during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 24 (Cooling System Impacts on Terrestrial Resources) (Plants with Once-Through Cooling Systems or Cooling Ponds)

PTN SLRA ER Section (Page): 4.6.8.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the physical alterations and other factors identified above for potential impacts of the operation of nuclear power plant cooling systems on terrestrial resources during the 20-year license renewal term by reviewing published site-specific radiological effluent release reports, site ERs, and SEISs. For this analysis, the NRC selected eight nuclear power plants with different types of cooling systems to investigate to determine the effects of cooling system operation on terrestrial resources. PTN was one of the eight plants for which NRC conducted a site-specific analysis. (NRC 2013a)

The NRC summarized its review of this issue in the FSEIS (NRC 2019a). Impacts on terrestrial biota associated with the operation of the cooling system have not been reported as a problem at any of the nuclear power plants evaluated. No adverse effects on terrestrial plants or animals have been reported as a result of increased water temperatures, fogging, humidity, or reduced habitat quality. Because of the low concentrations of contaminants within the liquid effluents associated with the cooling systems, the uptake and accumulation of contaminants in the tissues of wildlife exposed to the contaminated water or aquatic food sources are not expected to be a significant issue, and the impacts are expected to be SMALL for all plants. Potential mitigation measures would include regular monitoring of the cooling systems for water quality and measures to exclude wildlife from contaminated ponds. On the basis of these considerations, the NRC concluded that the impact of continued operation of the cooling systems on terrestrial resources would be SMALL for all nuclear plants. (NRC 2013a)

A site-specific evaluation is summarized here to determine the anticipated cooling system impact level associated with normal operations at PTN during the proposed SLR term.

PTN's CCS and its influence on the surrounding terrestrial habitat and terrestrial species populations is analyzed in the following sections. Continued operation of the plant during the SLR term is expected to include operation and maintenance of the CCS, maintenance of site facilities, releases of gaseous and liquid effluents, and maintenance of transmission lines. Terrestrial habitats and wildlife would continue to be exposed to impacts associated with these activities during the proposed SLR term, but these would not differ significantly from current conditions.

Several other issues address the potential discharge of contaminants and the controls that PTN has in place. Issue 9 discusses the programs, procedures, and permits that PTN has in place to prevent and mitigate impacts to surface water quality from non-cooling water discharges, land disturbance, stormwater runoff, and spills, including use of compliance with stormwater regulations and a spill prevention, control, and countermeasures plan. Moreover, the NPDES permit for PTN requires implementation of additional measures to further protect surface water, including programs targeting IWW and stormwater. Issue 9's assessment concludes impacts would be SMALL. Issue 14 addresses the discharge of metals in the cooling system effluent and Issue 15 addresses the discharge of biocides in the cooling system effluent. The discharge of

cooling water is subject to the current NPDES permit. The permit specifies which biocides can be used and requires monitoring for certain metals. The assessments for both issues conclude that the impacts to surface water from these constituents in the cooling water discharge would be SMALL. Issues 23 and 35 address terrestrial and aquatic resources exposure to radionuclides from PTN effluents. The assessments of both issues conclude that impacts would be SMALL.

PTN has implemented restoration/remediation activities to reduce salinity levels in the CCS and improve thermal conditions. As salinity, temperature, and other water quality parameters have improved in the CCS, PTN is restoring the seagrass beds in the CCS that act as biological filters. In late 2018, PTN began planting widgeongrass (Ruppia maritima), which was once the dominant seagrass species in the CCS and is adapted to higher salinity levels. During the previous reporting period, approximately 0.6 acre (32,670 plants) of seagrass (Ruppia maritima) were planted throughout the CCS, resulting in a total of 7 acres and over 100,000 individual plants being planted to date (FPL 2021b).

PTN has conducted annual monitoring since 2010 to determine if the CCS is impacting the surrounding area, including terrestrial ecological monitoring events to assess ecological conditions in the areas surrounding the CCS. PTN has collected porewater and ecological data from mangrove and marsh wetlands adjacent to the CCS and at control sites since the fall of 2010. These data have been submitted to state, regional, and local regulatory agencies on a semi-annual and annual basis since 2011. These data, combined with agencies' review, indicate there are no adverse impacts to marsh or mangrove wetlands resulting from operations of the CCS. The overall trends in species diversity and evenness have remained consistent throughout the entire period of record. The most recent annual monitoring reports state that data support the conclusion that the CCS does not have any ecological impact on the surrounding areas, and there is no evidence of CCS water in the surrounding marsh and mangroves areas from a groundwater pathway. (FPL 2020d, FPL 2021c)

As part of the SLR process, the NRC identified and reviewed new and potentially significant information for cooling system impacts on terrestrial resources such as the results of the terrestrial ecological monitoring events since 2010. The NRC concluded that operation of the CCS does not have a noticeable impact on wetlands or any other important attribute of the terrestrial resources on or near Turkey Point (NRC 2019a).

Additionally, as part of the SLR process, the U.S. Fish and Wildlife Service (USFWS) prepared a Biological Opinion (USFWS 2019, USFWS 2022) regarding the potential impact of continued operation on terrestrial species. The USFWS concluded for the piping plover, Kirtland's warbler, the Florida bonneted bat, Blodgett's silverbush, Cape Sable thoroughwort, Florida semaphore cactus, sand flax, and Florida bristle fern "no effect" due to no occurrence in the project area. The USFWS concluded the Florida panther, red knot, wood stork, and West Indian manatee may be affected, but are not likely to be adversely affected, by the proposed action. Federally listed species, including the American crocodile, its critical habitat, and the indigo snake were evaluated for the effects of the proposed action. After reviewing the current status of the American crocodile and its critical habitat, and the indigo snake, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, the USFWS's Biological Opinion concluded that the project, as proposed, is not likely to jeopardize the

continued existence of the American crocodile or indigo snake, and it will not adversely modify the critical habitat of the American crocodile (USFWS 2019). State and federally listed threatened and endangered species, including the American crocodile and indigo snake, have been addressed as a Category 2 Issue.

PTN monitors the American crocodile population annually to assess the condition and vitality of the population (FPL 2018a, Section 4.6). The most current report, the 2021 Annual American Crocodile Report, concluded that the population continues to remain in a much stronger position than before the Turkey Point CCS was established. With the continued environmental improvements taking place within the Turkey Point CCS, the American crocodiles had 27 successful nests in 2021. This resulted in 565 hatchlings being captured, processed, and released at Turkey Point in and around the CCS. PTN will continue to monitor the Turkey Point population. (FPL 2022c)

In addition to compliance with NPDES permit and associated BMP activities mentioned above, ongoing activities include maintenance activities on CCS berms and periodic removal of exotics (e.g., Australian pines, Brazilian pepper) from the CCS canals and berms, along the access roads, and CCS perimeter roads. On crocodile sanctuary berms, native vegetation is maintained, and all exotics are removed. Removal of the Australian pines on over 400 acres across the CCS has been completed thus far; this effort is currently ongoing and is expected to continue through 2023. Along with active removal of invasive exotic species, FPL planted native grasses on berms to aid erosion control and improve berm stability following completion of Australian pine removal activities. During the 2021 reporting period, 448,000 units of native salt tolerant grasses were planted on 10 berms and shorelines across the CCS. Removed vegetation from within the CCS is stockpiled on the berms and burned in accordance with a burn permit issued by the Florida Department of Agriculture and Consumer Services. The CCS berm maintenance plan includes procedures specific to the American crocodile sanctuary berm maintenance, and addresses scheduling of maintenance activities to minimize impacts during nesting season as well as pre- and post-nesting activities. Work in or around active American crocodile nests sites during March to August is prohibited. Furthermore, work on any American crocodile sanctuary or habitat must receive approval by the onsite crocodile biologist, and only trained operators can work on the sanctuaries. The American crocodile sanctuary berm maintenance procedure also addresses the need to avoid leaving ruts and depressions in the earth of the sanctuary berms as well as avoiding compaction of the earth that would inhibit a crocodile’s ability to dig to prepare its nesting site. (FPL 2018b)

PTN also conducts sediment removal activities within the CCS as part of the maintenance activities for the system (FPL 2018a, Section 3.6.1.4.4). Sections of the CCS in which sediment removal activities are undertaken are taken out of service and isolated to avoid turbidity and nutrient releases into the remaining in-service cooling canals. The sediment removal activities are sequenced to avoid mating and nesting periods for the American crocodile.

PTN has not proposed any refurbishment activities or construction of new facilities related to SLR (FPL 2018a, Sections 2.3 and 4.6.5.4). Land disturbance for continued operations at PTN would be related to routine infrastructure maintenance and renovation activities to maintain and upgrade or replace infrastructure and structures as needed to support PTN operations at PTN during the proposed SLR term. As detailed in Issue 9, FPL has an administrative procedure

addressing construction activities, which includes any clearing of land, excavation, or other action which would alter the physical environment or ecology of the site, thereby encompassing maintenance activities involving land disturbance.

The NRC's GEIS review of this issue considered the impacts on terrestrial resources that could result from reduced water availability due to surface water or groundwater withdrawals. The discussion of Issue 21 details groundwater withdrawals. PTN operates groundwater withdrawal wells authorized by state and district permits and as allowed under Florida regulations. Impact evaluations including those to environmental resources were conducted prior to permitting, showing that impacts from withdrawal and the potential for promoting contaminant migration were minimal.

The NRC's GEIS review of this issue also considered impacts of impingement on waterfowl at a cooling system's intake structure. As mentioned in Issue 26, only eight avian deaths were reported for the 2012–2021 time period. This low occurrence of avian deaths would indicate that none of the PTN structures, including the intake structure, have a significant impact on waterfowl.

Conclusion

This site-specific analysis agrees with the conclusions reached in the 2013 GEIS, which included specific analysis by the NRC on eight operating nuclear plants, including PTN. FPL has continued to monitor the surrounding surface waters and in its most recent annual report continued to conclude that there are no changes in Biscayne Bay water quality trends and no evidence of an ecological impact on the areas surrounding the CCS (FPL 2021b).

Due to controls to minimize contaminants in cooling system effluents, and continued adherence to federal, state, and local regulatory requirements, uptake, and accumulations of contaminates in the tissues of terrestrial wildlife, vegetation exposed to the waters of the CCS, or aquatic food sources are not expected to be significant. This issue is addressed in the FSEIS in Section 4.6.1. FPL finds that cooling system impacts on terrestrial resources during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 26 (Bird Collisions with Plant Structures and Transmission Lines)

PTN SLRA ER Section (Page): 4.6.9.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the impact on avian mortality from birds colliding with cooling towers and transmission lines by reviewing the primary literature for avian collision mortality associated with all types of man-made objects, as well as the results of monitoring studies conducted at six nuclear plants. The NRC found that collision mortality associated with nuclear plant structures and transmission lines represents only a fraction of the total annual bird collision mortality from all man-made sources. In addition, there are no reports of relatively high collision mortality occurring at the transmission lines associated with nuclear power plants in the United States. The length of nuclear power plant transmission lines is considerably less than the total 500,000 mi (800,000 km) of transmission lines estimated within the United States. The NRC staff concluded that bird collisions with cooling towers and other plant structures and transmission lines occur at rates that are unlikely to affect local or migratory populations. Therefore, the GEIS determined that the impact from bird collisions with cooling towers and transmission lines during the license renewal term was considered to be SMALL for all nuclear plants. (NRC 2013a)

PTN is connected to the 240-kV switchyard through a 590-foot-long transmission line. All in-scope transmission lines subject to the evaluation of environmental impacts for license renewal are located completely within the PTN site boundaries. The in-scope transmission lines at PTN are restricted to a fenced industrial area adjacent to and connecting PTN. (FPL 2018a, Section 2.2.5 and Figure 2.2-4)

Impacts to avian species that are federally listed by the USFWS as threatened or endangered were evaluated in the PTN SLR ER and addressed in the NRC's 2019 SEIS. (FPL 2018a, Section 4.6.6.4; NRC 2019a, Section 4.8.1.1) The NRC analyzed the potential impacts of the SLR for PTN and determined it would have no effect on the following species: piping plover (Charadrius melodus), Everglades snail kite (Rostrhamus sociabilis), and Kirtland's warbler (Setophaga kirtlandi). In its Biological Assessment for the proposed SLR for PTN Units 3 and 4, the NRC stated that "Because listed birds are not likely to occur near major plant structures and in-scope transmission lines, because the NRC staff is not aware of any known collisions, and because PTN maintains a voluntary corporate Avian Protection Plan (APP), the NRC staff finds that the likelihood of collision during the remainder of the current license and the period of extended operations would be very unlikely." (NRC 2018, Section 6.1.2.1)

The NRC also determined that the impacts of the SLR for PTN may affect, but not adversely affect the red knot and wood stork (NRC 2019a). In its July 2019 Biological Opinion, the USFWS reviewed the NRC's 2018 Biological Assessment, and other information and concluded that the likelihood of collisions for the red knot and wood stork is extremely unlikely because suitable habitat for these birds does not occur near major plant structures or in-scope transmission lines. The USFWS staff acknowledged that cooling towers present the greatest risk for bird collisions at nuclear power plants, and PTN has no cooling towers. In addition, the

USFWS considered that PTN is required to act in the event that site personnel discover an injured or dead bird associated with a collision; that there are no documented reports of collisions of red knots or wood storks with PTN structures; and that PTN also minimizes the impacts on bird species from collisions with in-scope transmission lines through its voluntary corporate APP. The NRC determined the proposed SLR term for PTN may affect, but it is not likely to adversely affect, the red knot or the wood stork. The USFWS concurred with the NRC based on the lack of documented collisions, PTN's voluntary corporate APP, and the limited time red knots or wood storks would utilize the area during migration. (USFWS 2019)

PTN has permits and reporting requirements for migratory bird protection. The 2018 PTN SLR ER reported two bird deaths at PTN. The updated data at PTN from 2012-2021 results in a total of eight bird deaths: one brown pelican (2016), three white pelicans (2017, 2021), one anhinga (2020), two grackles (2020 and 2021), and one green heron (2021) (PTN only reports on birds that are handled/removed/disposed of) at PTN from 2012–2021. This low occurrence of avian deaths would indicate that none of the PTN structures have a significant impact on the local or migratory bird populations. In addition, PTN’s adherence to regulatory and permit requirements for protected species and PTN’s administrative controls, such as those regarding response to avian collisions with transmission lines, minimize or avoid impact to these species. (FPL 2018a, Section 4.12.5.1)

PTN has no cooling towers (FPL 2018a, PTN SLR ER Section 2.2.3) and PTN has not proposed any refurbishment activities or construction of new facilities related to SLR. (FPL 2018a, PTN SLR ER Sections 2.3 and 4.6.5.4) Therefore, bird collisions with plant structures and transmission lines are not expected to affect local or migratory bird populations during the proposed SLR term.

Conclusion

Given that PTN has only had eight bird mortalities in the last 10 years; that the plant does not have any cooling towers; and that PTN will continue to follow regulatory and permit requirements for protected species as well as FPL’s administrative controls, it is not expected that an additional 20 years of plant operation would cause impacts to bird populations. FPL finds that impacts resulting from bird collisions with plant structures and transmission lines during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 27 (Transmission Right-of-Way Management Impacts on Terrestrial Resources)

PTN SLRA ER Section (Page): 4.6.10.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the impacts of transmission line ROW management on terrestrial resources and found that although the initial habitat destruction associated with ROW clearing can have numerous consequences on wildlife populations, the proper management of transmission line ROW areas does not have significant adverse impacts on current wildlife populations and that ROW management can provide valuable wildlife habitats. The NRC noted that continued ROW management during the license renewal term will not lower habitat quality or cause significant changes in wildlife populations in the surrounding habitat. Therefore, the NRC concluded that the impact of continued transmission line ROW management on terrestrial resources is SMALL for all nuclear plants. (NRC 2013a)

PTN is connected to the 240-kV switchyard through a 590-foot-long transmission line. All in-scope transmission lines subject to the evaluation of environmental impacts for license renewal are located completely within the PTN site boundaries. The in-scope transmission lines at PTN are restricted to a fenced industrial area adjacent to and connecting PTN, with limited ecological features. (FPL 2018a, Section 2.2.5 and Figure 2.2-4) PTN has not proposed any refurbishment activities or construction of new facilities related to SLR (FPL 2018a, Sections 2.3 and 4.6.5.4)

Under the Conditions of Certification, use of herbicides is monitored by the Southeast District and the siting coordination office of the FDEP. PTN is required to notify both the Southeast District and the siting coordination office of the type of herbicides to be used 60 days prior to use under permit No. PA 03-45. (FDEP 2016a, Section IV). PTN has administrative policies and implements BMPs for preventing erosion from soil disruption related to maintenance and management. The IWW/NPDES permit renewal requires PTN to implement BMPs to protect surface water and groundwater from runoff of pollutants and loose soil in industrial areas. (FPL 2022a, Sections II.D.12 and VII.C) Any area that is under conditions that could produce pollutants and sediments reaching surface water or groundwater, including those exposed to precipitation, must be mapped to determine the direction of flow, type of pollutant, quantity of pollutants, and potential for erosion. Stormwater BMPs must include stabilization measures to limit soil erosion, and measures to reduce the potential for the pollutant to reach surface waters and groundwater. (FPL 2022a, Section VII.C)

The ROW is highly developed and has very few ecological resources present. (FPL 2018a, PTN SLR ER Figure 2.2-4) Due to the high levels of disturbance and human presence, wildlife use of the ROW is likely to remain minimal. Because of the highly mobile nature of most wildlife species, any potential displacement from ROW management will be temporary. High levels of disturbance can increase presence of invasive species. Exotic invasive species are removed from the site and burned in accordance with the Florida Department of Agriculture and Consumer Services burn permit. (FPL 2018b, RAI T-1) Florida Statute 403.509 requires PTN to have an environmental control program for construction activities within the PTN certified boundary that includes minimizing the adverse effects on the environment and the ecology of

land, water, and wildlife (29-403.509(2)(f), F.A.C.). The comprehensive regulatory controls and permits in place and PTN's compliance with them, guided by their internal procedures, combined with limited resources within the ROW, would mitigate impacts to terrestrial resources from PTN's continued operations during the proposed SLR term.

Conclusion

The in-scope transmission ROW is developed, fenced, and industrialized. Management of the ROW is not likely to affect terrestrial resources. Implementation of BMPs will ensure continued minimal impact on terrestrial resources from ROW management and maintenance. FPL finds that impacts on terrestrial resources from transmission line ROW management during the proposed SLR term would be SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 28 (Electromagnetic Fields on Flora and Fauna) (Plants, Agricultural Crops, Honeybees, Wildlife, and Livestock)

PTN SLRA ER Section (Page): 4.6.11.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the impacts of electromagnetic fields (EMFs) on flora and fauna and concluded that no significant impacts of EMFs emitted on terrestrial biota have been identified. Although foliage very close to lines can be damaged, the overall productivity and reproduction of native and agricultural plants appear unaffected. Also, no evidence suggests significant impacts on individual animals or wildlife populations that are chronically exposed to EMFs under transmission lines or in the towers. Livestock behavior and production also appear unaffected by line operation. Therefore, the potential impact of EMFs on terrestrial biota is expected to be of SMALL significance for all plants. (NRC 2013a, Section 4.6.1.1)

At PTN, the in-scope transmission lines are confined to the PTN site and cross developed areas (FPL 2018a, Figure 2.2-4). Therefore, the in-scope lines do not cross agricultural fields, pastures, and wildlife habitat. Exposure to flora and fauna from electromagnetic fields (EMFs) due to in-scope transmission lines would be incidental and minimal. The NRC's 2013 literature search on the issue indicated that the EMFs produced by operating transmission lines up to 1,100 kV have not been reported to have any biologically or economically significant impact on plants, wildlife, agricultural crops, or livestock. (NRC 2013a, Section 4.6.1.1) The in-scope transmission lines are 240-kV and cross a 590-foot span between the generating units and the switchyard (FPL 2018a, Section 2.2.5). Consequently, impacts on terrestrial flora and fauna due to EMF exposure from the in-scope transmission lines are not anticipated during the proposed SLR term.

Conclusion

Given that in-scope transmission lines are confined to developed areas and are of a voltage not reported to have any biologically significant impact on plants, wildlife, agricultural crops, or livestock, the EMFs emitted by the PTN in-scope transmission lines would have no impact on flora and fauna. FPL finds that impacts from electromagnetic fields on flora and fauna during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 30 (Entrainment of Phytoplankton and Zooplankton) (All Plants)

PTN SLRA ER Section (Page): 4.6.12.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the entrainment of phytoplankton and zooplankton and found that due to no change in operation of the cooling system during the license renewal term, no change in effects on entrainment of phytoplankton and zooplankton was anticipated. Therefore, the NRC determined that entrainment of phytoplankton and zooplankton is expected to have a SMALL impact on populations of these organisms in source water bodies for all plants. Use of closed-loop cooling systems can reduce the effects of entrainment on zooplankton and phytoplankton as compared to once-through cooling systems (NRC 2013a, Section 4.6.1.2).

PTN Units 3 and 4 employ a closed-loop cooling system. PTN has not proposed any refurbishment activities or construction of new facilities related to the proposed SLR. (FPL 2018a, Sections 2.3 and 4.6.5.4)

Phytoplankton and zooplankton can be entrained at PTN when water from the CCS is pulled into the intake structures. (NRC 2019a, Section 4.7.1.1) However, entrainment impacts are limited because they are confined to the CCS. The CCS is regulated by the State of Florida under Permit No. FL0001562. (FPL 2018b, RAI No. A-3, Attachment 4) PTN's closed-loop, recirculating cooling system neither withdraws from nor discharges through a point source to any surface waters of the state. There is no direct, point source connection between the CCS and adjacent surface water features through which phytoplankton and zooplankton could travel (FPL 2018a). This absence of surface water connections prevents the establishment of new aquatic communities in the CCS. Fish species diversity in the CCS is low, with four species—sheepshead minnow (*Cyprinodon variegatus*), sailfin molly (*Poecilia latipinna*), eastern mosquitofish (*Gambusia holbrooki*), and mudflat fiddler crabs (*Uca rapax*)—representing the aquatic community. (NRC 2019a, Section 4.7.1.1) The diversity of phytoplankton and zooplankton is also less likely to be diverse in the CCS due to the lack of surface water connections. Therefore, it is reasonable to conclude that the phytoplankton and zooplankton community present in the CCS only influences the upper trophic levels within the CCS and does not have a larger influence on adjacent surface waters.

Further, water from the CCS moves through eight intake channels and flows through 0.37-inch mesh screens with a maximum flow rate per intake channel of 225,375 gpm. (NRC 2019a, Sections 3.1.1 and 4.7.1). The CCS comprises 5,900 acres, and its large size relative to the small intake area further reduces impacts of entrainment. Therefore, potential entrainment of phytoplankton and zooplankton due to license renewal is unlikely to significantly negatively affect the aquatic environment. (NRC 2019a, Section 4.7.1.1)

Conclusion

Due to the absence of surface water connections between the CCS and surface waters, FPL finds that impacts from entrainment on phytoplankton and zooplankton during the proposed SLR term are limited to the CCS and would have a SMALL impact on aquatic resources.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 32 (Infrequently Reported Thermal Impacts) (All Plants)

PTN SLRA ER Section (Page): 4.6.13.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed infrequently reported thermal impacts for all nuclear plants. Potential effects common to the operation of nuclear power plant cooling systems considered by NRC in the license renewal GEIS as infrequently reported thermal impacts are listed below, along with a description of the effect. The mitigation measures identified for the thermal effect are also included in the description and/or the standard used by NRC to classify the impacts of the effect as being of small significance. The NRC's review revealed only SMALL levels of impact in the aquatic resources due to the infrequently reported thermal impacts and expects the same at all plants. (NRC 2013a, Section 4.6.1.2)

Cold shock. Cold shock can occur when organisms acclimated to the elevated temperatures of a thermal plume are abruptly exposed to temperature decreases when thermal effluent stops. Such events are most likely to occur during winter. Cold shock events have only rarely occurred at nuclear plants Gradual shutdown of plant operations generally precludes cold shock events.

Creation of thermal plume migration barriers. The potential exists for thermal plumes to create a barrier to migrating fish if the mixing zone covers an extensive cross-sectional area of a river and exceeds the fish avoidance temperature. A demonstration of the size of the cross section being small enough to allow passage could indicate a SMALL impact.

Changes in the distribution of aquatic organisms. Impacts of thermal discharges on the geographic distribution of aquatic organisms are considered to be of SMALL significance if populations in the overall region are not reduced.

Accelerated development of aquatic insect maturation. Heated effluents could accelerate the development of immature stages of aquatic insects in freshwater systems, resulting in premature emergence. If adults emerge before the normal seasonal cycle, they may be unable to feed or reproduce. The NRC did not describe any occurrences of this effect at nuclear power plants and acknowledged that the literature search indicated it had not been observed in field investigations. The NRC also included the stimulation of population growth of macroinvertebrates from heated effluents under this effect, citing an occurrence at one nuclear power plant that was not linked to direct increases in water temperatures, but surmised to be the result of increases in zooplankton, vegetation, and current velocities in the area of the discharge.

Stimulation of the growth of aquatic nuisance species. An aquatic nuisance species is a non-indigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural, or recreational activities dependent on such waters. Thermal discharges can allow nuisance species, such as the Asiatic clam (*Corbicula fluminea*) and zebra mussel (*Dreissena polymorpha*), to become established or proliferate. The effects of stimulating the growth of nuisance organisms are considered to be of SMALL significance to aquatic resources if these organisms are restricted to the condenser

cooling system (e.g., Asiatic clam; zebra mussel) or do not proliferate beyond the immediate vicinity of the plant. Effects on nuisance organisms could be reduced by changing to a closed-cycle cooling system or by reducing the plant's generation rate.

PTN's discharge canal receives heated effluent from the plant and distributes the flow into the 32 feeder canals of the CCS. The CCS was designed and constructed as an IWW facility and is operated under IWW/NPDES Permit No. FL0001562. The CCS is a closed-loop cooling system which neither withdraws from nor discharges through a point source to any surface waters of the state. (FPL 2018a, Sections 2.2.3.2 and 3.6.1.4.1) Therefore, the CCS does not create thermal plume migration barriers, contribute to changes in the distribution of aquatic organisms in the region, promote population growth of macroinvertebrates in area surface waters, or allow nuisance species to become established or proliferate in area surface waters. Also, the waters of the CCS are not freshwater (see Issue 22); therefore, the concern that heated effluents could accelerate the development of immature stages of aquatic insects in freshwater systems is not applicable to PTN. As for cold shock, the CCS is located in southern Florida and thus would not experience the low water temperatures characteristic of cold shock events experienced at other nuclear power plants, even if the thermal effluent was suddenly stopped.

To further explore the potential for thermal impacts to extend beyond the CCS regarding this issue of infrequently reported thermal impacts, the results of PTN's extensive monitoring network are informative. In 2010, PTN initiated an extensive monitoring network to study the potential influence of the CCS to surrounding areas (FPL 2018a, Section 3.6.1.4.5). The annual monitoring report concluded that the cooling canals of the IWW facility do not have any ecological impact on the surrounding areas and there is no evidence of water migration from the canals into the surrounding marsh and mangroves areas via a groundwater pathway. Water quality and temperature data from Biscayne Bay and Card Sound continue to indicate there is no influence from the CCS. (FPL 2021b. Executive Summary and Sections 7.2 and 7.3)

Conclusion

As discussed above, most of the potential effects associated with this issue are not applicable to PTN's thermal discharge and its cooling water treatment system. Given that (a) PTN's thermal discharge is to the closed-loop CCS which does not discharge to surface water of the state through a point source (b) the CCS is a permitted IWW facility, and (c) extensive monitoring does not indicate significant thermal inputs to the surrounding area attributable to PTN's thermal discharge, FPL finds that infrequently reported thermal impacts from PTN's heated discharge during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 33 (Effects of Cooling Water Discharge on Dissolved Oxygen, Gas Supersaturation, and Eutrophication)

PTN SLRA ER Section (Page): 4.6.14 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the potential effects on aquatic biota from low dissolved oxygen levels, gas supersaturation (gas bubble disease), and eutrophication for nuclear power plant cooling water discharges. The addition of a heat load to an aquatic ecosystem via the discharge of cooling water has the potential to stress aquatic biota by simultaneously increasing metabolic rates and the need for oxygen and by reducing dissolved oxygen concentrations to sub-optimal levels. The potential for effects on biota from a reduction in the dissolved oxygen concentration is greater in ecosystems where dissolved oxygen levels are already approaching sub-optimal levels as a result of other factors that affect the environment. Thus, organisms in ecosystems where (1) the biological demand for dissolved oxygen is elevated as a result of increased levels of detritus or nutrients (e.g., eutrophication from runoff containing fertilizers or manure or from the release of dead, entrained organisms in the discharge of once-through cooling systems); or (2) low flow levels and high ambient temperatures already exist (e.g., as a result of drought conditions or hot weather) may be more susceptible to negative effects if dissolved oxygen levels are reduced further. For this reason, the U.S. Environmental Protection Agency (EPA) and states often regulate dissolved oxygen to ensure that minimum levels will be maintained. (NRC 2013a, Section 4.6.1.2)

In addition to the effects of cooling systems on dissolved oxygen described above, the NRC reviewed the potential for impacts to aquatic organisms from gas bubble disease. The rapid heating of water in the condenser cooling system also decreases the solubility and saturation point for other dissolved gases. Thus, as the water passing through the cooling system is heated, the water becomes supersaturated with gases. Although the levels of dissolved gases will return to normal values as the water cools and mixes with ambient waters, tissues of aquatic organisms that remain in the supersaturated effluent for extended periods can become equilibrated to the increased partial pressures of gases within the effluent. If these organisms are subsequently exposed to water with lower partial pressures (which occurs when the water cools or when the organisms move to water in other locations or at other depths), dissolved gas (especially nitrogen) within the tissues may come out of solution and form embolisms (bubbles) within the affected tissues, most noticeably the eyes and fins. The resulting condition is known as gas bubble disease. (NRC 2013a, Section 4.6.1.2)

In the 2013 GEIS, the NRC concluded that there would be no change in effects of low dissolved oxygen concentrations or gas supersaturation on aquatic biota during the license renewal term in the absence of changes to operation of the cooling system or the ambient conditions. Overall, the NRC concluded that impacts of plant operation on low dissolved oxygen concentrations and gas supersaturation attributable to cooling water discharges would be SMALL for all plants. (NRC 2013a, Section 4.6.1.2)

PTN's CCS, which receives PTN's thermal discharge, was designed and constructed as an IWW facility. The IWW permit and the federal NPDES permit (delegated to State of Florida) are

jointly issued under Permit No. FL0001562. The CCS is a closed-loop system and does not discharge through a point source to surface waters of the state. (FPL 2018a, Section 3.6.1.4.1; FPL 2018b, RAI A-2) PTN has not proposed any refurbishment activities or construction of new facilities related to SLR (FPL 2018a, Sections 2.3 and 4.6.5.4); therefore, no alterations that could affect these aspects of the cooling system are anticipated for the proposed SLR operating term.

The compliance history for the CCS is detailed in PTN Units 3 and 4 SLR ER, Section 3.6.1.4.5. Previous compliance issues concerned the CCS's interactions with the adjacent groundwater aquifer. As discussed below, an extensive monitoring network was put in place to determine if the groundwater pathway has affected area surface water and ecological resources. There are no violations or exceedances of the current IWW/NPDES permit regarding discharges to the CCS. (FPL 2018a, Sections 3.6.1.4.5 and 9.3; FPL 2018b, RAI WR-5; FPL 2022a).

As discussed in the PTN Units 3 and 4 SLR ER Section 3.6.1.4.5, the conditions of certification required additional monitoring to determine if the cooling canals are having an effect on the surrounding area. PTN monitors dissolved oxygen levels and nutrient levels such as ammonia, nitrogen, and phosphorus that can promote eutrophication in canals outside of the CCS and/or in Biscayne Bay/Card Sound. Monitoring for dissolved oxygen and ammonia is conducted within the CCS for comparison. Water samples collected from within the CCS exhibited no stratification and contained high levels of dissolved oxygen and low levels of ammonia throughout the water column and across the CCS. The CCS is not a source of low dissolved oxygen. Monitoring results outside of the CCS indicate that CCS water is not contributing nutrients that would promote eutrophication to the surrounding aquatic resources. Surface water samples with dissolved oxygen levels below the regulatory standard were limited to deep, stagnant, man-made canals located outside the CCS where anoxic groundwater seeps into the lower portions of the canals. These samples are not attributable to the CCS. Dissolved oxygen levels in Biscayne Bay were consistently measured above regulatory standards. Nutrient levels were also occasionally elevated at the bottom of the deep, stagnant man-made canals located outside of the CCS. The sources of the elevated nutrients are decaying plant detritus and runoff from area wetland organic soils. However, these canals at Turtle Point and the barge-turning basin were restored under a CWA Section 404 permit in December 2018 and May 2020, respectively. Nutrient levels measured in the near-shore Biscayne Bay sites adjacent to the CCS were low and comparative to the low Biscayne Bay levels measured miles away from the CCS. (FPL 2018c) Continued monitoring confirms prior findings that there is no indication that the CCS discharges to or has adversely impacted Biscayne Bay (FPL 2020d, FPL 2021c, FDEP 2022c).

No concerns were noted in the initial license renewal regarding gas supersaturation (NRC 2002a, Section 4.1). Because the CCS does not allow abrupt temperature changes or offer wide ranges in depth, and is a closed loop, if gas supersaturation occurs and the aquatic community is equilibrated to the increased partial pressures, the organisms would not have the opportunity to be subsequently exposed to lower partial pressures (which occurs when the water cools or when the organisms move to water in other locations or at other depths) to result in gas bubble disease.

To summarize, PTN discharges its cooling water to a permitted IWW facility, operates the facility in compliance with its permit, and has no plans to alter its cooling water system. Available data on the CCS, which also happens to serve as aquatic habitat, was evaluated to determine if the permitted facility has low dissolved oxygen, experiences eutrophication, or conditions that promote supersaturation of gases or contributes to these conditions in surrounding aquatic habitat.

Conclusion

PTN's cooling water discharge is to the CCS, which is permitted as an IWW facility and is not considered waters of the state. PTN discharges cooling water to the CCS in compliance with its current IWW/NPDES permit. Based on compliance with the requirements of the current IWW/NPDES permit the impacts from the effects of cooling water discharge on dissolved oxygen, gas supersaturation, and eutrophication within the CCS during the proposed SLR term would be insignificant (i.e., SMALL). Furthermore, monitoring data indicate that the CCS is not low in dissolved oxygen and the CCS does not contribute to conditions of low dissolved oxygen and elevated nutrient levels in the surrounding aquatic environment. Operating experience with the CCS has not indicated gas supersaturation to be of concern in the CCS.

FPL finds that impacts from the effects of cooling water discharge on dissolved oxygen, gas supersaturation, and eutrophication during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 34 (Effects of Non-Radiological Contaminants on Aquatic Organisms)

PTN SLRA ER Section (Page): 4.6.15.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the impact of continued operations during the license renewal term resulting in exposure of aquatic organisms to non-radiological contaminants. As long as changes to the cooling system, such as during refurbishment, do not occur during the license renewal term and the discharge requirements of the NPDES permit are met, no impact of contaminants on aquatic biota would be anticipated. On the basis of these considerations, the NRC concluded that the impact of contaminants on aquatic organisms associated with continued operations and refurbishment would be SMALL for all nuclear plants. (NRC 2013a)

The accumulation of contaminants in sediments and biota was designated as a Category 1 issue in the 1996 GEIS. Heavy or toxic metals (e.g., copper, zinc, and chromium) may be leached from condenser tubing and other heat exchangers and discharged by power plants as small-volume waste streams or corrosion products. Although heavy metals are found in small quantities in natural waters (and many are essential micronutrients), concentrations in the power plant discharge are typically controlled in the NPDES permit because excessive concentrations of heavy metals can be toxic to aquatic organisms. Discharges of metal and other toxic contaminants may also be subject to individual control strategies developed by the states to control toxic pollutants under the CWA. These strategies for point source discharges of toxic pollutants are implemented through the NPDES permit program. Heavy metal concentrations in discharges during normal operations are generally low. (NRC 2013a)

PTN has not proposed any refurbishment activities or construction of new facilities related to SLR (FPL 2018a, Sections 2.3 and 4.6.5.4); therefore, no alterations that could affect the CCS are anticipated for the proposed SLR operating term. The CCS is permitted as an IWW treatment facility (Permit No. FL0001562), and releases of IWW to the cooling canals (which are not considered waters of the state) are authorized. Issue 14 addresses the discharge of metals in the cooling system effluent and Issue 15 addresses the discharge of biocides in the cooling system effluent. The Issue 14 and Issue 15 assessments conclude that the impacts to surface water from these constituents in the cooling water discharge would be SMALL.

For assessment of other license renewal environmental issues, the NRC assumed that the species that make up the current aquatic community of the CCS are also representative of the aquatic community that would be present in the CCS during the proposed SLR term. The CCS aquatic community is of low diversity with only four species—sheepshead minnow, sailfin molly, eastern mosquitofish, and mudflat fiddler crab collected during the last ecological survey of the CCS in 2016 (EAI 2017). The 2016 ecological survey found no evidence that the environmental conditions within the CCS were negatively affecting the growth or reproduction of the species captured. (NRC 2019a; EAI 2017) The finding regarding no evidence of the environmental conditions within the CCS negatively affecting the species would have taken into account

exposure of the species to contaminants (e.g., metals and biocides) within the cooling water discharge.

PTN has implemented an expanded monitoring program that has helped facilitate addressing water quality issues in the CCS that has the potential to increase the exposure of aquatic organisms to sub-lethal stresses. PTN implemented restoration/remediation activities to reduce salinity levels in the CCS and improve thermal conditions. There have been improvements in the water quality in the CCS (e.g., stable temperatures as well as a reduction in salinity, nutrient concentrations, and turbidity) (FPL 2021b). The most recent monitoring report (FPL 2021b) stated remediation activities were effective in reducing the salinity levels in the CCS to the lowest annual average value since the start of monitoring. Further, as discussed in Issue 22, the RAASR Year 3 data demonstrate that the net westward migration of the hypersaline groundwater has been halted, and hypersaline groundwater from the cooling canal system is being intercepted, captured, contained, and retracted by the RWS. The continuous surface electromagnetic mapping survey compared to the 2018 baseline survey results indicate reduction in the volumetric extent of the hypersaline groundwater by 42% after 3 years of RWS operation. (FPL 2021c)

FPL continues to implement the CCS Thermal Efficiency Plan at PTN which includes the removal of large Australian pine trees on the CCS berms that add organic nutrients to the canals and impede air flow across the canals, which is important to cooling. The ongoing actions have continued to reduce the overall CCS temperatures. Since 2015, FPL has taken ongoing actions to expand the return of native submerged aquatic vegetation to the CCS canals to sequester canal nutrients, removal of nutrient dense foam from the CCS surface, and removal of Australian pine to reduce terrestrial vegetation biomass entering the canals. In addition, FPL planted native grasses on berms to aid erosion control and improve berm stability following completion of Australian pine removal activities.

As salinity, temperature, and other water quality parameters have improved in the CCS, PTN is restoring the seagrass beds in the CCS that act as biological filters. In late 2018, PTN began planting widgeongrass (Ruppia maritima), which was once the dominant seagrass species in the CCS and is adapted to higher salinity levels. During the previous reporting period, approximately 0.6 acre (32,670 plants) of seagrass (Ruppia maritima) were planted throughout the CCS, resulting in a total of 7 acres and over 100,000 individual plants (FPL 2021b). Healthy seagrass beds within the CCS will provide protection from predators, allowing fish and invertebrates to grow and reproduce. (FPL 2019a, Enclosure 2). Since no alterations of the CCS are planned for the proposed SLR term and discharges would continue to be in compliance with PTN's IWW/NPDES permit, the impact on the CCS aquatic community during the proposed SLR term from non-radiological contaminants would be SMALL.

A site-specific analysis was conducted by the NRC in response to comments expressing concern that contaminants in the closed-loop CCS could affect water quality in Biscayne Bay, which could potentially affect federally listed species (NRC 2019a). The NRC staff evaluated this potential impact, and the results are summarized below.

The potential pathway for exposure of aquatic organisms in Biscayne Bay to water or contaminants from the CCS is indirect and complex. The 2020 monitoring data from PTN's extensive water quality monitoring program indicated no changes in Biscayne Bay water quality

trends and no evidence of an ecological impact on the areas surrounding the CCS (FPL 2021b). Therefore, no impact on the surrounding aquatic communities during the proposed SLR term from non-radiological contaminants within PTN's cooling water discharge is expected.

FPL has continued to monitor the surrounding surface water and in its most recent annual report continued to conclude that there are no changes in Biscayne Bay water quality trends and no evidence of an ecological impact on the areas surrounding the CCS (FPL 2021b).

Conclusion

Implementation of BMPs, compliance with PTN's IWW/NPDES permit, and continued remediation and monitoring of the CCS are expected to minimize the potential for impacts to aquatic resources during continued operations associated with license renewal. There is no evidence of an ecological impact on the areas surrounding the CCS, and no discernible influence from the CCS on Biscayne Bay as a result of PTN's cooling water discharge is anticipated. In fact, recent monitoring data show marked improvements in water quality, temperature, and the ecological integrity of the CCS system. Compliance with current state IWW regulatory requirements and permit conditions, and other federal, state, and local regulations addressing discharges, will ensure that the impacts from this issue remain SMALL.

FPL finds that impacts from the effects of non-radiological contaminants on aquatic organisms during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 35 (Exposure of Aquatic Organisms to Radionuclides)

PTN SLRA ER Section (Page): 4.6.16.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the potential for both radioactive effluents and non-radiological contaminants associated with license renewal to affect aquatic biota for all nuclear power plants (NRC 2013a). The potential impact of radionuclides on aquatic organisms from normal operations of a nuclear power plant during the license renewal term was not identified as an issue in the 1996 GEIS. However, the impact of radionuclides on aquatic organisms has been raised as an issue by the public for several plants that have undergone license renewal, and that issue was reviewed by the NRC in the 2013 GEIS. Further, the NRC did not identify any new and significant information during its review of the PTN Units 3 and 4 SLR ER, site audits, or scoping period that would change the analysis and conclusions reached in the 2013 GEIS (NRC 2019a).

Pathways for aquatic biota exposure considered by the NRC in 2013 included that aquatic biota can be exposed externally to ionizing radiation from radionuclides in water, sediment, and other biota, and aquatic biota can be exposed internally via ingested food and water and, in certain situations, absorption through the skin and respiratory organs. No evidence of significant differences in sensitivity to radionuclides between marine and freshwater organisms have been reported. Some radionuclides tend to follow pathways similar to their nutrient analogs and can therefore be transferred rapidly through the food chain. These include (1) radionuclides such as strontium-90, barium-140, radon-226, and calcium-46 that behave like calcium and are therefore accumulated in bony tissues; (2) radionuclides such as iodine-129 and iodine-131 that act like stable iodine and accumulate in thyroid tissue; (3) radionuclides such as potassium-40, cesium-137, and rubidium-86 that follow the general movement of potassium and can be distributed throughout the body; and (4) radionuclides such as tritium, which resembles stable hydrogen, that is distributed throughout the body of an organism (NRC 2013a).

In the 2013 GEIS the NRC conducted a review of all operating nuclear power plants to evaluate the potential impacts of radionuclides on aquatic biota from continued operations. The NRC selected 15 representative plants to calculate estimated dose rates for aquatic biota. The total estimated dose rates for aquatic biota for these plants were all less than 0.2 rad/d (0.002 Gy/d), considerably less than the U.S. Department of Energy's guideline value of 1 rad/d (0.01 Gy/d). On the basis of the reviewed literature and the dose rates estimated for aquatic biota from site-specific data, the NRC concluded that the impact of radionuclides on aquatic biota from past operations would be SMALL for all plants, and it would not be expected to change appreciably during the renewal period. (NRC 2013a, Section 4.6.1.2)

The NRC conducted a site-specific analysis of potential impacts to non-human biota for the proposed PTN Units 6 and 7 from both the proposed units and the existing PTN Units 3 and 4. The analysis showed that the total cumulative dose from gaseous and liquid effluent from all four units was well below guideline values for protection of biota populations. The International Atomic Energy Agency concluded that chronic dose rates 10 mGy/d (1,000 mrad/d) to the

maximum exposed individual in a population of aquatic organisms would ensure protection of the population. The NRC concluded that the cumulative radiological impact on biota would not be significant. (NRC 2016, Section 5.9.5.3, and Appendix G.2.5)

The pre- and post-uprate studies and continuing annual reporting were undertaken to determine any influence on the surrounding surface water and groundwater due to the groundwater interface with the unlined cooling canals. Tritium levels measured in 2019 and 2020 were below the maximum contamination level established by the EPA for drinking water at 20,000pCi/L (NRC 2019b, FPL 2020c, FPL 2021f)

PTN operates in accordance with its license. Releases are maintained in compliance with 10 CFR Part 20 limits and reported in annual radioactive effluent release reports submitted to the NRC. In addition, PTN conducts sampling in accordance with its REMP. The PTN REMP is designed to provide representative measurements of radiation and of radioactive materials through various media exposure pathways. The REMP includes continuous direct radiation gamma exposure using thermoluminescent dosimeters with quarterly analysis, continuous airborne radioiodine and particulate sampling with weekly analysis, monthly sampling and analysis of surface water, semiannual sampling and analysis of shoreline sediment, semiannual sampling and analysis of fish and invertebrates, and monthly sampling and analysis of broad leaf vegetation. Supplemental ingestion pathway sampling is conducted semiannually for milk and marine fish, and annually for food crops (FPL 2018a). The most current REMP sampling verifies that the levels of radiation and concentrations of radioactive materials in environmental samples are not increasing. The 2019 and 2020 REMP reports indicate that the measured exposure rates and air particulate/radioiodine samples are consistent with exposure rates observed during the pre-operational surveillance program. In addition, there were no indications of any other nuclides that could be attributed to plant effluents and there were no indications of any nuclides in waterborne sediment or food products attributed to plant effluents and are below regulatory limits. (FPL 2020c, FPL 2021e) Sampling by the Florida Department of Health for inclusion in the 2021 REMP also does not show adverse trends in levels of radiation (FPL 2022b).

Conclusion

The total estimated dose rates for aquatic biota for all plants evaluated in the GEIS were all less than 0.2 rad/d (0.002 Gy/d), considerably less than the guideline value of 1 rad/d (0.01 Gy/d). The NRC's 2016 analysis using PTN's effluent data indicates that PTN is below this limit as well. Doses to aquatic organisms are expected to continue to be well below exposure guidelines developed to protect these organisms. Continued compliance with NRC radiological effluent limits and implementation of the REMP will ensure that the exposure of aquatic organisms to radionuclides is well within guidelines and adverse trends are detected to implement corrective actions. Continued compliance with effluent limits will ensure radiological impacts to aquatic organisms continue to be SMALL. Thus, FPL finds that impacts from the exposure of aquatic organisms to radionuclides during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 36 (Effects of Dredging on Aquatic Organisms)

PTN SLRA ER Section (Page): 4.6.17.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed potential impacts to aquatic organisms from dredging operations to support nuclear power plant operations, and anticipated that maintenance dredging would occur infrequently, would be of relatively short duration, would affect relatively small areas, and would be primarily undertaken in areas containing soft sediments that would be recolonized fairly rapidly by benthic organisms in surrounding areas. The NRC considered compliance with USACE, and applicable state permits sufficient to mitigate any impacts to a SMALL significance. (NRC 2013a)

For PTN, the proposed action does not include dredging activities in surface waters of the state or those under federal jurisdiction (FPL 2018a; NRC 2019a). PTN's cooling water intake is located within the closed-loop CCS, a permitted IWW facility, and maintenance dredging activities within the CCS are not part of this issue's scope. Barge deliveries are anticipated to be infrequent and any maintenance dredge, if required, would be conducted under federal, state, and local permits.

PTN conducts operations in compliance with FDEP and USACE regulatory and permitting requirements of the CWA Section 404 (FPL 2018a). For restoration activities at Turtle Point and the barge basin which involved fill activities requiring a CWA Section 404 permit, PTN obtained a USACE permit (No. SAJ-2016-02462 (SP-MLC). These restoration activities were completed in 2020 and all permit requirements have been fulfilled.

Note that FPL is currently in the application process for a USACE dredge and fill permit for wetland impacts associated with the FPL Miami-Dade Clean Water Recovery Center Project for FPL Unit 5 (fossil). The FPL Miami-Dade Clean Water Recovery Center Project consists of a ~ 8-mile waterline from Miami-Dade County South District Wastewater Treatment Plant to the Turkey Point site and an advanced reclaimed water treatment facility to be located upon uplands adjacent to the barge basin. The project will provide treated reclaimed water to Unit 5 for cooling purposes. Blowdown from Unit 5 and other process wastewaters from the project will be disposed of via two new Underground Injection Control wells to be located adjacent to Unit 5. This project, which is not associated with PTN Units 3 and 4, is anticipated to be constructed and operational by the end of 2024.

Conclusion

Given that PTN's cooling water intake structure is within a permitted IWW facility and that PTN operations are conducted in compliance with regulatory and permitting requirements, should the need for dredging arise, the potential impacts would be mitigated to SMALL by adherence to any permits. FPL finds that the effects of dredging on aquatic organisms during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 37 (Effects on Aquatic Resources) (Non-Cooling System Impacts)

PTN SLRA ER Section (Page): 4.6.18.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the activities and their effects under this issue as listed above, with the understanding that permits from various federal, state, and local governmental authorities are typically required for ground-disturbing activities and with proper application of environmental reviews, permitting processes, and BMPs, impacts on sensitive aquatic habitats would likely be avoided. With this understanding, the NRC concluded that the impact of continued operations and refurbishment activities on aquatic resources would be SMALL. (NRC 2013a, Section 4.6.1.2)

At PTN, onsite aquatic resources include hypersaline mudflats, remnant canals, channels, dwarf mangrove wetlands, and areas of open water. These aquatic resources encompass the CCS, mangrove swamp and tidal flats, Turkey Point nearshore waters, and the Turkey Point barge basin. PTN discharges cooling water and other process waters to the CCS, which encompasses approximately 5,900 acres of cooling canals and associated berms. The site has areas of mangrove swamp and tidal flats outside of the developed area and the CCS. Turkey Point is a narrow peninsula of land east of PTN that extends eastward into Biscayne Bay. Much of the area consists of previously filled land and roadways with adjacent mangrove swamps. The Turkey Point barge basin is adjacent to Biscayne Bay and receives barge traffic. (FPL 2008, Figure 2.3.5-1; FPL 2018a, Sections 3.6.1 and 3.7.1.1.1; NRC 2016, Section 2.4.2.1)

PTN has procedures and plans in place to address this issue's concern for the potential for impacts to onsite and nearby aquatic habitats as a consequence of soil erosion, changes in water quality, or releases of chemical contaminants as detailed below.

PTN has administrative procedures that establish the policies and general requirements for ongoing operations, maintenance, and construction activities to be conducted in accordance with the PTN's environmental protection plan (Appendix B to the PTN operating licenses), the conditions of certification for PTN's site certification, and applicable federal, state, and local regulations and permit conditions. PTN's procedures specify the requirements and permits applicable to the various PTN facilities, operations and maintenance activities, and construction activities. These procedures assign responsibilities for compliance with these environmental requirements and make staff aware of the existing permits and the conditions for when a new permit is needed. The procedures include environmental review questions and checklists that screen activities for compliance with the conditions of certification and identify activities that would cause any environmental impacts, such as changes in discharges and emissions, effects on the existing stormwater system, disturbance of natural areas, or impacts to wetlands. (FPL 2018b, RAI T-8)

PTN also has an SPCC plan that addresses storage, secondary containment, and inspections in addition, all aboveground storage tanks are equipped with secondary containment and automated spill and overfill detection systems as appropriate. For containers less than 55 gallons, PTN implements BMPs for storage and handling. There were no reportable spills

associated with PTN during the period from January 2012–March 21, 2022. (FPL 2018a, Sections 9.5.3.7 and 9.5.3.8; FPL 2018b, RAI WM-1 and WM-2)

PTN has not proposed any refurbishment activities or construction of new facilities related to SLR (FPL 2018a, Sections 2.3 and 4.6.5.4). Land disturbance for continued operations at PTN would be related to routine infrastructure maintenance and renovation activities to maintain and upgrade or replace infrastructure and structures as needed to support PTN operations. PTN's administrative procedure addressing construction activities, which includes any clearing of land, excavation, or other action which would alter the physical environment or ecology of the site, therefore encompasses maintenance activities which involve land disturbance. The procedure specifies stormwater permitting requirements and includes the state required BMPs, including SWPPPs applicable to construction sites. PTN would obtain the required permit and comply with the stormwater management and BMPs requirements for maintenance activities that could require a construction stormwater permit. The FDEP generic permit for stormwater discharge from large and small construction activities permit (No. 62-621.300 (40)(a)) is a general permit for construction activities that would require the preparation of a SWPPP that identifies BMPs to minimize erosion and sediment resulting from stormwater runoff. (FPL 2018b, RAI T-6)

The CCS was designed and constructed as an IWW facility. The IWW permit and the federal NPDES permit (delegated to State of Florida) are jointly issued under Permit No. FL0001562 (FPL 2018a, Section 3.6.1.4.1). An IWW/NPDES permit was issued May 2022 (FDEP 2022b).

Non-cooling system effluents from PTN, with the exception of sanitary wastewater, are also routed to the CCS. Sanitary wastewater is discharged to a septic system and to a deep subsurface injection well after treatment. (FPL 2018a, Section 2.2.3.1) The CCS is also permitted to receive stormwater runoff and wastewater from equipment and containment area drains. Stormwater runoff collects in drainage channels and floor drains, then typically flows through a series of stormwater catch basins. Equipment and containment area drains are routed to oil/water separators prior to being routed to the CCS. (FPL 2018a, Sections 2.2.3 and 3.6.1.4.2; FDEP 2005) In summary, both cooling water and non-cooling water from PTN are discharged to the CCS. The CCS is a closed-loop system and does not discharge through a point source to surface waters of the state.

The IWW/NPDES permit for PTN requires implementation of additional measures to further protect surface water from non-cooling water discharges. Conditions of the permit include requirements for PTN to institute programs targeting IWW and stormwater in order to prevent or minimize the generation and the potential for release of pollutants from facility operations to IWW and stormwater. The IWW BMPs program requires each facility component or system to be examined for waste minimization opportunities and determine and implement actions to reduce waste loadings and chemical losses to all wastewater and stormwater streams. Whenever there is a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g., precipitation), or other circumstances that result in amounts of pollutants reaching surface waters, the program must include a prediction of the direction, rate of flow, and the total quantity of pollutants which could be discharged from the facility as a result of each condition or circumstance. Stormwater BMPs must include a preventive maintenance program that involves timely inspection and maintenance of stormwater management devices (e.g., cleaning oil/water separators, catch basins) as well as inspecting and testing facility

equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems. (FPL 2022a)

PTN has a maintenance plan for the CCS that addresses maintenance activities on berms and specific activities and restrictions for those berms identified as the American crocodile sanctuaries based on historic nesting behavior. PTN periodically removes exotic vegetation (e.g., Australian pines, Brazilian pepper) from the CCS canals and berms, along the access roads, and CCS perimeter roads. The CCS berm maintenance plan includes procedures specific to the sanctuary berm maintenance. The procedure addresses scheduling of maintenance procedures to minimize impacts during nesting season as well as pre- and post-nesting activities. Work in or around active American crocodile nests sites during March to August is prohibited. Furthermore, work on any American crocodile sanctuary or habitat must receive approval by the onsite crocodile biologist, and only trained operators can work on sanctuaries or habitat. The American crocodile sanctuary berm maintenance plan also addresses the need to avoid leaving ruts and depressions in the earth of sanctuary berms as well as avoiding compaction of the earth that would inhibit a crocodile's ability to dig to prepare its nesting site. (FPL 2018b, RAI T-6)

PTN has conducted annual monitoring since 2010 to determine if the CCS is impacting the surrounding area, including terrestrial ecological monitoring events to assess ecological conditions in the areas surrounding the CCS. PTN has collected porewater and ecological data from marshes, mangroves, tree islands, and Biscayne Bay/Card Sound adjacent to the CCS and at control sites since the fall of 2010. These data have been submitted to state, regional, and local regulatory agencies on a semi-annual and annual basis since 2011. These data, combined with agencies' review, indicate there are no adverse impacts to marsh or mangrove wetlands resulting from operations of the CCS. The latest monitoring report from 2021 states that vegetation patterns have not changed significantly over the past 10 years; the biggest impact to the system has been due to climatic events (e.g., Hurricane Irma) and regional meteorological conditions. The scrub mangrove forest study sites have remained consistent structurally over the past 10 years with the exception of the reference transect which had some delayed mortality during this reporting period (not uncommon) from the impact of Hurricane Irma. The scrub mangroves in this area have been documented since the 1970s, and the area continues to be stable due to persistent nutrient limitations. The overall trends in species diversity and evenness have remained consistent throughout the entire period of record. The most recent annual monitoring reports also state that data support the conclusion that the CCS does not have any ecological impact on the surrounding areas, and there is no evidence of CCS water in the surrounding marsh and mangroves areas from a groundwater pathway. (FPL 2020d, FPL 2021b)

PTN conducts sediment removal activities within the CCS as part of the maintenance activities for the system. Sections of the CCS in which sediment removal activities are undertaken are taken out of service and isolated to avoid turbidity and nutrient releases into the remaining in-service cooling canals. (FPL 2018a, Section 3.6.1.4.4) The sediment removal activities are sequenced to avoid mating and nesting periods for the American crocodile. Heavy machinery is not used in proximity to nesting habitat from March to September during peak nesting activities. The most recent sediment removal activities were completed in 2022. PTN monitors the

American crocodile population annually to assess the condition and vitality of the population at PTN (FPL 2018a, Section 4.6).

The Turkey Point barge basin was developed in association with the original Units 1 and 2 and is used for transport of material and large components to the PTN site. The barge basin is 300 feet by 1,200 feet. Pursuant to the FDEP 2016 consent order, PTN developed a detailed plan and design for restoring the barge basin and another aquatic resource, the Turtle Point Canal. The Turtle Point Canal and barge basin restoration project was intended to improve the water quality within an approximately 1.9-acre remnant canal (Turtle Point Canal) and 5.6 acres of the barge basin immediately adjacent to the CCS. (FPL 2018a, Section 3.7.1.1.1; FPL 2018b, RAI WR-9) The Turtle Point Canal was previously the discharge point from the Grand Canal for Units 1 and 2. The canal was dredged during the initial construction to allow once-through cooling water to be discharged into Biscayne Bay. The canal has since been plugged and is no longer in use or necessary due to the construction of the CCS system. (FPL 2018b, Attachment 5 Enclosure 1) All federal, state, and local permits associated with the restoration project have been received, including a CWA Section 404 permit (USACE permit No. SAJ-2016-02462 [SP-MLC]). These restoration activities were completed in 2020 and all permit requirements have been fulfilled (FPL 2018b, RAIs A-4 and WR-9; FPL 2018f, Section 2.2.2. Continued monitoring confirms prior findings that there is no indication that the CCS discharges to or has adversely impacted Biscayne Bay (FPL 2020d, FPL 2021c, FDEP 2022c).

As for the potential for impacts to nearby aquatic habitats as a consequence of soil erosion, changes in water quality, or releases of chemical contaminants into nearby aquatic systems, the procedures and plans that PTN has in place as detailed above would also serve to protect the adjacent aquatic habitats in Biscayne Bay and Card Sound. Also, as noted above, the CCS is a closed-loop system and does not discharge through a point source to surface waters of the state.

Conclusion

The comprehensive regulatory controls and permits in place and PTN's compliance with them, guided by their internal procedures, would mitigate impacts to aquatic resources from PTN's continued operations during the SLR operating term. FPL finds that the impacts to aquatic resources from non-cooling systems during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 38 (Impacts of Transmission Line Right-of-Way Management on Aquatic Resources)

PTN SLRA ER Section (Page): 4.6.19.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the impacts of transmission line ROW management on aquatic species and found that changes in aquatic species diversity, abundance, or health from transmission line ROW maintenance are likely to be SMALL. The continued use of proper management practices with respect to soil erosion and application of herbicides is expected. In addition, license renewal for a specific plant would affect only the portion of the transmission line that connects the power plant to the first substation, so the amount of aquatic habitat crossed is likely to be small. Therefore, the NRC concludes the impact of transmission line ROW maintenance on aquatic resources would be SMALL for all nuclear plants. (NRC 2013a)

PTN is connected to the 240-kV switchyard through a 590-foot-long transmission line. All in-scope transmission lines subject to the evaluation of environmental impacts for license renewal are located completely within the PTN site. The in-scope transmission lines at PTN are restricted to a fenced industrial area adjacent to and connecting PTN Units 3 and 4. (FPL 2018a, Figure 2.2-4) PTN has not proposed any refurbishment activities or construction of new facilities related to SLR. (FPL 2018a, Sections 2.3 and 4.6.5.4)

PTN has administrative policies and implements BMPs for preventing erosion from soil disruption related to maintenance and management. This includes any chemical usage such as herbicide and pesticide application within the transmission line ROW are subject to BMPs for managing stormwater.

The conditions of certification require PTN to minimize adverse effects on the environment and the ecology of land, water, and wildlife within the PTN certified boundary (29-403.509(2)(f), F.A.C.). PTN has not proposed any refurbishment activities related to in-scope transmission lines as part of SLR (FPL 2018a, Section 2.3). The comprehensive regulatory controls and permits that are in place and PTN's compliance with them, guided by their internal procedures, would mitigate impacts to aquatic resources from PTN's continued operations during the proposed SLR term.

Conclusion

Compliance with conditions of certification and the IWW/NPDES permit, including BMP implementation will ensure minimal impact on aquatic resources from ROW management and maintenance. FPL finds that the impacts of transmission line ROW management on aquatic resources during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 39 (Losses from Predation, Parasitism, and Disease Among Organisms Exposed to Sub-Lethal Stresses)

PTN SLRA ER Section (Page): 4.6.20.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the potential losses of aquatic organisms to predation, parasitism, and disease from exposure to sub-lethal stresses. The effects of low dissolved oxygen levels are not expected to be felt by aquatic species beyond the thermal mixing zone. It is anticipated that heavy metal concentrations and radionuclide releases related to normal plant operations would not result in negative effects on aquatic biota. Impacts on the susceptibility of aquatic organisms to predation, parasitism, and disease due to sub-lethal stresses are considered to be of SMALL significance if changes are localized and populations of aquatic organisms in the receiving water body are not reduced. Indirect power plant-induced mortality has not been shown to cause reductions in the overall populations of aquatic organisms near any existing nuclear power plants. The level of impact due to sub-lethal stresses has been SMALL at plants reviewed by the NRC in the 2013 GEIS and is expected to be SMALL for all nuclear plants. (NRC 2013a Section 4.6.1.2)

The CCS, which receives PTN's thermal discharge, is a closed-loop system designed and constructed as an IWW facility. As stated in PTN Units 3 and 4 SLR ER Section 3.6.1.4.1, the IWW permit and the federal NPDES permit (delegated to State of Florida) are jointly issued under permit No. FL0001562. The CCS is a closed-loop system and does not discharge through a point source to surface waters of the state. (FPL 2018a, Section 3.6.1.4.1; FPL 2022a, RAI A-2) There are no construction or refurbishment plans related to the proposed action (FPL 2018a, Sections 2.3 and 4.6.5.4); therefore, no alterations that could affect these aspects of the cooling system are anticipated for the proposed SLR term.

Concerns about aquatic organisms' exposure to sub-lethal stresses attributable to PTN's intake and discharge operations leading to increased susceptibility to predation, parasitism, and disease is associated with the CCS and its potential to impact area aquatic resources. The following discussion first focuses on the stresses identified by the NRC in its 2013 GEIS: impingement, entrainment, thermal discharge, low dissolved oxygen levels, gas super saturation in tissues, and exposure to radionuclides and non-radiological contaminants. These stresses have been addressed in FPL's SLR ER, NRC's SEIS, and other Category 1 issues as summarized below.

As discussed in Issue 30 concerning entrainment of phytoplankton and zooplankton, the CCS is a closed-loop system and impacts to phytoplankton and zooplankton due to entrainment will remain small during the proposed SLR term. In the SEIS for SLR, the NRC evaluated the potential for impingement and entrainment of fish within the CCS. Although all fish in the CCS were assumed to be susceptible to impingement, and early life stages of some species were susceptible to entrainment, most fish were not at risk or impingement or entrainment due to the layout of the system and the large size of the CCS relative to small area influenced by the intake structure's withdrawal of water. The NRC staff concluded that impingement and entrainment are unlikely to create effects great enough to destabilize important attributes of the aquatic

environment over the course of the proposed SLR term and determined the impact level to be SMALL to MODERATE. As the CCS does not have a surface water connection with any other waterbody, there is no impingement or entrainment potential outside of the CCS. (NRC 2019a)

As discussed in Issue 32 concerning infrequently reported thermal impacts, PTN's intake and discharge do not contribute to these potential impacts. The CCS does not create thermal plume migration barriers, contribute to changes in the distribution of aquatic organisms in the region, promote population growth of macroinvertebrates in area surface waters, or allow nuisance species to become established or proliferate in area surface waters. Also, the waters of the CCS are not freshwater; therefore, the concern that heated effluents could accelerate the development of immature stages of aquatic insects in freshwater systems is not applicable to PTN. Due to PTN's location in southern Florida, cold shock events are not a concern. Furthermore, extensive monitoring does not indicate measurable thermal inputs to the surrounding area attributable to PTN's thermal discharge.

In the SEIS for SLR, the NRC evaluated heat shock thermal impacts on the aquatic community in the CCS. Based on the heat tolerance of the aquatic species present in the CCS, the size of the CCS (allowing species to seek cooler areas), and efforts by PTN to improve thermal efficiency, the NRC determined that the likelihood of mortality of aquatic organisms from PTN's thermal effluent during the proposed SLR term relatively low. However, the NRC stated that the high-temperature environment of the CCS is likely to exert physiological stress on aquatic organisms that could have fitness consequences, including reproductive effects, increased susceptibility to disease or infection, and reduced ability to escape predators. The NRC determined that these effects are unlikely to destabilize important attributes of the aquatic environment over the course of the proposed SLR term and determined the impact level to be SMALL to MODERATE to moderate. As the CCS does not have a surface water connection with any other waterbody, there was no thermal impact potential to aquatic organisms located outside of the CCS. (NRC 2019a, p. 4-56)

Issue 33 addresses cooling water discharge effects on aquatic populations due to dissolved oxygen and gas supersaturation. Monitoring data indicate that the CCS is not low in dissolved oxygen and the CCS does not contribute to conditions of low dissolved oxygen in the surrounding aquatic environment. Also, operating experience with the CCS has not indicated gas supersaturation to be of concern in the CCS.

As discussed in Issue 35 concerning radionuclide exposure to aquatic organisms, PTN's radioactive effluents result in radiological exposure to aquatic organisms well below the guideline values for protection of biota populations. Continued compliance with effluent limits will ensure radiological impacts to aquatic organisms continue to be SMALL.

As discussed in Issue 34 concerning effects of non-radiological contaminants on aquatic organisms, BMPs and compliance with IWW/NPDES permits are expected to minimize the potential for impacts to aquatic resources during continued operations associated with license renewal. There is no evidence of an ecological impact on the areas surrounding the CCS and no discernible influence from the CCS on Biscayne Bay as a result of PTN's cooling water discharge. Compliance with IWW regulatory requirements and permit conditions, and other federal, state, and local regulations addressing discharges, will ensure that the impacts from this issue remain SMALL.

As discussed above, the stresses attributable to PTN's intake and discharge operations were determined to have no or a small impact, with the exceptions that NRC determined impacts from impingement and entrainment and heat shock would be small to moderate. This issue looks at if these stressors lead to susceptibility to predation, parasitism, and disease for the aquatic community. NRC's 2013 GEIS assessment of this issue discussed a plant's heated discharge causing aquatic species to crowd into or congregate in the thermal plume as factors that increase the aquatic community's susceptibility to predation and disease. As discussed by NRC in its SEIS analysis of heat shock (NRC 2019a, Section 4.7.1.1), PTN's thermal discharge would lead to the opposite effect. The aquatic community would seek refuge away from the discharge area rather than be drawn in. The large size of the CCS would not promote crowding or congregation of the aquatic community. As for parasitism, as presented by NRC in the SEIS, the CCS aquatic community is of low diversity and includes only those species that can withstand the CCS water quality conditions. Such species would also be adapted to the parasites that would inhabit such waters, rather than exhibiting an increased susceptibility to parasitism.

PTN has implemented an expanded monitoring program that has helped facilitate addressing water quality issues in the CCS that has the potential to increase the exposure of aquatic organisms to sub-lethal stresses. PTN implemented restoration/remediation activities to reduce salinity levels in the CCS and improve thermal conditions. There have been improvements in the water quality in the CCS (e.g., stable temperatures as well as a reduction in salinity, nutrient concentrations, and turbidity) (FPL 2021b). The most recent monitoring report (FPL 2021b) stated remediation activities were effective in reducing the salinity levels in the CCS to the lowest annual average value since the start of monitoring. Further, as discussed in Issue 22, the RAASR Year 3 data demonstrate that the net westward migration of the hypersaline groundwater has been halted, and hypersaline groundwater from the cooling canal system is being intercepted, captured, contained, and retracted by the RWS. The continuous surface electromagnetic mapping survey compared to the 2018 baseline survey results indicate reduction in the volumetric extent of the hypersaline groundwater by 42% after 3 years of RWS operation. (FPL 2021c)

FPL continues to implement the CCS Thermal Efficiency Plan at PTN which includes the removal of large Australian pine trees on the CCS berms that add organic nutrients to the canals and impede air flow across the canals, which is important to cooling. The ongoing actions have continued to reduce the overall CCS temperatures. Since 2015, FPL has taken ongoing actions to expand the return of native submerged aquatic vegetation to the CCS canals to sequester canal nutrients, removal of nutrient dense foam from the CCS surface, and removal of Australian pine to reduce terrestrial vegetation biomass entering the canals. In addition, FPL planted native grasses on berms to aid erosion control and improve berm stability following completion of Australian pine removal activities.

As salinity, temperature, and other water quality parameters have improved in the CCS, PTN is restoring the seagrass beds in the CCS that act as biological filters. In late 2018, PTN began planting widgeongrass (Ruppia maritima), which was once the dominant seagrass species in the CCS and is adapted to higher salinity levels. During the previous reporting period, approximately 0.6 acre (32,670 plants) of seagrass (Ruppia maritima) were planted throughout the CCS, resulting in a total of 7 acres and over 100,000 individual plants (FPL 2021b). Healthy

seagrass beds within the CCS will provide protection from predators, allowing fish and invertebrates to grow and reproduce. (FPL 2019a, Enclosure 2).

Conclusion

PTN discharges cooling water to the CCS within the requirements of its IWW/NPDES permit. While the PTN's intake and discharge could attribute to the stressors of impingement, entrainment, thermal discharge, low dissolved oxygen levels, gas supersaturation in tissues, and exposure to radionuclides and non-radiological contaminants, the aquatic community exposed to these stressors is adapted to the conditions of the CCS and the large size of the CCS does not promote the crowding or congregating of aquatic organisms that can increase susceptibility to predation, parasitism, and disease. Based on continued efforts to improve thermal efficiency, and compliance with current state IWW regulatory requirements and permit conditions, and other federal, state, and local regulations addressing discharges, FPL finds that the overall impacts from sub-lethal stress exposure to organisms leading to increased susceptibility to predation, parasitism, and disease during the proposed SLR term are SMALL.

Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 40 (Employment and Income, Recreation and Tourism)

PTN SLRA ER Section (Page): 4.8.1.4 'Analysis' (4-47)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the employment, income, recreation and tourism impacts of continued operation and refurbishment on visual resources and notes that the nuclear power plant and the communities that support it is a dynamic socioeconomic system. The communities provide the people, goods, and services required to operate the facility and, in turn, the plant provides employment and income to the communities. The potential to negatively affect employment and income in surrounding communities is tied to changes in anticipated employment at the nuclear power plants. In its review, the NRC found that employment levels at a nuclear power plant, either through continued operation or refurbishment activities, are not anticipated to change as a result of license renewal. The NRC also evaluated potential negative effects on visual resources, which could impact recreation and tourism. In its review, NRC staff found that existing visual profiles of nuclear power plants were not expected to change during the license renewal term (see Issue 4). Consequently, tourism and recreational activities in the vicinity of nuclear plants are not expected to change as a result of license renewal. Therefore, the GEIS concluded that the impact of continued nuclear plant operations and refurbishment activities on employment, income, recreation, and tourism would be SMALL. (NRC 2013a, Section 4.8.1.1)

For the PTN SLR period, see the following evaluation for the Category 1 issue Employment and Income, Recreation and Tourism. As detailed in Issue 1 and Issue 2 (Onsite Land Use and Offsite Land Use) site specific analyses, there are no plans to add workers to support PTN Units 3 and 4 plant operations in the proposed SLR term. Furthermore, there are no refurbishment activities planned that would require additional workers. As discussed in the analysis of Issue 4 (Aesthetic Impacts), no significant changes to the visual appearance of plant structures or transmission lines are expected from continued operations and no refurbishment activities are planned that would change the visual profile of PTN.

Conclusion

Because there are no anticipated changes to the operational workforce or the site's visual profile associated with plant structures or transmission lines during the SLR term, and no refurbishment is planned, the people living in the vicinity of PTN, and Miami-Dade County are not likely to experience any changes in socioeconomic and aesthetic conditions during the proposed SLR term. FPL finds that employment and income, recreation, and tourism impacts during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 41 (Tax Revenues)

PTN SLRA ER Section (Page): 4.8.2.4 'Analysis' (4-48)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the tax revenue impacts of continued operation and refurbishment of a nuclear power plant. The plants and the workers who operate them are an important source of tax revenue for both local governments and public-school systems. Counties and municipalities in the vicinity of the nuclear power plant also receive revenue from sales taxes from both the plant and its employees. Therefore, the NRC found that changes in the number of workers or the amount of property taxes paid by the nuclear power plant could affect socioeconomic conditions around a nuclear plant. As part of its review, however, the NRC found that both employment and tax payments did not change appreciably during the license renewal term and were similar to the initial licensing period. Therefore, the GEIS concluded that the impact of continued nuclear plant operations and refurbishment activities on tax revenues would be SMALL. (NRC 2013a, Section 4.8.1.2)

For the PTN SLR period, see the following evaluation for the Category 1 issue Tax Revenues. Details of PTN's 2012-2017 annual property tax payments and total tax revenues and apportionment for Miami-Dade County, Miami-Dade County School District, and several regional taxing districts are discussed in the 2019 SEIS Section 3.10.5, Table 3-24 (NRC 2019a) and 2018 PTN SLR ER, Sections 3.9.5 and 4.8 (FPL 2018a). Turkey Point annual property tax payments and Miami-Dade County taxing jurisdiction revenues and apportionment for 2018-2021 are presented in Table 4. In 2019 a Miami-Dade County overassessment of the taxable value for PTN Units 3 and 4 took place and generated an overpayment of property taxes to Miami-Dade County by FPL. In 2020, the property tax payment (2019) was subsequently reconciled between FPL and Miami-Dade County. There have been no other reassessments or actions that resulted in a notable increase or decrease in FPL property tax payments to local jurisdictions made on behalf of PTN. Neither does FPL anticipate any changes in state and local tax laws, rates, and assessed property value that could result in notable future increases or decreases in PTN property taxes or other payments during the SLR term.

The proposed action is to continue to operate PTN Units 3 and 4 as currently designed and no refurbishment activities are anticipated for the period of extended operation, and no associated changes to employment or the taxable value of PTN is anticipated. Furthermore, there are no plans to add or decrease workers to support plant operations during the SLR term.

Table 4 Turkey Point Property Tax Payments 2018-2021

	2018	2019	2020	2021
FPL Total Property Tax Paid (Real and Tangible Personal Property) (1)(2)	$41,204,360	$54,277,962	$46,409,294	$46,891,023
Gas Unit 5	$5,481,933	$7,455,958	$9,375,498	$8,600,111
Nuclear Units 3-4	$34,461,320	$45,480,244	$35,743,971	$36,994,733
Miami-Dade County Operating Property Tax Revenues (Actual)	$1,882,876,000	$2,030,044,000	$2,181,561,000	N/A
School Property Tax (Levied)	$2,134,050,000	$2,169,325,000	$2,427,413,000	$2,517,844,000
Percent Payment Assigned to County	54.4	56.6	55.2	55.4
Percent Payment Assigned to School District	39.2	39	40.4	40.4
Percent Payment Assigned to Special Districts	6.4	4.4	4.4	4.2

1. Includes PTN annual property tax payment for the following: Everglades Mitigation Bank; Cooling Canal, Plant Buffer, Substation, McGregor Substation.
2. For 2019, PTN Units 3 and 4 were over assessed by Miami-Dade County. FPL and Miami-Dade County subsequently reconciled the over payment in 2020.

N/A = Not Available

(MDC 2022a; MDC 2022b; and MDCPS 2022)

Conclusion

Because there are no anticipated changes to the operational workforce, no refurbishment is planned, and tax payments are anticipated to remain relatively constant during the proposed SLR term for PTN, the people living in the vicinity of PTN, and Miami-Dade County are not likely to experience any changes in socioeconomic conditions during the proposed SLR term. FPL finds that tax revenue impacts during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 42 (Community Services and Education)

PTN SLRA ER Section (Page): 4.8.3.4 'Analysis' (4-49)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the potential impacts of continued operation and refurbishment on community services and education. Nuclear power plants and the workers who operate them are an important source of tax revenue for both community services and public-school systems. The NRC found that changes in employment or tax revenue, which include changes of the power plant's taxable value, can impact community services and education through either a reduction in available funding or an increased demand on resources. As part of its review, however, the NRC found that both employment and tax payments did not change appreciably during the license renewal term and were similar to the initial licensing period. Therefore, the GEIS concluded that the impacts of continued plant operations during the license renewal term on community services and education would be SMALL. (NRC 2013a, Section 4.8.1.3)

For the PTN SLR period, see the following evaluation for the Category 1 issue Community Services and Education. As described in Issue 1 and Issue 2 (Onsite Land Use and Offsite Land Use) site specific analyses, there are no plans to add workers to support PTN Units 3 and 4 operations during the SLR term. Furthermore, there are no refurbishment activities planned that would require additional workers or change the taxable value of the site. FPL's annual property taxes are expected to remain relatively constant throughout the proposed SLR term (see Issue 41 Tax Revenues).

Conclusion

Because no changes to employment are expected from continued operations, tax payments are anticipated to remain consistent throughout the SLR term, and no refurbishment activities are planned; the people living in the vicinity of PTN, and Miami-Dade County are not likely to experience any changes in socioeconomic conditions during the proposed SLR term beyond the current conditions. FPL finds that community services and education impacts during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 43 (Population and Housing)

PTN SLRA ER Section (Page): 4.8.4.4 'Analysis' (4-50)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the potential impacts of continued operation and refurbishment on population and housing. In its review, the NRC found that an increased number of workers at nuclear power plants during refueling and maintenance outages does create a short-term increase in the demand for temporary (rental) housing in the region around a plant. However, because of the short duration and repetitive nature of these activities and the general availability of rental housing units, employment-related housing impacts have had little or no long-term impact on the price or availability of rental housing. The workforce required to support refurbishment would create a similar impact. Additionally, the NRC found that employment levels at a nuclear power plant, either through continued operation or refurbishment activities, are not anticipated to change as a result of license renewal. Therefore, the GEIS concluded that the impacts of continued plant operations during the license renewal term on community services and education would be SMALL. (NRC 2013a, Section 4.8.1.4)

For the PTN SLR period, see the following evaluation for the Category 1 issue Population and Housing. As presented in the discussion of Issue 1 and Issue 2 (Onsite Land Use and Offsite Land Use) site specific analyses, there are no plans to add workers to support PTN Units 3 and 4 plant operations during the SLR term. Furthermore, there are no PTN refurbishment activities planned that would require additional workers.

Conclusion

Because no changes to employment are expected from the continued operation of PTN Units 3 and 4 and no refurbishment activities are planned that would require additional workers, the people living in the vicinity of PTN, and Miami-Dade County are not likely to experience any changes in population and housing conditions during the proposed SLR term. FPL finds that population and housing impacts during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 44 (Transportation)

PTN SLRA ER Section (Page): 4.8.5.4 'Analysis' (4-51)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the potential impacts of continued operation and refurbishment on transportation. The NRC found that transportation impacts depend on the anticipated change in workforce, the capacity of the local road network, traffic patterns, and the availability of alternate commuting routes to and from the plant. In its reviews, NRC staff identified that it is unlikely that additional workers will be needed for continued operations of a nuclear power plant. Furthermore, any impacts associated with commuting refurbishment workers are anticipated to be similar to the temporary impacts associated with refueling and scheduled maintenance activities. Therefore, the GEIS concluded that the impacts of continued plant operations during the license renewal term on transportation would be SMALL. (NRC 2013a, Section 4.8.1.5)

For the PTN SLR period, see the following evaluation for the Category 1 issue Transportation. As discussed in Issue 1 and Issue 2 (Onsite Land Use and Offsite Land Use) site specific analyses, there are no plans to add workers to support plant operations at PTN Units 3 and 4 during the proposed SLR term. Furthermore, there are no refurbishment activities planned that would require additional workers. Therefore, there are no anticipated changes in the commuting workforce of PTN.

Conclusion

Because no changes to employment are expected from continued operations of PTN Units 3 and 4 and no refurbishment activities are planned that would require additional workers, the people living in the vicinity of PTN, and Miami-Dade County are not likely to experience any changes in transportation conditions due to PTN during the proposed SLR term. FPL finds that transportation impacts during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 45 (Radiation Exposures to the Public)

PTN SLRA ER Section (Page): 4.9.3.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed radiation exposures to the public and states that experience with the design, construction, and operation of nuclear power reactors indicates that compliance with the design objectives of Appendix I to 10 CFR Part 50 will keep average annual releases of radioactive material in effluents at small percentages of the limits specified in 10 CFR Part 20 and 40 CFR Part 190. No aspect of future operation has been identified that would substantially alter this situation. During normal operations after license renewal, small quantities of radioactivity (fission, corrosion, and activation products) will continue to be released to the environment in a manner similar to that occurring during present operations. The concentration of radioactive materials in soils and sediments increases in the environment at a rate that depends on the rate of release and the rate of removal. Environmental monitoring programs are in place at all sites to provide a backup to the calculated doses based on effluent release measurements. (NRC 2013a, Section 4.9.1.1)

The proposed action is to continue to operate as currently designed; no refurbishment activities are proposed, so radioactive effluents would be similar to those under current operations. PTN submits annual radioactive effluent release reports to NRC and calculates the public dose from its liquid and gaseous radioactive releases. PTN uses its offsite dose calculation manual, updated as needed (FPL 2022a), to provide methods and parameters for calculating offsite doses in accordance with NRC requirements. These methods ensure that radioactive discharges from PTN meet NRC and EPA regulatory dose standards (NRC 2019a).

The reports for years 2017 – 2021 were reviewed and the results indicated that the annual public dose is a fraction of the regulatory limits and were in accordance with radiation protection standards identified within 10 CFR Part 50 (Appendix I), 10 CFR Part 20, and 40 CFR Part 190 (FPL 2019c, FPL 2020c, FPL 2021e, and FPL 2022a). As presented in ER Section 3.10.3, the results for years 2011 – 2016 were likewise a fraction of the limits. Because there is no reason to expect effluents to increase in the period of extended operation, annual doses to the public from continued operation are expected to be within regulatory limits.

In the GEIS, NRC also considered cumulative dose from an additional 20 years of operation, acknowledging the fatal cancer risk from the cumulative dose to the hypothetical Maximumly Exposed Individual (MEI) would be 50 percent higher for 60 years of operation over the baseline of 40 years of operation. As discussed above, PTN's annual releases are a fraction of regulatory limits. The MEI dose (total body) from 2021 operations was calculated to be 0.645 percent of the limit (FPL 2022a). Using the 2021 result, 20 years of operation would cumulatively expose this MEI to less than 13 percent of the annual regulatory limit. The MEI for PTN is a worker at PTN's child development center/fitness center for ten hours a day, five days each week for 50 weeks of the year, receiving exposure from both Unit 3 and Unit 4. This MEI would be unlikely to have an employment duration of 40 years, with 60 years being highly unlikely, and 80 years more so. NRC likewise acknowledged the unlikelihood of a single MEI (i.e., the same person)

being in a position for exposure throughout the entirety of a plant's operating years (60 years) (NRC 2013a, p. 4-415). Thus, while the exposure year over year would result in a cumulative dose, this cumulative dose would be the sum of annual doses that are a small fraction of the regulatory limit. Again, using the 2021 result, 20 years of operation with this low dose would not approach the permitted exposure for a single year, thus, a 50 percent increase in cumulative dose remains a low dose.

PTN's REMP is designed to determine if PTN's radioactive effluent releases are leading to an accumulation of radioactivity both onsite and in the surrounding offsite environment. The sampling and analysis are carried out by the Florida Department of Health. Review of PTN's recent annual radiological environmental operating reports indicated that doses to members of the public are well within ALARA criteria established by 10 CFR Part 50, Appendix I. Sampling by the Florida Department of Health does not show adverse trends in levels of radiation and radioactive materials in publicly accessible areas (FPL 2015; FPL 2016; FPL 2017; FPL 2018g; FPL 2019d, FPL 2020c, FPL 2021e, FPL 2022b). Thus, the REMP results indicate that radioactivity is not accumulating in environmental media after 49 years of operation (1972 to 2021).

As discussed in the GEIS, the concentration of radioactive materials in soils and sediments increases in the environment at a rate that depends on the rate of release and the rate of removal. Removal can take place through radioactive decay or through chemical, biological, or physical processes. For a given rate of release, the concentrations of longer-lived radionuclides and, consequently, the dose rates attributable to them would continue to increase if license renewal was granted. NRC's GEIS analysis regarding the accumulation of long-lived radionuclides from an additional 20 years of operation in an initial license renewal concluded that the increase would result in a negligible dose (less than 0.1 person-rem) (NRC 2013a, pg. 4-217) PTN's REMP's results discussed above indicate that radioactivity is not accumulating thus supporting that public dose would be negligible from continuing operation. PTN continues to release radioactive effluents at a fraction of regulatory limits and now halfway through its initial license renewal the REMP results continue to show no adverse trends in levels of radiation and radioactive materials. Continued operation into a second 20-year renewal term is expected to likewise show that there is not an accumulation of radioactivity. Furthermore, detecting any adverse trends in REMP results would allow for corrective actions to be implemented and ensuring that public dose whether from short- or long-lived radionuclides remains within regulatory limits.

PTN also uses its offsite dose calculation manual, updated as needed (FPL 2022a), to provide methods and parameters for calculating offsite doses in accordance with NRC requirements. These methods ensure that radioactive discharges from PTN meet NRC and EPA regulatory dose standards (NRC 2019a).

Conclusion

Radiation doses to the public from continued operations are expected to continue at current levels and would be well below regulatory limits during the proposed SLR term. REMP results show no show adverse trends in levels of radiation and radioactive materials after 49 years of operations. FPL finds that radiation doses to the public during the proposed SLR term are

SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 46 (Radiation Exposures to Plant Workers)

PTN SLRA ER Section (Page): 4.9.4.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed radiation exposures to plant workers. Occupational dose information collected and reviewed by the NRC in the 2013 license renewal GEIS provides evidence (particularly citing 2005 dose data) that doses to nearly all radiation workers are far below the worker dose limit established by 10 CFR Part 20 and that the continuing efforts to maintain doses at ALARA levels have been successful. As plants age, there may be slight increases in radioactive inventories, which would result in slight increases in occupational radiation doses. However, it is expected that occupational doses from refurbishment activities associated with license renewal and occupational doses for continued operations during the license renewal term would be similar to the doses during the current operations. (NRC 2013a, Section 4.9.1.1)

The proposed action is to continue to operate PTN as currently designed throughout the SLR term, and no refurbishment activities are proposed.

The most recent occupational radiation exposure report (NUREG-0713) presents dose data for NRC licensees. The average collective dose per reactor at PWRs have trended downward since 2005 (the data year that NRC reviewed in the GEIS) when the average dose per reactor was 79 person-rem with the exception of a slight increase in 2006 to 87 person-rem (NRC 2022, Table 4.2 and Figure 4.1). The data set present in the 2019 covers 1994 through 2019 and this longer timeframe also shows an overall downward trend for average collective dose per reactor. The middle 50% of collective dose per PWR reactors also trended downward since 2005 as well as since 1994 (NRC 2022, Figure 4.4b). The dose performance trend presented for PTN shows that since 2005, PTN' collective dose per reactor was similar to the PWR average collective dose per reactor with the exception of 2012 (NRC 2022, Appendix D). In 2012 PTN had an extended outage to implement its power uprate.

In GEIS presented that in 2005 the individual worker dose at PWRs in 2005 were all below 2 rem, less than half of the 5 rem regulatory limit [10CFR 20.1201(a)(1)]. This is also the case for 2019 with the highest dose range experienced for PWR workers being 1.0 to 2.0 rem and involving only 16 workers (NRC 2022, Appendix B). Of the 2,145 workers monitored at PTN in 2019, only 905 had a measurable dose and only two workers were in the highest dose range (0.5 to 1.0 rem) recorded at PTN (NRC 2022, Appendix B). The 3-year (2017–2019) average annual occupational dose (total effective dose equivalent) per worker at PTN was 0.091 rem (NRC 2022, Table 4.6). The average for pressure water reactor workers for the same time frame is 0.072 rem. Continued practice of ALARA principles will ensure PTN worker's exposure from continued operations remains within regulatory limits and ALARA.

NRC's GEIS assessment considered the radiological risk to workers to be SMALL, citing 2005 dose. NRC also indicated that as plants age, there may be slight increases in radioactive inventories, which would result in slight increases in occupational radiation doses. But, contrary to that conservative assumption, actual data for 2005 – 2019 demonstrates a downward trend in

occupational radiation doses even though the plants are older and inventories of spent nuclear fuel have increased. Thus, the GEIS analysis remains conservative.

The GEIS assessment also addresses the cumulative dose for its increase in fatal individual cancer risk to a worker. The cumulative dose to a worker would increase with each year worked beyond the baseline of a reactor's license term of 40 years. However, as acknowledged by NRC an individual worker is not likely to be employed for a for all 60 years of a reactor's license term plus initial renewal term. That same logic applies even more so to an SLR term; an individual worker is highly unlikely to be employed for 80 years. Therefore, a second license renewal term would not have a cumulative dose impact beyond that considered by NRC in the GEIS to be SMALL.

Conclusion

Occupational doses from continued operations are expected to be within the range of doses experienced during the current licensing term and would continue to be well below regulatory limits during the proposed SLR term. FPL finds that radiation exposure to plant workers during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 47 (Human Health Impact from Chemicals)

PTN SLRA ER Section (Page): 4.9.5.4 'Analysis' (New)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed the potential for human health impacts from the chemical effects and activities. Federal and state environmental agencies regulate the use, storage, and discharge of chemicals, biocides, and sanitary wastes. These environmental agencies also regulate how facilities like PTN manage minor chemical spills. The NRC requires nuclear power plants to operate in compliance with all permits, thereby minimizing adverse impacts to the environment and on workers and the public. It is anticipated that all plants will continue to operate in compliance with all applicable permits, and no additional mitigation measures would be warranted for the license renewal term. On the basis of these considerations, the NRC considered the health impact from chemicals to workers and the public to be SMALL for all nuclear plants. (NRC 2013a)

In nuclear power plants, chemical effects could result from discharges of chlorine or other biocides, small-volume discharges of sanitary and other liquid wastes, chemical spills, and heavy metals leached from cooling system piping and condenser tubing. Impacts of chemical discharges to human health are considered to be SMALL if the discharges of chemicals to water bodies are within effluent limitations designed to ensure protection of water quality (e.g., NPDES permits) and if ongoing discharges have not resulted in adverse effects on aquatic biota. Furthermore, the NRC offered that the effects of minor chemical discharges and spills at nuclear plants on water quality have been of SMALL significance and mitigated as needed. Spills and off-specification discharges occur so seldom that regulatory agencies have not expressed any concern about them with regard to operating nuclear power plants. (NRC 2013a)

As reported in the PTN Units 3 and 4 SLR ER, there have been no reportable spills or other non-radiological reportable releases at PTN from 2012 to 2016 (FPL 2018a). This record continues through 2021.

Plant workers may encounter hazardous chemicals when the chemistries of the primary and secondary coolant systems are being adjusted, biocides are being applied to address the fouling of cooling system components, equipment containing hazardous oils or other chemicals is being repaired or replaced, solvents are being used for cleaning, or other equipment is being repaired. FPL has a comprehensive occupational safety program covering PTN workers and activities. For the 10-year period 2012–2021, PTN had only 13 Occupational Safety and Health Administration (OSHA) recordable work-related injuries and illnesses.

As discussed in PTN SLR ER Sections 3.6, 3.7, 4.5, 4.6 and Chapter 9 (FPL 2018a), PTN operates in compliance with its various wastewater permits and in compliance with waste and chemical management regulations and continuously monitors many water quality data points in and around the CCS that are submitted to state agencies. FPL has a fleet-wide environmental management system to address the International Standards Organization 14001 elements for environmental management. The program establishes systems for proper management of chemicals and wastes.

The risk of human health impacts from chemicals could increase over time with the accumulation of chemical substances that do not easily biodegrade such as heavy metals and PCBs. With the CCS capturing the plant's wastewater and stormwater, the CCS would be a location to see accumulation of long-lived chemical substances if that was going to occur onsite. As discussed above under Issue 34 monitoring within the CCS survey found no evidence that the environmental conditions within the CCS were negatively affecting the growth or reproduction of the species captured. The finding regarding no evidence of the environmental conditions within the CCS negatively affecting the species would have taken into account exposure of the species to contaminants (e.g., metals and biocides) within the cooling water discharge. Thus, with regard to PTN, operations are unlikely to increasing risk to human health from chemicals.

Conclusion

Chemical hazards to plant workers resulting from continued operations associated with license renewal are expected to be minimized by good industrial hygiene practices as required by permits and federal and state regulations. Chemical releases to the environment and the potential for impacts to the public are expected to be minimized by adherence to discharge limitations of IWW/NPDES and other permits and regulatory requirements during the proposed SLR term. FPL finds that human health impacts from chemicals during the proposed SLR term are SMALL, consistent with the GEIS findings. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 48 (Microbiological Hazards to Plant Workers)

PTN SLRA ER Section (Page): 4.9.6.4 'Analysis' (New)

Supplemental Information

Microorganisms of particular concern for microbiological hazards due to nuclear power plant cooling systems include several types of bacteria (e.g., Legionella spp., Salmonella spp., Shigella spp., and Pseudomonas aeruginosa) and the free-living amoeba *Naegleria fowleri*, all of which require freshwater environments (NRC 2019a). Because PTN withdraws from and discharges to the CCS, which is a saline environment, the above freshwater microorganisms are not a concern for PTN workers performing tasks on the cooling water system. (NRC 2019a)

As explained in PTN SLR ER Section 3.6.1.4.3 (FPL 2018a), sanitary wastewater effluent from the onsite permitted treatment facility is not discharged to the CCS or other surface water bodies but to a deep injection well. Wastewater residuals generated by the treatment plant are transported to an approved offsite facility after being monitored to ensure that it does not pose a health risk.

Given the saline conditions of the cooling water system and sanitary wastewater handling, the PTN workers would have limited exposure pathways for microbiological hazards. Furthermore, work at PTN is conducted under a comprehensive industrial safety program designed to identify and minimize or eliminate hazards and limit exposure to remaining safety and health hazards. Therefore, the impact to the plant worker from microbiological hazards during the SLR term would be SMALL.

Regarding applicability to a second 20-year renewal. PTN is not proposing changes in the cooling water system or sanitary wastewater treatment and disposal. Further, should the need for changes in these systems arise, they would be carried out under state wastewater permits. Therefore, given the lack of exposure pathways, there would not be a material difference between the microbiological hazard risk of the initial 20-year renewal and a second. The human health impact from the microbiological organisms mentioned above are from acute exposure rather than chronic exposure.

Conclusion

Occupational health impacts are expected to be controlled by continued application of accepted industrial hygiene practices and FPL has a comprehensive occupational safety program to minimize worker exposures as required by permits and federal and state regulations. Furthermore, given the lack of exposure pathways, the microbiological hazards to the workers during the SLR term would be SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 49 (Physical Occupational Hazards)

PTN SLRA ER Section (Page): 4.9.7.4 'Analysis' (New)

Supplemental Information

Plant conditions which result in an occupational risk, but do not affect the safety of licensed radioactive materials, are under the statutory authority of Occupational Safety and Health Administration (OSHA). PTN adheres to OSHA standard 29 CFR Part 1910 Subpart R, Special Industries, as it relates to Electric Power Generation, Transmission and Distribution (29 CFR Part 1910.269).

FPL has a comprehensive occupational safety program covering PTN workers and activities. For the 10-year period 2012–2021, PTN had 13 OSHA-recordable work-related injuries and illnesses and no fatalities.

Regarding applicability to a second 20-year renewal. PTN would continue to have a comprehensive occupational safety program. The human health impact from most physical hazards would be due to singular events (e.g., fall) which do not accumulate therefore no materials difference from one renewal term and a subsequent one. The exception would be physical hazards that have a chronic exposure component such as sound level exposure. OSHA regulations address such precautions and continued compliance with OSHA regulations for exposure and use of personal protective equipment. Therefore, there would not be a material difference between the physical hazard risk of the initial 20-year renewal and a second.

Conclusion

Occupational safety and health hazards are generic to all types of electrical generating stations, including nuclear power plants, and are of small significance. FPL has a comprehensive occupational safety program designed to address OSHA safety standards and use of protective equipment. PTN's very low incidence of OSHA-recordable work-related injuries and illnesses indicates the effectiveness of its occupational safety program and the PTN workers' continued adherence to safety standards and use of protective equipment throughout the proposed SLR term. FPL finds that physical occupational hazards during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 50 (Design-Basis Accidents)

PTN SLRA ER Section (Page): 4.15.1 'Analysis' (4-80)

Supplemental Information

Section 5.3 of the 1996 GEIS discusses the impacts of potential accidents, their consequences, and addresses the general characteristics of DBAs, including characteristics of fission products, meteorological considerations, possible exposure pathways, potential adverse health effects, avoiding adverse health effects, accident experience and observed impacts, and emergency preparedness. In the 2013 license renewal GEIS, the NRC reexamined the information from the 1996 GEIS regarding DBAs and concluded that this information is still valid. The NRC found that the environmental impacts of DBAs are of SMALL significance for all nuclear plants. This conclusion was reached because the plants were designed to successfully withstand these accidents, and a licensee is required to maintain the plant within acceptable design and performance criteria, including during any license renewal term. It is also stated that the environmental impacts during a license renewal term should not differ significantly from those calculated for the DBA assessments conducted as part of the initial plant licensing process. Impacts from DBAs would not be affected by changes in plant environment because such impacts (1) are based on calculated radioactive releases that are not expected to change; (2) are not affected by plant environment because they are evaluated for the hypothetical maximally exposed individual; and (3) have been previously determined acceptable (NRC 1996; NRC 2013a).

During the integrated plant assessment, the license renewal team evaluated PTN systems, structures, and components and conducted time-limited aging analyses to ensure that systems, structures, and components remain capable of performing their functions consistent with existing plant design and performance criteria specified in the PTN licensing basis. Current design and performance criteria will be maintained during the proposed SLR term (FPL 2018a).

As part of the initial license renewal process, to receive NRC approval to operate a nuclear power facility, an applicant must submit a safety analysis report (SAR) as part of its application.

The PTN SAR presents the design criteria and design information for the proposed reactor and comprehensive data on the proposed site. The PTN SAR also discusses various hypothetical design basis accidents and the safety features designed to prevent and mitigate accidents.

The NRC staff reviews the application to determine whether the plant design meets the NRC's regulations and requirements and includes, in part, the nuclear plant design and its anticipated response to an accident.

A number of these postulated accidents are not expected to occur during the life of the plant but are evaluated to establish the design basis for the preventive and mitigative safety systems of the facility. The acceptance criteria for DBAs are described in 10 CFR Part 50 and 10 CFR Part 100. The environmental impacts of DBAs are evaluated during the initial license process, and the ability of the plant to withstand these accidents was demonstrated to be acceptable before issuance of the operating license. The results of these evaluations are found in license documentation such as the staff's safety evaluation report, the final environmental impact

statement, and the licensee's final safety analysis report. The licensee is required to maintain the acceptable design and performance criteria throughout the life of the plant including any extended-life operation. The consequences for these events are evaluated for the hypothetical maximum exposed individual; as such, changes in the plant environment will not affect these evaluations. Because of the requirements that continuous acceptability of the consequences and aging management programs be in effect for license renewal, the environmental impacts as calculated for DBAs should not differ significantly from initial licensing assessments over the life of the plant, including the license renewal period. Accordingly, the design of the plant relative to DBAs during the extended period is considered to remain acceptable and the environmental impacts of those accidents were not examined further in the GEIS (NRC 2002a).

When the 2013 GEIS was issued, the NRC's review of updated external hazards information for all operating power reactors (as ordered by the Commission following the Fukushima Dai-Ichi accident) remained ongoing. On March 24, 2020, the NRC completed its review of such information as to PTN and concluded that no further regulatory actions were needed to ensure adequate protection or compliance with regulatory requirements, re-confirming the acceptability of PTN's design basis. (NRC 2020)

The PTN SLR ER previously provided a site-specific analysis of "mitigation alternatives" related to Severe Accidents, but the GEIS provides a generic analysis of the "impacts" of Severe Accidents. Therein, the NRC concluded that:

> "The probability-weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts from severe accidents are SMALL for all plants."

Regarding Severe Accidents, the NRC Staff evaluated the information in the PTN SLR ER in consideration of the probability-weighted consequences of severe accidents and concluded that the aggregate risk increases from the sources of new information when compared to the PTN specific decrease in internal events core damage frequency resulted in a factor of 18.3 lower environmental impact (as compared to the 1996 GEIS or PTNs previous SAMA analysis from initial license renewal). These sources of new information are those that the NRC has determined to be important to severe-accident impact and include new internal events, new external events, new source term information, use of BEIR VII risk coefficients, spent fuel pool accidents, higher fuel burnup, low power and shutdown events, and population increase. The NRC has determined that all other sources of new information (e.g., new meteorological information, new emergency preparedness information) do not contribute sufficiently to the environmental impacts to warrant their inclusion in severe accident analysis, especially given the 18.3 reduction in environmental impact over the prior analyses and the small likelihood of finding cost effective plant improvements for other new information sources. This aggregate environmental impact reduction from new sources of information supports the 2013 GEIS conclusions for severe accidents for the extended subsequent license renewal period. (NRC 2019a, Appendix E.3.10)

Conclusion

The environmental impacts of DBAs are of SMALL significance for PTN because the plant was designed to successfully withstand these accidents. Due to the requirements for PTN to maintain the licensing basis (the adequacy of which the NRC recently re-confirmed) and implement aging management programs during the license renewal term, the environmental impacts during the license renewal term are not expected to differ significantly from those calculated for the DBA assessments conducted as part of the initial plant licensing process. Based on this analysis FPL finds that impacts due to DBAs are SMALL, consistent with the GEIS findings. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN.

Supplemental Information for Category 1 Issue No. 51 (Low-Level Waste Storage and Disposal)

PTN SLRA ER Section (Page): 4.11.1.4 'Analysis' (4-57)

Supplemental Information

In the 2013 license renewal GEIS, the NRC considered that during normal plant operations, routine plant maintenance and cleaning activities would generate LLRW. Depending on the types and concentrations of radionuclides in the waste, the NRC classifies LLRW as belonging to Class A, Class B, Class C, or greater-than-Class C, which are highly regulated. Class C or greater LLRW must not only meet rigorous requirements but also requires the implementation of additional measures at the disposal facility to protect against inadvertent intrusion. As discussed in Section 4.13.1 of the GEIS, the NRC does not expect the generation and management of the LLRW during the license renewal term to result in significant environmental impacts. The NRC believes that the comprehensive regulatory controls in place and the low public doses achieved at reactors ensure that the radiological impacts on the environment will remain SMALL during the term of a renewed license. The maximum additional onsite land that may be required for LLRW storage during the term of a renewed license and associated impacts would be SMALL. Non-radiological impacts on air and water would be negligible. The radiological and non-radiological environmental impacts of long-term disposal of LLRW from any individual plant at licensed sites are SMALL. In addition, the NRC concluded in the GEIS that there is reasonable assurance that sufficient LLRW disposal capacity will be made available when needed for facilities to be decommissioned consistent with NRC decommissioning requirements. (NRC 2013a)

PTN previously established its radiological waste programs and controls in accordance with NRC regulations. FPL has developed long-term plans which ensure that radioactive waste generated during the subsequent license renewal term will be sent directly for disposal, stored onsite in existing structures, or shipped to an offsite licensed facility for processing and disposal. ER Section 2.2.6 lists nine facilities for receipt of FPL waste for processing. As shown in PTN's recent Annual Radioactive Effluent Release Reports, FPL continues to use a variety of licensed facilities for processing and disposing of its LLRW (FPL 2019c, FPL 2020e, FPL 2021f, and FPL 2022a). FPL anticipates that it would continue to have access to licensed LLRW processing and disposal facilities during the proposed SLR term. This is in consistent with NRC's conclusion mentioned above specific to the greater disposal capacity needed for decommissioning that sufficient LLRW disposal capacity would be available.

Prior to shipping LLRW offsite for processing, PTN would continue to manage and store LLRW onsite in accordance with NRC regulations and dispose of LLRW in NRC-licensed treatment and disposal facilities during the proposed SLR term. An LLRW storage facility is to be utilized to provide interim LLRW storage capabilities for PTN (FPL 2018a, Section 2.2.6.3). The LLRW storage facility is designed to safely store 5 years of LLRW within an array of concrete shields inside a precast panel concrete building. The storage of LLRW waste is licensed under the general license provided to power reactor licensees under 10 CFR Part 50. FPL does not anticipate the need for expansion of onsite LLRW storage facilities.

PTN has a radioactive waste management program in accordance with NRC regulations. PTN does not anticipate any increase in LLW from normal operations and does not have planned or anticipated changes in its radioactive waste management program during the proposed SLR operating term.

Review of PTN's recent annual radiological environmental operating reports (AREORs from 2012–2020) indicated that doses to members of the public are well within ALARA criteria established by 10 CFR Part 50, Appendix I. As reflected in the AREORs, sampling by the Florida Department of Health during those years does not show adverse trends in levels of radiation and radioactive materials in publicly accessible areas. Sampling by the Florida Department of Health for inclusion in the 2021 REMP also does not show adverse trends in levels of radiation (FPL 2022b). Thus, the radiological environmental monitoring indicates the effectiveness of PTN's controls. In accordance with the NRC's finding, PTN's compliance with comprehensive regulatory controls and use of NRC-licensed treatment and disposal facilities will ensure the continued SMALL impacts from the storage and disposal of LLRW during the proposed SLR term. (FPL 2013; FPL 2014; FPL 2015; FPL 2016; FPL 2017; FPL 2018g; FPL 2019d; FPL 2020c; FPL 2021e)

As mentioned in Issue 55, the radiological impacts from disposal of waste generated during a SLR term has the potential to increase as long-lived radionuclides accumulate at disposal facilities. However, the disposal facilities would be licensed, which means the facility would have a design including design capacity and conditions of operation to minimize environmental impacts.

Conclusion

PTN plans to continue to manage and store LLRW onsite in accordance with NRC regulations and dispose of LLRW in NRC-licensed treatment and disposal facilities during the proposed SLR term. There are comprehensive regulatory controls in place and PTN's compliance with these regulations and use of licensed treatment and disposal facilities would allow the impacts to remain SMALL during the proposed SLR term. Additionally, PTN's recent annual radiological environmental operating reports indicated that doses to members of the public are well within ALARA criteria established by 10 CFR Part 50, Appendix I. Sampling by the Florida Department of Health during those years does not show adverse trends in levels of radiation and radioactive materials in publicly accessible areas. FPL finds that impacts from LLRW waste storage and disposal for the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 52 (Onsite Storage of Spent Nuclear Fuel)

PTN SLRA ER Section (Page): 4.11.2.4 'Analysis' (4-58)

Supplemental Information

For on-site storage of spent fuel during the license renewal term, Table B-1 was amended after the 2013 GEIS by the Continued Storage Rule (79 FR 56238) to codify the Commission's determination that the impacts would be SMALL. This rulemaking postdates the LR GEIS rulemaking in 2013, and the Commission's codified impact determination was not overturned by the NRC's CLI-22-02 Order. The Continued Storage Rulemaking explicitly considered subsequent license renewals, stating in Footnote 3 at 79 FR 56245 "The Commission's regulations provide that renewed operating licenses may be subsequently renewed…The GEIS [Continued Storage of Spent Nuclear Fuel GEIS] assumes two renewals in evaluating potential environmental impacts." Pursuant to the Commission's generic analysis and codified conclusion, the impacts of onsite storage of spent fuel during the SLR term at PTN are SMALL.

Supplemental Information for Category 1 Issue No. 53 (Offsite Radiological Impacts of Spent Nuclear Fuel and High-Level Waste Disposal)

PTN SLRA ER Section (Page): 4.11.3.4 'Analysis' (4-59)

Supplemental Information

For offsite disposal of spent fuel and high-level waste during the license renewal term, Table B-1 was amended after the 2013 GEIS by the Continued Storage Rule (79 FR 56238) to codify the Commission's determination to reclassify this issue as a Category 1 issue with no impact level assigned. This rulemaking postdates the LR GEIS rulemaking in 2013, and the Commission's codified impact determination was not overturned by the NRC's CLI-22-02 Order. The Continued Storage Rulemaking explicitly considered subsequent license renewals, stating in Footnote 3 at 79 FR 56245 "The Commission's regulations provide that renewed operating licenses may be subsequently renewed…The GEIS [Continued Storage of Spent Nuclear Fuel GEIS] assumes two renewals in evaluating potential environmental impacts." Pursuant to the Commission's generic analysis and codified conclusion, offsite radiological impacts of spent nuclear fuel remain a Category 1 with no impact level assigned, but "the impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR part 54 should be eliminated."

Supplemental Information for Category 1 Issue No. 54 (Mixed Waste Storage and Disposal)

PTN SLRA ER Section (Page): 4.11.4.4 'Analysis' (4-61)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed mixed waste storage and disposal. Several factors associated with the guidance for handling, storing, and disposing of mixed waste were considered by the NRC in the 2013 license renewal GEIS (NRC 2013a, Section 4.11.1.4). The NRC determined that the comprehensive regulatory controls and the facilities and procedures in place at nuclear power plants ensure that the mixed waste is properly handled and stored and that doses to and exposure to toxic materials by the public and the environment are negligible at all plants. The NRC review revealed that license renewal will not increase the small but continuing risk to human health and the environment posed by mixed waste at all plants and that radiological and non-radiological environmental impacts from the long-term disposal of mixed waste from any individual plant at licensed sites were minimal.

PTN has established radiological waste programs and controls in accordance with NRC regulations to manage radioactive waste onsite in accordance with NRC regulations and dispose of mixed waste in NRC-licensed and EPA-permitted treatment and disposal facilities during the proposed SLR term (FPL 2018a, Sections 2.2.6 and 4.11.4). Mixed waste generated at Turkey Point is not normally stored at the site. The waste is shipped to an offsite facility that manages and disposes mixed waste. FPL anticipates that it would continue to have access to licensed LLRW/EPA permitted processing and disposal facilities during the proposed SLR term. This is in consistent with NRC's conclusion mentioned in Issue 51 specific to the greater disposal capacity needed for decommissioning that sufficient LLRW disposal capacity would be available.

Review of PTN's recent annual radiological environmental operating reports indicated that doses to members of the public are well within ALARA criteria established by 10 CFR Part 50, Appendix I. Sampling by the Florida Department of Health during those years (2012–2020) shows no adverse trends in levels of radiation and radioactive materials in publicly accessible areas (FPL 2018a, FPL 2018g; FPL 2019d, FPL 2020c, FPL 2021e). Sampling by the Florida Department of Health for inclusion in the 2021 REMP also does not show adverse trends in levels of radiation (FPL 2022b).

PTN has the following procedures in place to manage mixed waste:

- Procedure No. EV-AA-101-1000. A fleet-wide environmental management system to address the International Standards Organization 14001 elements for environmental management.
- Administrative Procedure No. 0-ADM-036. A comprehensive non-radiological environmental protection program for PTN that includes oversight and controls for hazardous waste management.

- Administrative Procedure No. 0-ADM-015.2. A procedure for handling and storage of hazardous and mixed waste that implements the regulatory requirements for management, storage, inspections, and shipping.

As indicated in PTN SLR ER Chapter 9 and through a 2022 review of plant records, PTN has not received any violations for hazardous waste management in the past 5 years based on a review of its compliance history. PTN is inspected by Miami-Dade County Department of Environmental Resources Management (MDC DERM) for compliance with state and county waste management regulations. A routine inspection was conducted on December 8, 2021, and no findings were issued.

As mentioned above the NRC indicated in the GEIS that license renewal will not increase the small but continuing risk to human health and the environment posed by mixed waste at all plants and that radiological and non-radiological environmental impacts from the long-term disposal of mixed waste from any individual plant at licensed sites were minimal. The small risk would continue for a SLR term. The radiological and nonradiological impacts from disposal of mixed waste generated during a SLR term has the potential to increase as long-lived radionuclides and toxic metals accumulate at disposal facilities. However, the disposal facilities would be permitted and licensed, which means the facility would have a design and conditions of operation to minimize environmental impacts. PTN is a small quantity generator of hazardous waste, and the most recent generation of mixed waste was during an outage. Given the small quantities of mixed waste generated at PTN, the minimal impact (i.e., SMALL) would also be applicable a SLR term.

Conclusion

PTN's compliance with comprehensive regulatory controls and use of NRC-licensed and EPA-permitted treatment and disposal facilities will ensure the continued SMALL impact from the handling, storage, and disposal of mixed waste during the proposed SLR term. This is further supported by the negligible doses and exposure to toxic materials for the public and the environment. License renewal would not increase the small continuing risk to human health and the environment posed by mixed waste at PTN. The radiological and non-radiological environmental impacts of long-term disposal of mixed waste from any individual plant at licensed sites are considered SMALL. FPL finds that impacts from mixed waste storage and disposal for the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 55 (Nonradioactive Waste Storage and Disposal)

PTN SLRA ER Section (Page): 4.11.5.4 'Analysis' (4-62)

Supplemental Information

In the 2013 license renewal GEIS, the NRC considered that nuclear plants generate small quantities of hazardous waste (including universal waste) during operation and refurbishment. The management of hazardous wastes generated at nuclear facilities, both onsite and offsite, is strictly regulated by the EPA or the responsible state agencies per the requirements of the RCRA. Nonradioactive nonhazardous waste generated at nuclear facilities is managed by following BMPs and are generally disposed of in local landfills permitted under RCRA Subtitle D regulations.

The NRC reviewed the findings of the 1996 GEIS in Section 4.11.1.5 of the 2013 license renewal GEIS (NRC 2013a), which stated that the impacts associated with managing nonradioactive wastes at uranium fuel cycle facilities, including nuclear power plants, were found to be SMALL. It was indicated that no changes to nonradioactive waste generation would be anticipated for license renewal, and that systems and procedures are in place to ensure continued proper handling and disposal of the wastes at all plants.

PTN is currently classified as a small quantity generator of hazardous wastes and does not anticipate any change in this status during the proposed SLR term. FPL addresses the management of PTN's hazardous waste, universal waste, and oily waste through its administrative procedures. These procedures establish responsibilities and controls for managing waste generated, pollution prevention, and the control and storage of chemicals. A hazardous material coordinator ensures the proper sampling, packaging, storage, shipping analysis, and disposal of hazardous materials generated at PTN and is supported by corporate environmental services. PTN utilizes permitted and licensed vendors to transport and recycle or dispose of the wastes. Vendors and suppliers are managed and vetted at the corporate level. (FPL 2018a, Section 2.2.7)

PTN maintains the following waste-related permits:

- FDEP IWW/NPDES Facility Permit No. FL0001562
- FDEP Sewage Treatment Facility Domestic Wastewater Facility Permit No. FLAO13612-002-DW3P
- FDEP Sanitary Wastewater Disposal Well Domestic Wastewater Facility Permit No. 0127512-002-UO
- Miami-Dade County Department of Environmental Resources Management (MDC DERM) Sewage Treatment Facility Domestic Wastewater Permit No. DWO-00010
- MDC DERM Industrial Waste Permit No. IW-000016 (hazardous materials and non-hazardous waste generation)

- MDC DERM Industrial Waste Permit No. IW5-006229 (fleet vehicle maintenance facility)

PTN has not received any violations for hazardous waste management in the past 5 years based on a review of its compliance history. PTN is inspected by MDC DERM for compliance with state and county waste management regulations. A routine inspection was conducted on December 8, 2021, and no findings were issued.

As mentioned above under Issue 54, impacts from disposal of waste generated during a SLR term has the potential to increase as long-lived toxic metals (those that do not easily biodegrade) accumulate at disposal facilities. However, the disposal facilities would be permitted, which means the facility would have a design and conditions of operation to minimize environmental impacts. PTN is a small quantity generator of hazardous waste. Given the small quantities of mixed waste generated at PTN, the minimal impact (i.e., SMALL) would also be applicable a SLR term.

Conclusion

PTN would continue to store and dispose of nonradioactive hazardous and nonhazardous waste in accordance with EPA, state, and local regulations, and dispose of the wastes in appropriately permitted disposal facilities during the proposed SLR term. The continuation of existing systems and procedures to ensure proper storage and disposal would allow the impacts to be of small magnitude. FPL finds that impacts associated with managing nonradioactive wastes at PTN for the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 56 (Offsite Radiological Impacts—Individual Impacts from other than the Disposal of Spent Fuel and High-Level Waste)

PTN SLRA ER Section (Page): 4.13.1.4 'Analysis' (4-75)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed offsite radiological impacts. As stated in the 2013 license renewal GEIS (NRC 2013a), the generic issues related to the uranium fuel cycle would not be affected by continued operations associated with license renewal. In addition, the NRC staff identified no new and significant information for these issues (NRC 2019a).

The impacts to the public from radiological exposures were considered by the NRC in Table S-3 of 10 CFR 51.51. Impacts to individuals from radioactive gaseous and liquid releases, including radon-222 and technetium-99 would remain at or below regulatory limits as long as facilities operate under a valid license issued by either the NRC or an agreement state. PTN's nuclear fuel is supplied by vendors with the appropriate licenses and radioactive waste services are contracted with facilities having the appropriate licenses and permits.

As stated above, the generic issues related to the uranium fuel cycle would not be affected by continued operations associated with license renewal. This would apply to a second license renewal term as well provided PTN continues to utilize facilities with the appropriate licenses and permits.

Conclusion

The impacts to the public from radiological exposures have been considered by the NRC in Table S-3 of 10 CFR 51.51. Impacts to individuals from radioactive gaseous and liquid releases, including radon-222 and technetium-99 would remain at or below regulatory limits as long as facilities operate under a valid license issued by either the NRC or an agreement state. The NRC concluded in the GEIS that offsite radiological impacts of the uranium fuel cycle to individuals are SMALL. FPL finds that impacts from PTN's contribution to offsite radiological impacts would be SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS (also see discussion of applicability to a second license renewal term in Issue 45). Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 57 (Offsite Radiological Impacts—Collective Impacts from other than the Disposal of Spent Fuel and High-Level Waste)

PTN SLRA ER Section (Page): 4.13.2.4 'Analysis' (4-76)

Supplemental Information

In the 2013 license renewal GEIS, the NRC reviewed offsite radiological impacts. As stated in the GEIS (NRC 2013a), the generic issues related to the uranium fuel cycle would not be affected by continued operations associated with license renewal. In addition, the NRC staff identified no new and significant information for these issues (NRC 2019a).

PTN's nuclear fuel is supplied by vendors with the appropriate licenses and radioactive waste services are contracted with facilities having the appropriate licenses and permits.

As stated above, the generic issues related to the uranium fuel cycle would not be affected by continued operations associated with license renewal. This would apply to a second license renewal term as well provided PTN continues to utilize facilities with the appropriate licenses and permits.

Conclusion

There are no regulatory limits applicable to collective doses to the general public from fuel cycle facilities. The practice of estimating health effects on the basis of collective doses may not be meaningful. All fuel cycle facilities are designed and operated to meet the applicable regulatory limits and standards. The GEIS concluded that the collective impacts are acceptable. FPL finds that impacts from PTN's contribution to offsite radiological impacts would be SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS (also see discussion of applicability to a second license renewal term in Issue 45). Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 58 (Non-Radiological Impacts of the Uranium Fuel Cycle)

PTN SLRA ER Section (Page): 4.13.3.4 'Analysis' (4-76)

Supplemental Information

PTN's nuclear fuel is supplied by vendors with the appropriate licenses and radioactive waste services are contracted with facilities having the appropriate licenses and permits.

As stated in the GEIS (NRC 2013a), the generic issues related to the uranium fuel cycle would not be affected by continued operations associated with license renewal. This would apply to a second license renewal term as well provided PTN continues to utilize facilities with the appropriate licenses and permits.

Conclusion

As stated in the GEIS (NRC 2013a), the generic issues related to the uranium fuel cycle would not be affected by continued operations associated with license renewal. All fuel cycle facilities are subject to regulatory limits and standards to minimize non-radiological impacts from its operations. FPL finds that the non-radiological impacts of the uranium fuel cycle resulting from the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 59 (Transportation)

PTN SLRA ER Section (Page): 4.13.4.4 'Analysis' (4-77)

Supplemental Information

PTN's nuclear fuel is supplied by vendors with the appropriate licenses and radioactive waste services are contracted with facilities having the appropriate licenses and permits.

In the 2013 license renewal GEIS, the NRC reviewed transportation. As stated in the 2013 license renewal GEIS (NRC 2013a), the generic issues related to the uranium fuel cycle would not be affected by continued operations associated with license renewal. In the 2013 GEIS NRC confirmed that the impacts of this issue to be SMALL and bounded by the values given in Table S-4 in 10 CFR 51.52 provided the following three conditions established in NRC's transportation addendum to the 1996 GEIS (i.e., NUREG-1437, Volume 1, Addendum 1) were met:

1) enrichment of fresh fuel was 5.0 percent or less;
2) burnup of the spent fuel was 62,000 MWd/MTU or less; and
3) higher burnup spent fuel (higher than 33,000 MWd/MTU) was cooled for at least 5 years before being shipped offsite.

The NRC did not revisit the radiological impact analysis of transporting spent nuclear fuel to away from reactor storage locations in the 2014 GEIS for Continued Storage of Spent Nuclear Fuel and again stated that the radiological impact analysis can be found in Table S-4 in 10 CFR 51.52 (NRC 2014).

The fuel used at PTN is enriched to a maximum of 5.0 percent, and the fuel peak rod burnup limit is 62,000 MWd/MTU (FPL 2018a). Furthermore, as discussed in PTN SLR ER Section 2.2.6.5, spent fuel is stored on site in each of the units' spent fuel pools prior to transfer to onsite dry storage (FPL 2018a). The environmental assessment for the EPU determined that spent fuel management was bounded by the impacts analyzed in Table S-4 (NRC 2012b).

As presented in PTN SLR ER Sections 4.11.1.4 and 4.11.4.4, FPL has a comprehensive program of managing its radioactive and mixed wastes at PTN that implements the regulatory requirements for management, storage, inspections, packaging, and shipping. Also as presented in PTN SLR ER Section 4.11.3, FPL stores its spent nuclear fuel in NRC-licensed canister and cask systems. (FPL 2018a)

PTN would comply with the applicable NRC, U.S. Department of Transportation, U.S. Department of Energy, and state regulatory controls for packaging and transportation of radioactive wastes and spent nuclear fuel. Given that PTN meets the three criteria from NUREG-1437, Volume 1, Addendum 1and radioactive waste shipping procedures to implement regulatory requirement, FPL finds that impacts from PTN's contribution to offsite radiological impacts from radioactive waste management would be SMALL.

The 2013 GEIS analysis of the incremental effects of a 20-year renewal does not materially differ between an initial 20-year renewal period and a second 20-year renewal period. The impacts (e.g., direct radiation) of a transportation event would be discrete from other

transportation events and accumulation of dose by the public other than persons in the cab of a truck transporting the material on subsequent trips would be unlikely. The packaging of radioactive materials in accordance with NRC and DOT regulations would minimize exposure. Further, the transportation events are unlikely to be staffed by the same person throughout a license term and into a second.

Conclusion

The GEIS concluded that the impacts associated with the transportation of fuel and waste to and from a reactor resulting from the renewal of an operating license for any plant would be SMALL, given that the conditions listed above are met. As confirmed in the SLR ER, PTN meets these conditions and FPL finds that environmental impacts from transporting materials to and from uranium fuel cycle facilities during the proposed SLR term are SMALL. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to the SLR term for PTN, as supplemented here.

Supplemental Information for Category 1 Issue No. 60 (Termination of Plant Operations and Decommissioning)

PTN SLRA ER Section (Page): 4.14.4 'Analysis' (4-79)

Supplemental Information

In the 2013 license renewal GEIS, the NRC confined the scope of this issue to the effects of an additional 20 years of operation on the impacts of decommissioning. NRC found that license renewal delays the date of reactor shutdown and decommissioning but does not alter the impact levels anticipated to result from the eventual termination of operations and decommissioning. (NRC 2013a)

The NRC has developed regulations and guidance for the decommissioning of nuclear facilities, including nuclear power plants. These regulations are found in 10 CFR 50.82 (Termination of License), Subpart E to 10 CFR Part 20 (Radiological Criteria for License Termination), and the guidance document *Consolidated NMSS Decommissioning Guidance*, NUREG-1757 (NRC 2002b). Termination of nuclear power plant operations would result in the cessation of activities necessary to maintain the reactor, as well as a significant reduction in plant workforce. It is assumed that the termination of operations would not immediately lead to the dismantlement of the reactor or other infrastructure. The impacts of decommissioning are described in the *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors*, NUREG-0586 (NRC 2002c).

Only the incremental increase in the impacts of termination of plant operations and decommissioning attributable to continued operation during the proposed SLR term is within the scope of this issue. The potential for the additional operating years to alter the impacts attributable to termination of plant operations or decommissioning is presented by resource area in Table 5.

The additional operating years would generate additional spent nuclear fuel to be managed during the decommissioning period, as well as potentially greater volumes of radioactive waste or radioactive materials. However, adherence to NRC regulations would allow the expected increase in spent fuel volume to be safely accommodated onsite in existing dry or pool storage. The proposal to continue operation during an SLR term does not include construction of additional plant structures that would require decommissioning, and additional workers that would incrementally increase socioeconomic impacts of termination of plant operations are not anticipated for the proposed SLR term. Radiation exposures from continued operations and stored spent fuel to both workers and the public are expected to remain at current levels, which are well below regulatory limits. Therefore, the impacts are expected to remain SMALL.

FPL would plan and conduct decommissioning activities in accordance with NRC-reviewed methods and evaluate anticipated environmental impacts to ensure they are bounded by previously issued environmental assessments or are SMALL. No new and significant information has been identified for this issue. (FPL 2018a, Section 4.14.4)

Table 5: Site-Specific Impacts of License Renewal on Termination of Operations and Decommissioning

Issue	Impact
Land use	PTN is located on a site certified for power generation and co-located with other generating units. The proposed action does not include a change in onsite land use or additional structures. No additional workers whose housing could affect offsite land use are proposed. Therefore, the land needed for and impacted by decommissioning activities would not be changed by the additional 20 operating years.
Visual resources	No additional structures were proposed to continue operation for another 20 years; therefore, the visual impact of the plant at the end of the current license term as well as the end of the proposed SLR term would be the same. There would be no visual impact during decommissioning as a result of the additional 20 years of operation.
Air quality	There are no additional emission sources expected to be added to the PTN site, and licensees are already required to operate within permit requirements. Therefore, there would be no additional impacts to air quality during decommissioning as a result of the additional 20 years of operation.
Noise	Noise levels at the end of the current license renewal term and at the end of the proposed SLR term would be the same. No additional impacts related to noise would occur as a result of extending the operation of the plant by an additional 20 years.
Geology and soils	With no construction planned during the proposed SLR term, there would be no additional impacts to geology and soils from decommissioning as a result of the 20-year SLR term.
Surface water	No significant surface water impacts are anticipated during the SLR term that would be different from those occurring during the current license term. Therefore, there would be no change in the impacts to surface water during decommissioning as a result of the additional 20 years of operation.

Issue	Impact
Groundwater	During the current operational period, operation of the CCS has measurably degraded groundwater quality. The approved groundwater Recovery Well System (RWS) began full time remedial operations on May 15, 2018. Analyses of data through year 3 of remediation (2021) demonstrate that the net westward migration of the hypersaline plume has been halted; hypersaline groundwater from the canal cooling system is being intercepted, captured, contained, and retracted by RWS operations. Continuous surface electromagnetic mapping data shows that the volume of hypersaline water in the compliance area has been reduced by 42% since remediation began in 2018. Pursuant to the FPL-FDEP Consent Order (CO), an assessment of whether the plume will retract to the L-31 E canal by Year 10 (2028) is due to the FDEP in 2023 after completion of 5 years of remediation. Should additional remediation measures be deemed necessary after five years, FPL will submit plans for approval to FDEP and implement said plans to complete the groundwater remediation. Due to the remediation efforts, groundwater quality will improve over the SLR term, and there would be no negative impacts to groundwater during decommissioning as a result of the additional 20 years of operation.
Terrestrial	Terrestrial resources can be impacted by landscape maintenance, stormwater management, elevated noises levels, and other ongoing operations and maintenance activities. However, these impacts are not different from current site activities and would remain the same throughout the proposed SLR term. Therefore, there should be no additional impacts on terrestrial resources during decommissioning as a result of the additional 20 years of operation.
Aquatic	Aquatic resources can be impacted by landscape maintenance, stormwater management, effluent discharge, and other ongoing operations and maintenance activities. However, these impacts are not different from current site activities and would remain the same throughout the proposed SLR term. Therefore, there should be no additional impacts on terrestrial resources during decommissioning as a result of the additional 20 years of operation. The CCS would continue to operate in support of Unit 5, and retired fossil Units 1 and 2. PTN plans to continue to withdraw water from the CCS to support the operation of these units in synchronous condenser mode over the course of the decommissioning period, and Unit 5, which remains in operation, discharges blowdown to the CCS.
Special status species	The NRC determined that the continued operations of PTN during the proposed SLR term would either have no affect or are not likely to adversely affect special status species. The continued operation during the SLR term would therefore not impact decommissioning activities beyond what is currently anticipated. The CCS would continue to operate in support of Unit 5, and retired fossil Units 1 and 2. PTN plans to continue to withdraw water from the CCS to support the operation of these units in synchronous condenser mode over the course of the decommissioning period, and Unit 5, which remains in operation, discharges blowdown to the CCS. PTN currently implements a crocodile management plan to improve breeding and nesting habitat and protect American crocodiles on the PTN site. This plan is a requirement per the 2019 Biological Opinion.
Historic and cultural resources	PTN is located on a site certified for power generation and co-located with other generating units. PTN has a low archeological potential and current site infrastructure will be utilized during the proposed SLR term. For these reasons, the potential impact of decommissioning activities on cultural resources would not change as a result of the additional 20 years of operation.

Issue	Impact
Socioeconomics	PTN has no plans to add non-outage workers during the proposed SLR term, does not anticipate changes in tax payments, and has no plans for refurbishment. Therefore, impacts under the SLR term from the additional 20 years of operation will not impact decommissioning activities.
Human health	Continued operation of PTN through the proposed SLR term would not change the current exposure to physical, chemical, and microbiological hazards, or risks of accidents than those currently in existence and controlled by accepted industrial hygiene practices as required by permits and federal and state regulations. Chemical releases to the environment and the potential for impacts to the public are expected to continue to be minimized by adherence to discharge limitations of draft NPDES and other permits. Radiation doses are expected to continue at current levels during the proposed SLR term and would be well below regulatory limits. Due to adherence to ongoing practices, the additional 20 years of operation will not impact decommissioning efforts.
Environmental justice	FPL has determined that minority and low-income populations within a 50-mile radius of PTN will not be at risk of impact from continued operations associated with the proposed SLR term. Radiation doses from continued operations would continue at current levels and would remain within regulatory limits. Terrestrial and aquatic monitoring programs conducted by PTN are designed to ensure contaminants are not entering natural systems that would impose a risk to the environment or the public. As operations during the proposed SLR term will continue with current monitoring activities and compliance with existing regulations, the additional 20 years of operation would have no impact on decommissioning.
Waste management	Continued operation during the proposed SLR term would generate additional waste which would need to be handled under the comprehensive regulatory controls that are in place. Therefore, the low public doses achieved at reactors to date ensure that the impacts to the environment would remain SMALL during the proposed SLR term. The expected increase in volume of spent fuel can be safely stored onsite in either pool or dry storage. Continued operation would not impact decommissioning activities.

Conclusion

Decommissioning will occur whether PTN is permanently shut down at the end of its current renewed operating license term, or at the end of the proposed SLR term 20 years later. After permanent shutdown, plant operators will initiate decommissioning in accordance with 10 CFR 50.82, “Termination of License.”

Based on the analysis provided, FPL finds that renewal of the license for the proposed SLR term is expected to have a negligible effect on the impacts of terminating operations and decommissioning and is therefore considered SMALL for all resources. Based on the discussion above, the impacts for this issue with respect to an SLR term for PTN are materially consistent with the 2013 GEIS. Thus, the 2013 GEIS analysis and conclusion on this issue remains valid and applicable to one SLR term for PTN, as supplemented here.

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