DECISION DOCUMENT

ANALYSIS OF THE CLEAN WATER ACT

SECTION 301(h) SECONDARY TREATMENT WAIVER RENEWAL APPLICATION

FOR THE

CAROLINA REGIONAL WASTEWATER TREATMENT PLANT

NPDES PERMIT NO. PR0023752

PUERTO RICO

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION 2

NEW YORK, NEW YORK

MAY 2020

TABLE OF CONTENTS

INTRODUCTION

The Puerto Rico Aqueduct and Sewer Authority (hereinafter, the applicant or PRASA) has requested a renewal of its waiver under section 301(h) of the Clean Water Act (the Act), 33 U.S.C. Section 1311(h), from the secondary treatment requirements contained in Section 301(b)(1)(B) of the Act, 33 U.S.C. Section 1311(b)(1)(B), for the Carolina Regional Wastewater Treatment Plant (RWWTP), a publicly owned treatment works (POTW). [National Pollutant Discharge Elimination System (NPDES) Permit No. PR0023752]

The applicant is seeking a section 301(h) waiver to discharge wastewater receiving less-than-secondary treatment to the Atlantic Ocean. The original application for a section 301(h) modification of secondary treatment requirements at the Carolina RWWTP was submitted to the U.S. Environmental Protection Agency (EPA) Region 2 in 1979 and was tentatively approved by the EPA on September 30, 1988. In 2002, after a thorough review of updated information, EPA approved PRASA's first application for its section 301(h) modified permit ("modified permit") for the Carolina RWWTP, and subsequently issued a modified permit that became effective on June 1, 2002 and expired on May 31, 2007. Pursuant to 40 CFR §122.21, the terms and conditions of the 2002 modified permit have been administratively extended until issuance of a new permit. In December 2006, PRASA again submitted a modified permit application requesting a renewal of its modification from the secondary treatment requirements. On March 26, 2008, the applicant submitted supplemental information to EPA supporting its 2006 permit renewal application in response to an EPA request for additional information. On December 17, 2010, EPA found that PRASA had demonstrated that all the criteria had been met for the Carolina RWWTP with an effective date of permit issued on March 1, 2011. On September 4, 2015, PRASA submitted the original renewal application to discharge treated wastewater from Carolina RWWTP. On June 26, 2019, PRASA submitted an updated application for renewal of the 301(h) Waiver for the Carolina RWWTP.

This Decision Document presents EPA Region 2's findings, conclusions, and recommendations as to whether the applicant's modified discharge will comply with the criteria set forth in section 301(h) of the Act, as implemented by regulations contained in 40 CFR part 125, subpart G, and Puerto Rico Water Quality Standards (PRWQS) Regulations, Resolution Number R-03-05.

DECISION CRITERIA

Under Section 30l(b)(l)(B) of the Act, 33 U.S.C. Section 1311(b)(l)(B), POTWs in existence on July l, l977, were required to meet effluent limitations based upon secondary treatment as defined by the Administrator of EPA (the Administrator). As previously described, secondary treatment is defined by the Administrator in terms of three parameters: TSS, BOD_5, and pH. Uniform national effluent limitations for these pollutants were promulgated (see 40 CFR Part 133) and included in NPDES permits for POTWs issued under Section 402 of the Act. POTWs were required to be in compliance with these limitations, in most circumstances, by July l, l977.

Congress subsequently amended the Act, adding section 301(h), which authorized the Administrator, with State[1] concurrence, to issue NPDES permits which modify the secondary treatment requirements of

the Act. P.L. 95-217, 91 Stat. 1566, as amended by P.L. 97-117, 95 Stat. 1623; and Section 303 of the Water Quality Act (WQA) of 1987. Section 301(h) provides that:

The Administrator, with the concurrence of the State, may issue a permit under [Section 402 of the Act] which modifies the requirements of subsection (b)(l)(B) of this section with respect to the discharge of any pollutant from a publicly owned treatment works into marine waters, if the applicant demonstrates to the satisfaction of the Administrator that:

1) there is an applicable water quality standard specific to the pollutant for which the modification is requested, which has been identified under [Section 304(a)(6) of the Act];

2) the discharge of pollutants in accordance with such modified requirements will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife, and allows recreational activities, in and on the water;

3) the applicant has established a system for monitoring the impact of such discharge on a representative sample of aquatic biota, to the extent practicable, and the scope of such monitoring is limited to include only those scientific investigations which are necessary to study the effects of the proposed discharge;

4) such modified requirements will not result in any additional requirements on any other point or nonpoint source;

5) all applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced;

6) in the case of any treatment works serving a population of 50,000 or more, with respect to any toxic pollutant introduced into such works by an industrial discharger for which pollutant there is no applicable pretreatment requirement in effect, sources introducing waste into such works are in compliance with all applicable pretreatment requirements, the applicant will enforce such requirements, and the applicant has in effect a pretreatment program which, in combination with the treatment of discharges from such works, removes the same amount of such pollutant as would be removed if such works were to apply secondary treatment to discharges and if such works had no pretreatment program with respect to such pollutant;

7) to the extent practicable, the applicant has established a schedule of activities designed to eliminate the entrance of toxic pollutants from non-industrial sources into such treatment works;

8) there will be no new or substantially increased discharges from the point source of the pollutant to which the modification applies above that volume of discharge specified in the permit;

9) the applicant at the time such modification becomes effective will be discharging effluent which has received at least primary or equivalent treatment and which meets the criteria established under

> [Section 304(a)(1) of this Act] after initial mixing in the waters surrounding or adjacent to the point at which such effluent is discharged . . .”

For the purpose of this subsection, the phrase "the discharge of any pollutant into marine waters" refers to a discharge into deep waters of the territorial sea or the waters of the contiguous zone, or into saline estuarine waters where there is strong tidal movement and other hydrological and geological characteristics which the Administrator determines necessary to comply with the requirements of Sections 30l(h)(2) and 101(a)(2) of the Act. For the purposes of Section 301(h)(9), “primary or equivalent treatment” means treatment by screening, sedimentation and skimming adequate to remove at least 30 percent of the biochemical oxygen demanding material and 30 percent of the suspended solids in the treatment works influent, and disinfection, where appropriate. A municipality which applies for a waiver of secondary treatment shall be eligible to receive a permit pursuant to this subsection which modifies the requirements of subsection (b)(1)(B) of this section with respect to the discharge of any pollutant from any treatment works owned by such municipality into marine waters. No permit issued shall authorize the discharge of sewage sludge into marine waters. In order for a permit to be issued for the discharge of a pollutant into marine waters, such marine waters must exhibit characteristics assuring that water providing dilution does not contain significant amounts of previously discharged effluent from such treatment works. No permit issued shall authorize the discharge of any pollutant into marine or estuarine waters which at the time of application does not support a balanced, indigenous population of shellfish, fish and wildlife, or allow recreation in and on the waters or which exhibit ambient water quality below applicable water quality standards adopted for the protection of public water supplies, shellfish and wildlife, or recreational activities or such other standards necessary to assure support and protection of such uses. The prohibition contained in the preceding sentence shall apply without regard to the presence or absence of a causal relationship between such characteristics and the applicant’s current or proposed discharge.

On August 9, 1994, EPA promulgated final regulations implementing these statutory criteria in 40 CFR Part l25, Subpart G. These regulations provide that a section 30l(h) modified NPDES permit may not be issued in violation of 40 CFR §l25.59(b), which requires, among other things, compliance with provisions of the Coastal Zone Management Act (l6 U.S.C. l45l et seq.), the Endangered Species Act (l6 U.S.C. l53l et seq.), Title III of the Marine Protection, Research and Sanctuaries Act (l6 U.S.C. l43l et seq.), and other applicable provisions of State or Federal laws or Executive Orders such as requirements of Essential Fish Habitat of the Magnuson-Stevens Fishery Conservation and Management Act and the President’s Executive Order on Coral Reef Protection dated June 11, 1998. Furthermore, in accordance with 40 CFR §125.59(i), the decision to grant or deny a section 301(h) waiver shall be made by the Administrator and shall be based on the applicant's demonstration that it has met all the requirements of 40 CFR §§125.59 through 125.68, as described in this Decision Document. EPA has reviewed all data submitted by the applicant in the context of applicable statutory and regulatory criteria and has presented its findings and conclusions in this Decision Document.

SUMMARY OF FINDINGS

Based upon review of information provided by the applicant and other supporting documents, EPA makes the following findings regarding the modified discharge's compliance with statutory and regulatory criteria:

1) The modified discharge will not cause violations of PRWQS standards for dissolved oxygen, color, turbidity, or pH. [Section 301(h)(1), 40 CFR §125.61]

2) The applicant has demonstrated that it can consistently achieve PRWQS at and beyond the zone of initial dilution. The applicant's modified discharge, alone or in combination with pollutants from other sources, will not impact public water supplies. The modified discharge will not interfere with the protection and propagation of a balanced indigenous population of fish, shellfish, and wildlife, and will not affect recreational activities. [Section 301(h)(2), 40 CFR §l25.62]

3) The applicant has proposed an adequate monitoring program to assess the impact of the modified discharge. The terms of this program will become enforceable conditions of the modified permit to be issued to the applicant. [Section 30l(h)(3), 40 CFR §l25.63]

4) The applicant's modified discharge will not result in additional treatment requirements on any other point or nonpoint sources. [Section 30l(h)(4), 40 CFR §l25.64]

5) The applicant has an industrial pretreatment program and the program continues to be implemented on an island-wide basis. [Section 301(h)(5), 40 CFR §§125.66 and 125.68]

6) The applicant has demonstrated that it has met the urban pretreatment requirements. [Section 301(h)(6), 40 CFR §125.65]

7) The applicant has proposed a toxics control program to limit the entrance of toxic pollutants from nonindustrial sources into the treatment works. [Section 30l(h)(7), 40 CFR §l25.66]

8) There will be no new or substantially increased discharges from point sources of pollutants to which the waiver applies above those specified in the modified permit. [Section 30l(h)(8), 40 CFR §l25.67]

9) The applicant has demonstrated the modified discharge will receive at least primary or equivalent treatment and meet the requirements established under Section 304(a)(1) of the Act after initial mixing. [Section 301(h)(9), 40 CFR §125.60]

CONCLUSION

EPA has concluded that the applicant's modified discharge will not adversely impact the marine environment and beneficial uses of the receiving water, and will comply with the requirements of Section 301(h) of the Act and 40 CFR Part 125, Subpart G.

RECOMMENDATION

It is recommended that the applicant be granted a section 301(h) modified permit in accordance with the above findings, and that a public notice of intent to issue a section 301(h) modified permit be prepared in accordance with all applicable provisions of 40 CFR Parts 122 and l24. In accordance with 40 CFR §125.68, the Carolina RWWTP Section 301(h) modified permit (NPDES Permit No. PR0023752) shall contain, in addition to all applicable terms and conditions required by 40 CFR Part 122, the following special conditions:

1. All requirements determined necessary by the Puerto Rico Department of Natural and Environmental Resources (DNER) as part of its Final Water Quality Certificate to ensure that the modified discharge will comply with all applicable provisions of Commonwealth law, including water quality standards. [Section 401, 40 CFR §124.54]

2. Effluent limitations and mass loadings for BOD and TSS presented below, in accordance with 40 CFR Parts 122 and 125;

Table 1 - Proposed Section 301(h) Modified Effluent Limitations

Parameter	Monthly Average	Average Weekly	Daily Maximum	Percent Removal
Flow, MGD	45	--	90	--
BOD_5, mg/l	130	--	--	30
BOD_5, kg/day	22,166	--	--	--
TSS, mg/l	70	--	--	60
TSS, kg/day	11,935	--	--	--

3. Requirements for the use of chemical addition (e.g., polymer) to increase solids removal to achieve a 60 percent removal rate, on a monthly average basis, for TSS;

4. Monitoring requirements for establishing and implementing the Carolina RWWTP section 301(h) Waiver Demonstration Studies that include, but are not limited to, biological, effluent, and water quality monitoring that are consistent with 40 CFR §§125.60, 125.62, 125.63, and 125.68(c);

5. Reporting requirements for the Carolina RWWTP section 301(h) Waiver Demonstration Studies, in accordance with 40 CFR §125.68(d);

6. Requirements to modify, as necessary, and implement a toxics control program upon the effective date of the modified permit to limit the entrance of toxic pollutants from nonindustrial sources into the treatment works; and

7. Requirements for implementing a pretreatment program and nonindustrial control program in accordance with 40 CFR §§125.65, 125.66, and 125.68(b).

DESCRIPTION OF THE TREATMENT FACILITY

The Carolina RWWTP is located on the north coast of the island of Puerto Rico, within the Town of Loíza. The facility provides service to the Towns of Carolina, Trujillo Alto, Canóvanas, Loíza, sections of Rio Piedras (San Juan), and Rio Grande. The Carolina RWWTP first began operations in August 1986 and is designed to provide primary treatment of wastewater through screening, grit removal, polymer-enhanced sedimentation, and chlorination for disinfection. The design life of the facility is estimated to be 40 years and the facility has a daily average design flow of 45 MGD and a daily maximum design flow of 90 MGD.

At the Carolina RWWTP, influent travels through the bar screen to the grit collector, Parshall flume and primary settling tank. To enhance solids sedimentation PRASA adds polymer. As a result, effluent from the Carolina RWWTP can be considered as having undergone advanced primary treatment. Primary tank sludge is pumped to the holding tank and primary tank scum is sent to the scum collectors. Sludge from the primary treatment process is dewatered onsite and transported either to the Municipal Landfill on the southwestern portion of the island or to the Puerto Nuevo Regional Wastewater Treatment Plant. The applicant has requested effluent limits based on a daily maximum design flow of 90 MGD and a monthly average design flow of 45 MGD.

DESCRIPTION OF RECEIVING WATERS

The Carolina RWWTP is located on the north coast of the island of Puerto Rico. The north coast consists of a narrow shelf (2.8 to 4.6 km) that forms continuously strong currents and wave action, which can be exacerbated by tropical storm events. Depths at the shelf break are typically around 700 ft (213 m) with the deepest depths ranging between 1,200 ft (366 m) and 2,400 ft (732 m). Because of strong wave action, the north coast has few coral reefs compared to the south coast region of the island, which has a wide shelf that protects the coast and allows for the support of fringing coral reefs. Coral reefs on the north coast are much lower in species diversity than those on the south coast and generally other Caribbean reefs (Glynn 1973). The nearest coral assemblage to the Carolina RWWTP's outfall is at Punta Vacia Talega, which is 0.93 miles (1.5 km) southwest of the outfall and consists of a rock reef with very sparse hard coral growth.

Currents in the vicinity of the Carolina RWWTP outfall are generally influenced by the Atlantic Ocean current system known as the North Equatorial Current. Local winds do not significantly affect the general hydrological flow patterns near the outfall, although they may influence surface currents. Current data show that surface currents generally flow westerly and range in speeds of 4.9 to 30.2 cm/sec whereas mid-depth and near bottom currents generally flow in the easterly direction and are slightly slower with speeds that ranged between 3.4 and 26.2 cm/sec, and 3.0 and 20.5 cm/sec, respectively. Based on current monitoring data, PRASA determined that the currents in the vicinity of the Carolina RWWTP outfall can be generally characterized as flowing easterly at an average speed of 13.7 cm/sec.

The Carolina RWWTP discharges wastewater approximately 6,234 ft (1,900 m) from the shore into Class SB waters. According to 2019 WQSR, all Class SB waters are intended for propagation and maintenance of desirable species (including threatened or endangered species), of ecologic importance, whether individually or as part of the ecological community. The critical initial dilution (CID) was updated in 2016 Mixing Zone Application (MZA) using the initial dilution model DKHW in Visual Plumes based on the same assumptions and data as 2015 MZA resulting in a revised initial dilution of 116:1. On January 24, 2020 DNER issued a mixing zone approval of CID at 116:1.

APPLICATION OF STATUTORY AND REGULATORY CRITERIA

EPA's review of the Carolina RWWTP Compliance with PR WQSR in receiving waters

The Carolina RWWTP compliance with PR Water Quality Standards Regulations (WQSR), as related to the receiving waters, was evaluated by EPA based on the Puerto Rico WQSR adopted on April 26, 2019 and the Carolina waiver monitoring reports (2010 through 2018).

On an annual basis, receiving water samples were collected at above 7 stations (C1 through C7) and analyzed for general constituents, metals and pesticides. Water samples were obtained at three depths 10th, 50th and 90th percentile. Once every 5 years, the full suite of 301(h) parameters were analyzed including the list of supplemental organic parameters. At each station, a water column depth profile was performed for the following field parameters: Dissolved Oxygen (DO), Temperature, pH and conductivity.

EPA analyzed the compliance with the applicable water quality standards (WQS) set in PR's 2019 WQSR based on monitoring completed for the 5-year reporting period (2013-2018), with no 301(h) waiver monitoring conducted at the Carolina RWWTP in 2017 as a result of Hurricane Maria.

Per WQSR adopted by Puerto Rico in 2019, the Carolina RWWTP discharges into Class SB waters. The criteria applicable to Class SB waters are Puerto Rico Water Quality Criteria set forth for Class SB waters in the Puerto Rico's WQSR in 2019.

1. Attainment of Water Quality Standards related to BOD5 and TSS [Section 301(h)(1), 40 CFR §125.61]

The Carolina RWWTP discharges into Class SB waters. PRASA has requested a waiver of the secondary treatment requirements for biochemical oxygen demand (BOD), which affects DO) in the receiving waters, and for total suspended solids (TSS), which affects the turbidity or light attenuation in the receiving water. PRASA, therefore, needs to demonstrate that it meets DNER receiving water standards for DO and turbidity. As noted in the EPA March 2011 301(h) waiver approval, DNER issued a positive determination that the Carolina RWWTP advanced primary discharge would comply with established PRWQSR with respect to DO and turbidity. Carolina RWWTP operations are authorized under a Water Quality Certificate (WQC) issued by DNER and under an NPDES permit issued by EPA. The NPDES permit includes a waiver of secondary treatment requirements for BOD and TSS, which is allowed by Section 301(h) of the Act.

Under 40 CFR 125.61, which implements Section 301(h)(1), water quality standards must be applicable to the pollutants for which the modification is requested, and PRASA must demonstrate that the modified discharge will comply with these standards. PRASA's 2019 Carolina Re-Application for a 301(h) waiver specifically focused on the discharge standards for two parameters: BOD and TSS. The BOD_5 affects DO while TSS influences turbidity of the receiving water.

As a result, EPA has evaluated receiving water data from the Appendices included in PRASA's Renewal Application document (2019) and the effluent monitoring data (2013 – 2018) to assess the impact of the modified discharge on the attainment of other water quality standards related to BOD_5 and TSS. As described in the 2019 Renewal Application, a total of 7 stations (C1 through C7) were sampled annually from 2013 to 2016 and in 2018, in alternating wet and dry seasons for the 301(h) waiver demonstration studies at following stations:

- Stations C1 and C2, located at the edge of the ZID,
- Stations C3 and C4 designated as "farfield" locations,
- Station C5 serving as the "background" reference station,
- Station C6 located within the ZID and
- Station C7 located near shore.

On an annual basis, receiving water samples were collected at above 7 stations and analyzed for general constituents, metals and pesticides. Water samples were obtained at three depths 10th, 50th and 90^{th} percentile. Once every 5 years, the full suite of 301(h) parameters were analyzed including the list of supplemental organic parameters. At each station, a water column depth profile was performed for the following field parameters: Disolved Oxygen (DO), Temperature, pH and conductivity.

EPA analyzed the compliance with the applicable water quality standards (WQS) set in PR's 2019 WQSR based on monitoring completed for the 5-year reporting period (2013-2018), with no 301(h) monitoring conducted at the Carolina RWWTP in 2017 as a result of Hurricane Maria. A summary of the evaluation is provided below.

a. DO

Adopted in 2019, PRWQSR requires that DO for Class SB waters, such as those in the vicinity of Carolina RWWTP outfall, shall not be less than 5.0 mg/L except when natural conditions cause this value to be depressed. Compliance with the applicable PRWQS for DO is assessed in two ways: 1) by comparing ambient DO concentrations observed at all 301(h) monitoring stations with the applicable WQS; and 2) the nearfield and far field DO analyses for the Carolina RWWTP.

DO Ambient Water Evaluation:

The minimum DO values measured in the receiving waters from 2013 through 2016 and in 2018 in the vicinity of the Carolina RWWTP discharge ranged from 5.72 mg/L (at Station C7, at 9 m below the surface in 2015) to 6.6 mg/L (occurred at Station C7, 4m below surface in 2014). All ambient DO values reported for seven monitoring stations were above the Class SB DO criteria of 5.0 mg/L.

Based on observed monitoring data in the vicinity of the Carolina RWWTP outfall, the applicant has demonstrated that the applicable DO criterion for Class SB waters (5.0 mg/L) is being met in the ambient receiving waters. EPA will, however, require that PRASA continue to monitor DO in the ambient receiving waters, as part of the Carolina RWWTP 301(h) Post Waiver Monitoring Plan, which will be included as a requirement in the final 301(h) modified NPDES permit. EPA will continue to evaluate future DO data for compliance with applicable water quality standards.

Near field and far field DO analyses**:**

The calculation of effluent discharge effects on receiving water DO concentration is based on the procedure presented in Section II, Chapter 6, Part C of the Interim Mixing Zone and Bioassay Guidelines. The Guidelines provide for a sequential process to evaluate DO in the nearfield (following initial dilution) and in the far field (following subsequent plume diffusion). Initial DO demands are negligible and are not very sensitive to either effluent DO or IDOD concentration. Based on these calculations, the DO concentrations in the discharge nearfield will meet the requirements of the PRWQSR for all effluent DO concentrations.

The results of the far field DO demand calculations indicate an insignificant DO demand in the far field (0.006 mg/L for both cases) after initial dilution, based on an effluent DO of 0.0 and an IDOD of 4.0 mg/L. The minimum DO is calculated to be greater than 5.0 mg/L. Therefore, the DO criterion of the PRWQSR (5.0 mg/L) will be achieved in both the nearfield and the far field under worst-case conditions. **On the basis of the above EPA's ambient water analysis and the Applicant's near field and far field DO analyses, the EPA 301(h) Review Team concludes that the Carolina RWWTP discharge will not cause violations of the 2019 PRWQS for DO in SB waters.**

b. Color

Article 3.1.2 of PRWQS provides that "the waters of Puerto Rico shall be free from color attributable to discharges in such a degree as to create a nuisance to the enjoyment of the existing or designated uses of the waterbody." Specifically, for Class SB waters, Article 3.2.2 provides that color shall not be altered except by natural causes. Color in water can reduce light penetration and affect aquatic life by limiting photosynthesis by phytoplankton and aquatic plants (EPA 1986b).

To assess the impact of the modified discharge on color in the receiving water, EPA reviewed effluent and ambient monitoring data. Based on effluent monitoring data collected from June 2002 through October 2018, color was observed between 5 and 60 Pt-Co Units. Furthermore, based on section 301(h) Waiver Demonstration Studies, the color at and beyond the ZID was reported between the levels of non-detect and 5 Pt-Co Units. In accordance with DNER's IWQC, EPA proposes an effluent limitation of 65 Pt-Co for color in the draft permit. **Based on review of effluent data, EPA believes that the Carolina RWWTP will be able to meet this limitation.**

c. Turbidity

Suspended solids in the effluent can result in a significant loading of particles to the water column and their subsequent deposition onto the seafloor in the vicinity of the modified discharge. Pursuant to 40

CFR 125.61 and 125.62, PRASA must demonstrate that the modified discharge from the Carolina RWWTP will comply with water quality standards for suspended solids, which may include criteria for turbidity, light transmission, light scattering, or maintenance of the euphotic zone. Rule 1303.1 of PRWQS provides that "the waters of Puerto Rico shall be free … from turbidity attributable to discharges in such a degree as to create a nuisance to the enjoyment of the existing or designated uses of the waterbody." Specifically, Rule 1303.2 B (f) provides that turbidity in Class SB waters shall not exceed 10 nephelometric turbidity units (NTUs), except by natural causes.

Ambient Waters Evaluation:

PRASA monitored ambient turbidity in Class SB waters, at seven stations (C1 – C7) at three depths per station (surface, 50% and 90%). During monitoring events from 2013 -2016 and 2018, PRASA collected a total of 126 ambient turbidity samples, with values ranging from 0.08 to 2.6 NTUs (measured at 10 meters depth at far field station C4 in 2013). All of these samples were significantly below and in compliance with the Class SB turbidity criteria of 10 NTUs.

Turbidity Effluent Evaluation:

Effluent limitation of less than 168 NTU (Daily) based on the NPDES Permit for the Carolina RWWTP.

Effluent Evaluation:

Samples collected from July/2017 to June/2019 at the Carolina RWWTP did not exceed effluent limitation for the Turbidity parameter.

In summary, Turbidity was consistently below the PRWQSR criterion of 10 NTU at the mixing zone boundary and in the adjacent receiving water. **Based on the above data, all ambient turbidity samples collected were in compliance with the PRWQS for turbidity of 10 NTU.**

d. pH

Pursuant to 40 CFR Part 133, secondary treatment requirements provide that effluent values for pH shall be maintained within the range of 6.0 to 9.0 standard units. In the renewal application, PRASA did not request a waiver from pH requirements.

In addition to the secondary treatment requirements for pH, Article 3.2 of PRWQS has established water quality criteria for pH for Class SB waters which states that "in no case the pH will lie outside the range of 7.3 to 8.5 standard pH units, except when caused by natural phenomena." EPA also evaluated receiving water monitoring data for pH at and beyond the edge of the mixing zone to ensure that the modified discharge will not cause or contribute to changes to pH levels in the receiving water.

The observed pH ranged from 8.07 in 2014 to 8.20 SU in 2016. All observed pH values are within the 7.3 to 8.5 SU range criterion**. Based on review of all the pH data, EPA has concluded that the applicant has demonstrated that the modified discharge will consistently meet water quality criteria for pH at and beyond the boundary of the ZID**.

In summary, the 2019 PRWQSR criteria for all of the oceanographic parameters were met based on the results of the 2013 – 2018 sampling events, except for temperature in 2015. Because elevated temperature readings were reported at far field station only, these exceedances are not believed to be attributable to the Carolina RWWTP outfall.

2. Attainment of Other Water Quality Standards and Impact of Discharge on Public Water Supplies; Shellfish, Fish and Wildlife; and Recreation [Section 301(h)(2), 40 CFR §125.62]

Section 301(h)(2) of the Act provides that the Administrator may issue a permit which modifies the requirements of secondary treatment provided that the modified discharge protect human health and the environment. Specifically, Section 301(h)(2) requires that the applicant's discharge must not interfere with the attainment and maintenance of water quality which assures protection of public water supplies; assures protection and propagation of a balanced, indigenous population (BIP) of shellfish, fish and wildlife; and allows recreational activities. Pursuant to 40 CFR §125.62(a), the applicant's outfall and diffuser must be located and designed to provide adequate initial dilution, dispersion, and transport of wastewater such that the discharge does not exceed, at and beyond the ZID, all applicable water quality standards, nor exceed section 304(a) criteria for toxic pollutants for which there are no applicable EPA-approved standards.

a) Pollutant-specific Analysis [40 CFR §125.62(a)] Toxic pollutants, bacteria and whole effluent toxicity.

Pursuant to the current modified permit, PRASA is required to monitor the concentration of approximately 150 pollutants in the Carolina RWWTP effluent and receiving water in the vicinity of the facility's outfall. Based on review of effluent monitoring data, EPA identified several pollutants of potential concern due to effluent concentrations that were reported above water quality criteria. In accordance with 40 CFR §125.62(a), EPA has applied a CID of 116:1 to assess attainment of water quality criteria (i.e., toxic pollutants, bacteria, and whole effluent toxicity) at the ZID.

Conventional Constituents:

Out of all conventional constituents analyzed from 2013 to 2018 against 2019 PRWQSR (turbidity, MBAS, undissociated sulfide, nitrogen, *Enterococcus*, and fecal coliform bacteria), all were observed at concentrations below the applicable water quality standards at the edge of ZID (stations C1 and C2), except for *Enterococcus* bacteria.

Enterococcus – 2019 PR WQSR include the criterion of geometric mean not to exceed 35 colonies/100 mL in any 90-day interval and the 90th percent tile of the same sample not to exceed 130 colonies/100 mL in the same 90-day interval, applicable to class SB waters.

Ambient Water Evaluation:

2013 - *Enterococcus* bacteria concentrations were reported at greater than the WQS at all depths at Stations C3 far field station (ranging from 700 to 3000 col/100mL). The maximum station geometric

mean for *Enterococcus* bacteria concentrations was 2,231 colonies/100 mL at the 50th percentile depth at Station C3.

2014 - *Enterococcus* bacteria concentrations were reported at greater than the WQS at 1 site: the 90th percentile depth at Station C1 (edge of ZID; geometric mean of 63 colonies/100 mL).

2015 - *Enterococcus* bacteria concentrations were reported at greater than the WQS at 3 sites: the 90th percentile depth of Station C2 (edge-of-ZID; geometric mean of 1,128 colonies/100 ml) and the 10th and 50th percentile depths of Station C6 (ZID; geometric means of 500 and 270 colonies/100 ml, respectively).

2016 – *Enterococcus* bacteria concentrations were reported at greater than the WQS at 3 sites: the 10th percentile depth of Station C2 (edge-of-ZID; geometric mean of 41 colonies/100 ml) and the 10th and 90th percentile depths of Station C6 (ZID; geometric means of 218 and 742 colonies/100 ml, respectively).

2018 – *Enterococcus* bacteria concentrations were reported at concentrations below WQS.

In summary, as a result of annual sampling completed from 2013 to 2016 and 2018, out of all conventional constituents analyzed against numeric water quality standards (turbidity, MBAS, Sulfide, Total Nitrogen, *Enterococcus*, and Fecal Coliform), all were observed at concentrations below the 2019 PRWQSR at all monitoring stations, except for *Enterococcus* bacteria. The limitation for *Enterococcus* bacteria did not exceed effluent limitation for Enterococci until January of 2020 in which exceedance have been observed for the 90th percentile limitation. PRASA plans to upgrade the Carolina's sedimentation tanks which will address these exceedances. A compliance schedule has been authorized in the permit in accordance with 40 CFR 122.47.

301(h) Program Constituents**:**

The Carolina QAPP/SAP requires effluent and receiving water monitoring for the full list of EPA Priority Pollutants, as well as for certain parameters included in the EPA Marine Water Quality Criteria, on either an annual basis or once per 5-year permit period. PRASA, as part of its annual monitoring events completed from 2013 -2016 and 2018, analyzed the full list of EPA priority pollutants in the Carolina RWWTP effluent and in the ambient receiving waters, at seven ambient monitoring stations (C1 – C7) and at three depths per station (surface, 50% and 90%). All of the compounds detected in the receiving waters in 2013, 2014 and 2015 were present at concentrations below the 2019 PRWQSR.

In March 2016, the results of the suite of parameters monitored annually in the vicinity of the Carolina outfall indicated that all were present at concentrations less than the respective WQS, with the exception of copper.

Copper - PR WQSR include the aquatic life criterion of 3.73 ug/L for copper, applicable to class SB waters.

In 2016, a single copper concentration (6.19 ug/L) was reported to be greater than the WQS at far field Station C3 (at 50th percentile depth). Copper concentrations were below the applicable WQS at all other stations, including the edge of the mixing zone stations (C1 and C2) and the ZID station (C6). No copper exceedances were observed in receiving waters during 2013-2015 period or in 2018. As a result, this single exceedance is not considered to be representative of the receiving water conditions around the Carolina RWWTP outfall.

In 2016 and 2018, the results of the suite of parameters monitored annually in the vicinity of the Carolina outfall indicated that all were present at concentrations less than the respective WQS, with the exception of sulfate.

Sulfates - PR WQSR include the criterion of not to exceed 2,800 mg/l for sulfates, applicable to estuarine class SB waters. In 2016, sulfate concentrations were reported at values greater than the WQS at all receiving water stations and depths, with a maximum concentration of 3,058 mg/L except for one sample with a value of 2,789 mg/L. In 2018, sulfate concentrations were reported at values greater than the WQS at all receiving water stations and depths, with a maximum concentration of 3,237 mg/L at the 10th percentile depth at Station C5 (reference). Because the elevated sulfate concentrations were reported throughout the study area (including reference and far field sites), these exceedances are not believed to be attributable to the Carolina RWWTP outfall.

All of the compounds detected in the receiving waters in 2013, 2014 and 2015 were present at concentrations below the 2019 PRWQSR. One single exceedance of copper in 2016 and exceedances of sulfates in 2016 and 2018 are not considered to be a representative of receiving water condition around the Carolina RWWTP outfall. As a result, it is EPA's conclusion that these data indicate that the receiving waters in the vicinity of the Carolina RWWTP outfall are not being adversely influenced by the discharge of the effluent treated at the advanced primary level.

Parameters for which compliance with the 2019 WQSR could not be evaluated

The evaluation of Program Detection Limits and Laboratory Reporting Limits as related to the applicable 2019 WQSR was performed. Table below provides a list of compounds for which the Reporting Limits exceed the corresponding water quality criteria. As a result, for the parameters listed below, compliance with the applicable WQSR cannot be determined.

Exhibit 1. Compounds for which Reporting Limits as listed in the QAPP exceed corresponding PR Water Quality Criteria

	2019 WQSR Ug/L	Program Detection Limit Ug/L	Reporting Limits Ug/L
	0.0000077	0.0002	0.0004
Dieldrin	0.000012	0.0002	0.0004
Heptachlor	0.000059	0.0002	0.0004

	2019 WQSR Ug/L	Program Detection Limit Ug/L	Reporting Limits Ug/L
Heptachlor Epoxide	0.00032	0.0002	0.0004
Toxaphene	0.0002	0.05	0.1
Guthion	0.01	0.05	0.1
Chlorpyrifos	0.0056	0.025	0.05
Demeton	0.1	0.075	0.15
Benzo(a) anthracene	0.013	0.1	0.2
Benzo(a) pyrene	0.0013	0.1	0.2
Benzo(b)fluoranthene	0.013	0.1	0.2
Benzidine	0.11	10	20
Benzo(k)fluoranthene	0.13	0.1	0.2
Dibenzo(a,h)anthracene	0.0013	0.1	0.2
3,3-Dichlorobenzidene	1.5	5	10
1,2 Diphenylhydrazine	2	5	10
Indeno(123-cd) pyrene	0.013	0.1	0.2
N-nitrosodi-n-propylamine	5.1	5	10
4,4 - DDE	0.00018	0.0002	0.0004
4,4 DDT	0.0003	0.0002	0.0004
Pentachlorophenol	0.4	5	10
2,3,7,8 -TCDD (Dioxin)	5.1 x 10-8	5	10
1,2,4 -Trichlorobenzene	0.76	5	10
1,2 - Diphenylhydrazine	2	5	10
3,3 - Dichlorobenzidine	1.5	5	10
Bis (2 Ethylhexyl) Phthalate	3.7	5	10
Butylbenzyl Phthalate	1	3	6
Hexachlorobutadiene	0.1	5	10
Hexachlorocyclopentadiene	4	5	10
Hexachloroethane	1	5	10

	2019 WQSR Ug/L	Program Detection Limit Ug/L	Reporting Limits Ug/L
N-Nitrosodi-n-Propylamine	5.1	5	10

Because the Reporting Limits for these parameters are higher than the applicable WQS criteria, the EPA 301(h) Review Team is not able to determine whether or not the Carolina RWWTP discharge will adversely affect these levels in the receiving water during the next permit term. **PRASA must use appropriate EPA approved testing methods that the detection limits are adequate and lower enough to address the Detection Limits and Reporting Limits for these parameters during the next permit term.**

Whole Effluent Toxicity

EPA defines Whole Effluent Toxicity (WET) as "the aggregate toxic effect of an effluent measured directly by a toxicity test" (54 FR 23868, June 2, 1989). Article 3.1.9 of PRWQS provides that all waters of Puerto Rico shall not contain any substance at such concentration which, either alone or as result of synergistic effects with other substances is toxic or produces undesirable physiological responses in human, fish or other fauna or flora. Under section 101(a)(3) of the Clean Water Act, this is referred to as the general narrative standard of "no toxics in toxic amounts." PRWQS definitions include a numeric interpretation of this narrative standard as for toxicity as meeting a criterion of 0.3 Acute Toxic Units (TUa) and 1.0 Chronic Toxic Units (TUc). As part of the NPDES permitting program, whole effluent toxicity (WET) testing is routinely used to evaluate both the toxicity of wastewater discharges and compliance with narrative water quality standards that prohibit the discharge of toxic pollutants in toxic amounts, or otherwise provide for the maintenance and propagation of a balanced population of aquatic life.

Since effluent toxicity is inversely related to the effect concentration (the lower the effect concentration, the higher the toxicity in the effluent), concentration-based toxicity measurements are typically expressed as toxic units (TUs) to better illustrate the magnitude of potential toxicity. In EPA's Technical Support Document (TSD) for Water Quality-based Toxics Control, EPA recommends that in the absence of a numeric criterion for the parameter toxicity, a criterion maximum concentration (CMC) of 0.3 Toxic Units Acute (TUa) and criterion continuous concentration (CCC) of 1.0 Toxic Units Chronic (TUc) be used to ensure aquatic life protection against acute and chronic toxicity in the receiving water (EPA 1991). Article 1 of PRWQS provides that TUa and TUc be defined by the Lethal Concentration (LC50) of the tested effluent at which 50 percent of the test organisms die, where TUa = 100 ÷ LC50; and the No Observed Effect Concentration (NOEC), where TUc = 100 ÷ NOEC. The NOEC is the highest tested effluent concentration (in percent effluent) that does not cause an adverse effect on the test organism (i.e., the highest effluent concentration at which the values for the observed responses are not statistically different from the control).

For the purpose of the section 301(h) evaluation, EPA evaluated receiving water toxicity with consideration of a CID of 116:1. EPA applied the CID to acute and chronic water quality criteria of 0.3 TUa and 1.0 TUc to determine the maximum allowable level of effluent toxicity or wasteload allocation

(WLA) that would still ensure attainment of water quality criteria for toxicity at the edge of the mixing zone. EPA calculated acute and chronic WLAs of 34.8 TUa and 116 TUc, respectively, and then compared the WLAs to effluent WET data.

Pursuant to the current modified permit, PRASA is required to conduct acute and chronic WET testing on flow-weighted 24-hour composite effluent samples using the mysid shrimp (*Mysidopsis bahia*), sea urchin (*Arbacia punctulata*); and sheepshead minnow *(Cyprinidon variegatus*). These aquatic tests are laboratory tests and are designed to measure the biological effect (e.g., an acute effect such as mortality and chronic effects such as impairment of growth and reproduction) of the effluent on the aquatic organism.

The discharger provided the document Update of Supplemental 301(h) Waiver Application Information for the Carolina Regional Wastewater Treatment Plant (NPDES Permit PR0023752) (May 15, 2019) as part of the Clean Water Act §301(h) Waiver and Mixing Zone application. This document included Chapter 4: Whole Effluent Toxicity Testing, and tabulated WET results from December 2006 through April 2015. For the purposes of this evaluation, the EPA used WET data from January 2010 through April 2015 as being most representative of current conditions at the plant. Based on available WET data included in the application, all TUa values were below the acute WLA whereas several chronic WET tests reported TUc values that exceeded the chronic WLA.

Since chronic toxicity has been observed, EPA has determined that the modified discharge will cause, has the reasonable potential to cause, or contributes to an excursion above the narrative criterion for chronic toxicity. Therefore, with consideration of dilution, EPA has proposed a maximum daily effluent limitation of **115.633 TUc** for chronic toxicity in the draft permit, expressed as a minimum No Effects Concentration of **0.8648 %.** Based on review of more recent effluent WET data, EPA believes that the Carolina RWWTP will be able to meet this effluent limitation upon permit issuance.

EPA is also requiring that the discharger develop a plan for a toxicity reduction evaluation (TRE) within the first three months of the permit term. This plan may be an update of that developed for the previous NPDES permit cycle. Violation of the limitation for chronic toxicity would trigger accelerated monitoring for twelve weeks. During the accelerated testing period an additional violation of the limitation would require activation of the TRE workplan, and implementation of their strategy to identify and abate the source of toxicity.

b) Impact of Discharge on Public Water Supplies [40 CFR §125.62(b)]

Pursuant to 40 CFR §125.62(b), which implements Section 301(h)(2) of the Act, the applicant's modified discharge must allow for the attainment or maintenance of water quality that assures the protection of public water supplies. The applicant's modified discharge also must not interfere with the use of planned or existing public water supplies. As specified in Article 3.2.3 of PRWQS, drinking water (for human consumption) has not been established as a designated use for the Class SB waters of Puerto Rico. At this time, drinking water supplies in Puerto Rico are derived from inland surface and groundwater sources. The outfall is located 6,200 feet (more than 1 mile) offshore in marine waters approximately 100 feet deep. The discharge is to an open ocean environment, and, therefore, poses no risk to any current or proposed public water supply systems.

Therefore, EPA has concluded that the modified discharge would not affect public water supplies.

c) Biological Impact of Discharge [40 CFR §125.62(c)]

Pursuant to 40 CFR §125.62(c), the applicant must demonstrate that its modified discharge will allow for the attainment or maintenance of water quality which assures protection and propagation of a balanced indigenous population (BIP) of shellfish, fish and wildlife, and that a BIP of shellfish, fish and wildlife will exist in all areas beyond the ZID that might be affected by the modified discharge.

Since 1999, PRASA has conducted extensive surveys to obtain biological data as part of the 301(h) waiver monitoring program. The biological surveys address the biological integrity of key communities: 1) phytoplankton community, 2) infaunal benthic invertebrates (those living within soft-bottomed sediments), and 3) coral communities. These community-level evaluations, along with fish tissue bioaccumulation evaluations, are described in detail in each of PRASA's 301(h) monitoring reports to EPA. The results for the 301(h) waiver monitoring and reporting conducted at the Carolina RWWTP for the reporting period (2010–2018) are summarized below.

Phytoplankton Assessment

PRASA summarizes chlorophyll *a* concentrations for each sampling station and each depth during the past 5 years (2014 - 2018) of sampling and analysis. The results of the analyses of chlorophyll *a* indicate that chlorophyll *a* concentrations at the stations nearest to the outfall are comparable to, if not lower in average concentration than, those found elsewhere within the study area. It was observed that although chlorophyll *a* concentrations vary among sampling periods and among sampling stations, there are no consistent patterns that indicate that the Carolina outfall effluent discharge is adversely affecting chlorophyll *a* or phytoplankton.

In summary, the lack of significant spatial or depth-based variability in chlorophyll *a* concentrations related to the Carolina ocean outfall serves further to document the lack of significant biotic response to effluent discharges from the Carolina RWWTP. This indicates the presence BIPs of phytoplankton near the discharge.

Benthic Invertebrates

In aquatic systems, the monitoring of benthic invertebrates adjacent to wastewater discharges can provide useful information on the spatial extent and magnitude of impacts to the surrounding area. Benthic communities are an important component in the analysis of a BIP since they are sedentary or relatively immobile and therefore may be chronically exposed to pollutants. To assess the effect of the modified discharge on benthic infaunal community, EPA reviewed the number of taxa and several biological indices (e.g., species diversity, evenness, and richness) that escribe the overall condition of the benthic community. For the purpose of the section 301(h) evaluation, EPA reviewed information provided by PRASA that include the following biological indices: Number of Taxa, Shannon-Wiener Diversity Index (H), Species Evenness (J), and Species Richness (D).

Number of Taxa. This metric measures the overall variety of the macroinvertebrate assemblage in a community. The average number of taxa ranged from 33 (Station C7 nearshore reference) to 53 (Station C3 East Far field). The station with the highest number of taxa (75) was at the ZID boundary (Station C2). The reference station (C5) had, on average, 41 taxa during the 5-year period. The ZID boundary stations (C1 and C2) and the east and west far field stations (C3 and C4) had similar numbers of taxa, 45 to 40, on average. Overall, the data show the number of taxa to be relatively stable through time with no trend relative to the location of the outfall.

Shannon-Wiener Diversity Index. (H′). This index is used to characterize species diversity in a community; it accounts for both abundance and evenness of the species present. The highest average species diversity value was associated with the west far field station (C4); the lowest average was associated with the control (reference) station (C5). The eastern far field (C3), ZID boundary (C1), and shallow reference (C7) stations had average species diversity values at the lower end of the range. The other ZID boundary (C2) and west far field (C4) stations had mid-range average H index values. Based on information provided by PRASA, the species diversity does not appear to significantly differ between ZID stations and the reference station or far field stations.

Species Evenness. (Pielou's Evenness J). This index provides a measure of the similarity of the abundances of different species in a group or community. Average species evenness values were greatest at the center of the ZID (C6), edge-of-ZID (C1 and C2), western far field (C4), and nearshore (C7) stations. The lowest average J index value was associated with the reference station (C5). The eastern far field (C3) stations had average J index values in the mid-range of species evenness values for all stations sampled. As with species diversity, there is no overall trend in average species evenness related to ZID proximity from 2013–2018.

Species Richness. The species richness metric (D) is a measure of number of species rather than the number of individuals of each species in the community. On average, the greatest species richness D values were found at the eastern far field station (C3). The lowest species richness index values were, on average, found at the nearshore reference and the ZID edge stations (Stations C7 and C1, respectively). There appears to be little difference among stations sampled during the monitoring period and no indication of adverse effects on species richness relative to the location of the Carolina RWWTP discharge.

Number of Individuals**.** The average number of individuals at Station C1 had the lowest average number of individuals (472) from 2013–2018. The 2017 hurricane activity is likely a contributing factor to fewer individuals observed during March 2018. Station C3 (east far field) has consistently had the highest average number of individuals since 2013, with an average number of 1,284 individuals. No effects related to the outfall operation are apparent based on the number of individuals.

Estimated Density**.** This metric is a measure of abundance of individuals per square meter. The eastern far field station (C3) and the ZID edge station (C1) had the highest and lowest average organism density, respectively, a difference of approximately two- to three-fold. Station C1 (edge-of-ZID) had an average density similar to that of the reference station (C5). There is no apparent trend in species density related to ZID proximity during the 5-year monitoring period.

Presence or Absence of Pollution-Tolerant Benthic Species. Evaluation of the presence of pollution-tolerant infaunal organisms, as documented in the surveys conducted between 2013 and 2018 demonstrate that *pollution-tolerant* organisms are rarely present in the populations associated with the Carolina RWWTP outfall. Thirteen polychaete genera (*Capitella* sp., *Cirriformia* sp., *Glycinde* sp., *Goniada* sp., *Lumbrineris* sp., *Marphysa* sp., *Mediomastus* sp., *Nephtys* sp., *Nereis* sp., *Notomastus* sp., *Polydora* sp., *Prionospio* sp., and *Scoloplos* sp.) and three families (Capitellidae, Lumbrineridae, and Spionidae) have been identified in the scientific literature as having species that may be indicators of organically enriched or disturbed areas. There are variations within the species habitat preferences in these genera, and there is no indication that all species in a particular genus are tolerant of pollution or other environmental stresses.

Benthic Invertebrate Summary. Based on benthic monitoring data, benthic invertebrate communities within and at the boundary of the ZID appear moderate to highly diverse relative to communities assessed at monitoring stations beyond the ZID. ZID station C1 and within-ZID station C6 reported the highest number of taxa and species richness, with ZID station C1 also having the greatest species diversity. In addition, benthic species diversity, evenness, and richness appear relatively unchanged between benthic monitoring surveys conducted before and after issuance of the current modified permit at stations located within and at the boundary of the ZID. Furthermore, pollution-tolerant species and opportunistic colonizers were generally observed at low densities. **Therefore, EPA has determined that the applicant has demonstrated that the benthic invertebrate community has not been adversely impacted by the modified discharge.**

Distinctive Habitats of Limited Distribution

According to EPA's ATSD, distinctive habitats of limited distribution are defined as habitats whose protection is of special concern because of their ecological significance, such as coral reefs, or value to humans, such as for subsistence fishing (EPA 1994). Because of their nature, distinctive habitats of limited distribution may be highly susceptible to the potential effects of discharged suspended solids, nutrients, and other pollutants on the unique faunal components of marine communities.

Per the most recent (22 August 2012) QAPP for 301(h) monitoring around the Carolina RWWTP discharge, coral community sampling was to change to a frequency of once every 5 years during the dry season only. This was agreed to because of the continual problems with wet season sampling in the Carolina area. Under this scenario, there should have been a coral community sampling event in the 2018 dry season. However, in 2017 the two hurricanes interrupted the entire 301(h) monitoring program and it appears to have been neglected in future years because it didn't fall within the previously scheduled activities for those years.

Previous coral community monitoring was performed in March 2010 and February 2012, where eight coral community monitoring stations were surveyed at locations southeast and southwest of the Carolina RWWTP outfall. Five stations (CC6 to CC10) were surveyed on inshore reefs to the south and southwest of the outfall near Punta Vacía Talega. Three additional stations (CC3 through CC5) were surveyed along inshore reef areas east of the Loíza River and south of the Carolina outfall. Density of stony corals increased at all stations, although it varied among surveys. The variability may be

attributable to random selection of video frames coupled with the sparse nature of coral colonies in these habitats.

The highest densities were consistently recorded at Stations CC9 and CC10, and the lowest densities at Station CC5 throughout the monitoring period. Stony corals along permanent video transects at all coral monitoring stations were generally healthy from 2010 to 2012, with no significant signs of bleaching or disease. Station CC5, the station closest to the mouth of the Loíza River, consistently had the lowest number of species, whereas Station CC10, the station farthest from the river mouth, had the highest number of species.

There are no coral communities in the immediate vicinity of the Carolina RWWTP outfall discharge; the communities surveyed (the nearest to the outfall) are well inshore. The coral community assessments indicate that the inshore portion of the study area does not have well-developed coral reef communities. These conditions are believed to be attributable to the natural physical stresses on the community caused by the high-energy nearshore environment coupled with Loíza River discharge of sediments susceptible to frequent episodes of re-suspension. These conditions pre-date outfall construction and operation.

As a result, based on coral community monitoring, EPA has determined that the applicant has demonstrated that distinctive habitats of limits distribution will not be impacted adversely by the modified discharge from the Carolina RWWTP.

Sediment Quality. Sediment samples were evaluated for the presence of constituents regulated by EPA under the 301(h) program, including priority pollutant organic compounds, pesticides, metals, and other miscellaneous inorganic constituents.

Results of these analyses indicate that no regulated organic compounds were detected from sediments obtained at the ZID station (C6) during the 5-year reporting period. Furthermore, concentrations of detected organic constituents were greater at reference locations or far field locations than at the edge-of- ZID stations; therefore, outfall-related deleterious effects were not indicated in relation to sediment accumulations of organic compounds that might be related to the Carolina RWWTP discharge.

Organic Constituents. Available ecological benchmark concentrations are presented for comparison. Of the two organic constituents (chloroform and methylene chloride) detected in sediment at the ZID station from 2013 to 2018, all concentrations were less than applicable NOAA benchmark concentrations. The same was true for concentrations reported in sediments from the edge-of-ZID (C1 and C2), far field (C3, C4, and C7), and reference (C5) stations.

Metals and Inorganic Constituents. The results of regulated inorganic constituent analyses indicated that several were consistently detected from sediments obtained during the surveys. With respect to sediment benchmark screening values, concentrations of the inorganic constituents found in the sediments are generally below levels associated with possible adverse effects (benchmark values). In all cases for which NOAA ER-M screening benchmarks are available (antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), concentrations in sediments at the edge of ZID did not exceed ER-M values. Only 2 of the 17 inorganic constituents in sediments collected at the ZID (Station C6) during the past 5 years of monitoring had concentrations greater than the NOAA ER-L, AET, or

other screening benchmark values for marine sediments. These constituents were arsenic and manganese. However, both constituents were also found in greater than or comparable concentrations in sediments at the reference and/or far field stations. Therefore, these constituents are not attributable to the Carolina RWWTP outfall discharge.

Therefore, it can be concluded that there is no indication that any deleterious effects are occurring at the outfall that may be associated to the discharge and that a BIP is being maintained in its vicinity. Based on this review, EPA has concluded that the chemical characteristics in sediments beyond the ZID are not changed by the modified discharge. There is no indication of long-term accumulation of chemical constituents attributable to the Carolina outfall operations, and no apparent cause for concern with respect to the concentrations of organic and inorganic constituents that were identified.

Fish Bioaccumulation Assessment

Fish specimens were collected for bioaccumulation analyses and assessment as specified in the QAPP/SAP. During collection and processing, fish specimens were handled carefully to avoid contact with the vessel deck or any potentially contaminating surfaces. The potential effects on the biological community resulting from chemical concentrations in fish tissue were evaluated by comparing concentrations to benchmark values that indicate potential risk.

In general, concentrations of constituents that were quantifiable in fish tissues collected from the ZID (Station C6) were comparable to those demonstrated at the reference location (Station C5) and or far field locations (Stations C3 and C4). Furthermore, most constituents were detected at concentrations far below the established EPA benchmarks for bioaccumulation and do not indicate harm to fish. For the most part, where a benchmark concentration was exceeded at the ZID station, it was also exceeded at the reference station, which indicates that the accumulation was not related to the effluent discharge.

Because elevated metal concentrations for arsenic, barium, chromium, lead, mercury, selenium, and zinc were detected above benchmarks either throughout the study area or only in single fish specimens, the estimated/detected ZID concentrations for these seven constituents are not likely attributable to the Carolina RWWTP. Therefore, the results of the analysis of fish tissue samples collected at stations associated with the mixing zone at the outfall, as well as from sites located outside the immediate influence of the Carolina RWWTP effluent, indicated that no significant deleterious bioaccumulation of metals constituents in fishes has occurred during the 2014–2018 monitoring period.

Biological Impact of Discharge Conclusion

Based on aforementioned biological monitoring data, EPA has determined that PRASA has demonstrated that its modified discharge will allow for the attainment or maintenance of water quality which assures protection and propagation of a BIP of shellfish, fish and wildlife, and that a BIP of shellfish, fish and wildlife will exist in all areas beyond the ZID that might be affected by the modified discharge. **Therefore, EPA has concluded that the applicant has met the requirements of 40 CFR §125.62(c).**

Absence of Extreme Adverse Impacts Within the ZID [40 CFR §125.62(c)(3)]

Pursuant to 40 CFR §125.62(c)(3), conditions within the ZID must not contribute to extreme adverse biological impacts, including but not limited to, the destruction of distinctive habitats of limited distribution, the presence of disease epicenters, or the stimulation of phytoplankton blooms which have severe adverse effects beyond the ZID.

As previously described, EPA has concluded that the applicant has demonstrated that the modified discharge would provide for the attainment of water quality criteria for DO, turbidity, toxic pollutants, and toxicity. In addition, EPA is not aware of any phytoplankton blooms, fish kills, or other adverse impacts in the vicinity of the Carolina RWWTP discharge. Therefore, EPA does not anticipate any adverse impacts to rise to the level of being extremely adverse as a result of the modified discharge since the discharge is to open coastal waters and has a predicted CID of 116:1 based on the maximum daily flow of 90 MGD. **As a result, EPA has concluded that the modified discharge would not cause conditions within the ZID that would contribute to extreme adverse biological impacts.**

d) Impact of Discharge on Recreational Activities [40 CFR §§125.62(a) and (d)]

Under 40 CFR §125.62(a), the applicant's outfall and diffuser must be located and designed to provide adequate initial dilution, dispersion, and transport of wastewater such that the discharge does not exceed, at and beyond the ZID, all applicable water quality standards. Furthermore, pursuant to 40 CFR §125.62(d), the applicant's discharge must allow for the attainment or maintenance of water quality which allows for recreational activities beyond the ZID, including, without limitation, swimming, diving, boating, fishing, picnicking, and sports activities along shorelines and beaches. Also, there must be no federal, territorial, or local restrictions on recreational activities within the vicinity of the applicant's outfall unless such restrictions are routinely imposed around sewage outfalls or would be lifted or modified if the applicant's Carolina RWWTP were upgraded to secondary treatment (EPA 1994). Because of the potential for pathogenic microorganisms to be transmitted by contaminated water, monitoring of indicator bacteria such as total coliform, fecal coliform and enterococcus can be used to identify the presence of sewage and fecal contamination and ensure the protection of the beneficial uses of the waterbody, such as water contact recreation.

In the renewal application, PRASA indicated that the Carolina RWWTP mixing zone is located1.7 miles from the nearest recreational beach and, since the discharge point is located more than 6,000 ft offshore at a depth of 90 ft, the modified discharge is unlikely to impact recreational uses.

The discharge has no effect on the use of the area for recreational activities. The generally rough waters of the north coast of Puerto Rico discourage significant recreational activities in the discharge area. As a result, there is little recreational fishing or boating near the outfall. In addition, the historical absence of live reefs in the area combined with the rough waters result in little, if any, recreational diving in the area of the outfall and discharge.

Finally, as summarized in the 2015 MZA and confirmed by five receiving water sampling events during the past 5 years, the data demonstrate that the outfall does not cause water quality criteria established to protect public health and the environment to be exceeded at the edge of the small mixing zone.

Therefore, the effluent from the Carolina RWWTP outfall does not represent a hazard to recreational activities.

Water Contact Recreation.

To protect the beneficial uses of Class SB waters for water contact recreation, Articles 3.2.2(B)(2) and 3.2.3(B)(2) of PRWQS provide water quality criteria for bacteria based on the level of indicator bacteria, such as total coliform, fecal coliform, and/or enterococci. In November 2004, pursuant to the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000, EPA promulgated enterococci criteria for states and territories, such as Puerto Rico, that do not currently have water quality criteria sufficient to protect recreational uses in coastal waters (69 FR 67217, November 16, 2004). Therefore, in accordance with 40 CFR§131.41(c)(2), EPA also has applied enterococcus criteria to Class SB waters to further assess the potential impact of bacteria on water quality located in the vicinity of the Carolina RWWTP discharge. The following are bacteria criteria that are applicable to the assessment of the impact of the modified discharge: 2019 PR WQSR include the criterion of geometric mean not to exceed 35 colonies/100 mL in any 90-day interval and the 90th percent tile of the same sample not to exceed 130 colonies/100 mL in the same 90-day interval, applicable to class SB waters.

Based on effluent and receiving water monitoring data discussed previously, EPA believes that the modified discharge will have a potential not meeting water quality criteria for bacteria at the ZID pursuant to 40 CFR §125.62(a). As a result of annual sampling completed from 2013 to 2016 and 2018, out of all conventional constituents analyzed against the numeric water quality standards, all were observed at concentrations below the 2019 PRWQSR at all monitoring stations, except for *Enterococcus* bacteria. The limitation for *Enterococcus* bacteria did not exceed effluent limitation for Enterococci until January of 2020 in which exceedance have been observed for the 90th percentile limitation**. PRASA plans to upgrade the Carolina's sedimentation tanks which will address these exceedances. A compliance schedule has been authorized in the permit in accordance with 40 CFR § 122.47.**

Stressed Waters [40 CFR §125.62(f)]

Under 40 CFR §125.62(f) the applicant must demonstrate that the modified discharge will not contribute to, increase, or perpetuate stressed conditions, contribute to further degradation if pollution from other sources increases, and will not retard recovery if pollution from other sources decreases. As defined in 40 CFR §125.58(z), stressed waters are those ocean waters for which an applicant can demonstrate that the absence of a balanced indigenous population is caused solely by human perturbations other than the applicant's modified discharge.

In the renewal application, PRASA indicated that Carolina RWWTP does not discharge into stressed waters, as defined in 40 CFR §125.58(z). Based on available data, EPA has determined that a balanced indigenous population exists in the vicinity of the Carolina RWWTP outfall and that the modified discharge will provide for the attainment of water quality standards and criteria at and beyond the ZID. **Therefore, EPA has concluded that the applicant has met the requirements of 40 CFR §125.62(f).**

3. Establishment of a Monitoring Program [Section 301(h)(3), 40 CFR §125.63]

Under 40 CFR §125.63, which implements Section 301(h)(3) of the Act, the applicant must have a monitoring program designed to evaluate the impact of the modified discharge on the marine biota, demonstrate compliance with applicable water quality standards, and measure toxic substances in the discharge. In addition, the applicant must also demonstrate that it has the resources necessary to implement the monitoring program upon issuance of a section 301(h) modified permit and to carry it out for the life of the permit (40 CFR §125.63(a)(1)(iii)). The frequency and extent of the monitoring program are to be determined by taking into consideration the Carolina RWWTP's rate of discharge, quantities of toxic pollutants discharged, and the potential for significant impacts in the receiving water (40 CFR §125.63(a)(1)(iv)).

1) Biological Monitoring

Pursuant to 40 CFR §125.63(b), the applicant must have a biological monitoring program that provides adequate data to evaluate the impact of the discharge on the marine biota. Under 40 CFR §125.63(b)(1), the applicant's biological monitoring program must include periodic surveys of control sites and biological communities most likely to be affected by the discharge; periodic bioaccumulation studies and examination of possible adverse effects of effluent-related toxic substances; periodic sampling of sediments for toxic pollutants and pesticides; and periodic assessment of fisheries.

a) Water Quality Monitoring

Pursuant to 40 CFR §125.63(c), the applicant must have a receiving water monitoring program that provides adequate data for evaluating compliance with water quality standards or criteria, and measures the presence of toxic pollutants which have been identified or are expected to be in the Carolina RWWTP effluent discharged to the receiving water.

b) Effluent Monitoring

Pursuant to 40 CFR §125.63(d), the applicant must have an effluent monitoring program that provides quantitative and qualitative data that measures toxic substances and pesticides in the effluent, and data for evaluating compliance with the percent removal efficiency requirements under 40 CFR §125.60. As described in EPA's ATSD, the major objectives of effluent monitoring are to provide data for determining compliance with permit effluent limitations and section 304(a) water quality criteria, measure the effectiveness of the toxic substances control programs, and relate effluent characteristics to the receiving water biological and water quality conditions (EPA 1994). In addition, influent and effluent monitoring provides data for assessment of treatment plant performance with primary treatment requirements for BOD_5 and TSS.

PRASA is required to design a monitoring program to evaluate the impact of the Carolina discharge on the marine environment and must also demonstrate the capability to implement this program after the issuance of the 301(h) waiver. PRASA has designed and implemented a comprehensive marine monitoring program that was approved by EPA, and to date has submitted 32 individual monitoring reports to EPA.

In the recent (22 August 2012) QAPP, PRASA submitted the draft QAPP/SAP document for the proposed marine monitoring plan. Sampling frequencies for the 301(h) Monitoring Program requirements at the Carolina Regional Wastewater Treatment Plant as below.

Component	Frequency
Annual Effluent	Once a year per permit period (alternating wet and dry seasons)
Supplemental Effluent	Once every 5 years (year before permit is due for renewal)
Annual Receiving Water	Once a year per permit period (alternating wet and dry seasons)
Supplemental Receiving Water	Once every 5 years (year before permit is due for renewal)
Benthic Invertebrates	Once a year per permit period (alternating wet and dry seasons)
Annual Sediment	Once a year per permit period (alternating wet and dry seasons)
Supplemental Sediment	Once every 5 years (year before permit is due for renewal)
Fish Tissue	Once every 5 years (year before permit is due for renewal)
Coral Communities	Once every 5 years (year before permit is due for renewal)

Since its approval, there have been several EPA-approved revisions to the document, and the monitoring continues per the required procedures and schedules outlined in the August 2012 Carolina Waiver Monitoring QAPP. **Therefore, EPA has concluded that the applicant has met the requirements of 40 CFR §§125.63(a) through (d).**

4. Effect of Discharge on Other Point and Nonpoint Sources [Section 301(h)(4), 40 CFR §125.64]

In accordance with Section 301(h)(4) of the Act, EPA may not issue a Section 301(h) modified permit unless the applicant demonstrates that such modified requirements will not result in any additional requirements on any other point or nonpoint source. In the renewal application, PRASA indicated that the modified discharge will not cause additional treatment or control requirements for other point or nonpoint sources (PRASA 2007d). On September 4, 2015 PRASA requested a determination from PRDNER that the modified discharge from the Carolina RWWTP will comply with all applicable provisions of Commonwealth law, as required by 40 CFR§125.64(b). On January 24, 2020, DNER issued a WQC indicated that the modified discharge will not cause violations to the applicable water

quality standards in the receiving water. EPA has concluded that the modified discharge from the Carolina RWWTP will not impact other point or nonpoint sources.

5. Urban area pretreatment program [Section 301(h)(5) and (6), 40 CFR §125.65]

In accordance with Section 301(h)(5) and (6) of the Act, EPA may not issue a section 301(h) modified permit unless the applicant demonstrates that all applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced. As explained in the preamble to the 1994 revision of the section 301(h) regulations (59 FR 40656, August 9, 1994), for urban area pretreatment programs with significant numbers of industrial users, at any given time, it is reasonable to expect that at least one or more of those users might be out of compliance. EPA determines a POTW's continuing eligibility for a section 301(h) modified permit under section 301(h)(6) by measuring industrial user compliance and POTW enforcement activities against existing criteria in the EPA's National Pretreatment Program.

PRASA has an Industrial Pretreatment Program that was approved by the EPA on September 28, 1985, and an Enforcement Response Plan approved by the EPA on May 30, 1995, as part of this program. Revisions to PRASA's sewer use ordinance were approved by the EPA on September 8, 2003.

1) Establishment of local limits

As part of an Industrial Pretreatment Program, POTWs that apply for a modified permit must assess the need for local limits and set local limits in accordance with 40 CFR Part 403 based on an analysis of toxic pollutants known or suspected of being introduced by industrial sources. Local limits are developed for pollutants that may cause interference, pass through, sludge contamination, and/or worker health and safety problems, if discharged in excess of the receiving POTW's capabilities and/or receiving water quality standards. The EPA's original approval of PRASA's Industrial Pretreatment Program in 1985 contained general island-wide local limits for all of its wastewater treatment facilities. PRASA assessed the need for facility-specific local limits for the Carolina RWWTP on an annual basis. According to PRASA's Carolina Wastewater Treatment Plant Technically Based Local Limits report dated June 2019, PRASA has established local limits for the following pollutants for the Carolina RWWTP service area:

Parameter	Local Limits (mg/l)
Arsenic	0.23
Beryllium	1.90
BOD_5 *	250
Cadmium	0.10
Chromium	1.0
Color	250 Pt/Co Units

Parameter	Local Limits (mg/l)
Copper	4.4
Cyanide (free)	0.05
pH (maximum)	9.0 S.U.
pH (minimum)	6.5 S.U.
Lead	0.22
Mercury	0.009
Nickel	0.38
Oil and Grease	50
Phenols (Phenolics substances)	1.0
Selenium	0.2
Silver	0.21
Thallium	0.39
Temperature	60°C (140°F)
TSS *	250
Zinc (total)	0.5

PRASA has incorporated limits for these pollutants into all applicable industrial pretreatment permits for industries that discharge to the Carolina RWWTP. For Chloroform and Toluene, PRASA determined that local limits were not necessary for the Carolina RWWTP service area since these pollutants were not detected in both the influent and effluent and any detectable level was below the water quality criteria.

a) **Compliance and Enforcement of Local Limits**

For urban area pretreatment programs with significant numbers of industrial users, at any given time, it is reasonable to expect that at least one or more of those users might be out of compliance (59 FR 40656, August 9, 1994). The EPA determines a facility's continuing eligibility for a modified permit under section 301(h)(6) by measuring industrial user compliance and the POTW's enforcement activities against existing criteria in EPA's National Pretreatment Program. A POTW's enforcement program is considered adequate if not more than 15 percent of its significant industrial users (SIUs) meet the significant noncompliance (SNC) criteria in a single year. Under the Industrial Pretreatment Program for the Carolina RWWTP, there are three SIUs that have pretreatment permits authorizing discharges to the facility. According to PRASA's 2017 Industrial Pretreatment Program Annual Report 2016-2017, the Carolina RWWTP service area reported a SNC rate of sixty-six percent (two of three SIUs). PRASA

issued Notices of Noncompliance to the facilities and the facilities returned to compliance. These enforcement actions against the industrial users indicate that PRASA's enforcement program has met the criteria for adequate enforcement of its pretreatment program for the Carolina RWWTP.

Since PRASA has established local limits as a means to control toxic pollutants that may be introduced by an industrial discharger, and has demonstrated that it is able to enforce these limits, EPA has concluded that the applicant has demonstrated that it has met requirements of 40 CFR §125.65 for an urban area pretreatment program.

6. Toxics Control Program [section 301(h)(5), 40 CFR §§125.66(a) through (c)]

a) Chemical Analysis

Pursuant to 40 CFR §125.66(a), at the time of application, the applicant must submit a chemical analysis of its current discharge for all toxic pollutants and pesticides defined in 40 CFR§§125.58(p) and (aa). As specified in EPA's ATSD, the applicant must submit results of wet and dry weather analyses of the effluent if known or suspected industrial sources of toxic pollutants or pesticides exist. The analysis shall be performed on a minimum of two 24-hour composite samples (one dry weather and one wet weather). Applicants may supplement or substitute chemical analyses if the composition of the supplemental or substitute samples typifies that which occurs during wet and dry weather conditions.

b) Toxic Pollutant Source Identification

Under 40 CFR §125.66(b), the applicant must submit at the time of application an analysis of the known or suspected sources of toxic pollutants or pesticides identified in response to 40 CFR§125.66(a). To the extent practicable, the applicant shall also categorize the sources according to industrial and nonindustrial types.

In the renewal application, PRASA indicated that the Carolina RWWTP generally provides service to light industry including assembly-type operations and small-scale food processors. At this time, PRASA indicates that thirteen industries are permitted as significant industrial users that discharge to the Carolina RWWTP. Based on PRASA's 2017 *Industrial Pretreatment Program Annual Report 2016-2017*, EPA has concluded that the applicant has met the requirements of 40 CFR §125.66(b).

c) Industrial Pretreatment Program

Under 40 CFR §125.66(c), an application for a section 301(h) waiver that has known or suspected industrial sources of toxic pollutants must have an approved pretreatment program as described in 40 CFR Part 403. In the renewal application, PRASA indicated that the Carolina RWWTP currently has an EPA-approved industrial pretreatment program and has implemented the program throughout the island. EPA originally approved the applicant's industrial pretreatment program on September 28, 1985, and Enforcement Response Plan on May 30, 1995. The Puerto Rico Rules and Regulations for the Supply of Water and Sewer Supply (Rules and Regulations) were approved as part of the original program in 1985 and met the existing pretreatment requirements for legal authority at 40 CFR §403.8. Effective October 3, 2003, PRASA revised its Rules and Regulations in accordance with changes made to the federal

pretreatment regulations (e.g., additional federal prohibitions, revised definitions, and notification requirements). Since PRASA has an EPA-approved industrial pretreatment program for the Carolina RWWTP, EPA has concluded that the applicant has demonstrated that it has met the requirements of 40 CFR §125.66(c).

PRASA is adequately enforcing its Industrial User Pretreatment Program. All SIUs are monitored once a year, and unannounced compliance inspections are performed at least twice a year. Non-compliance issues are addressed with escalated enforcement actions. A detailed report concerning the compliance status of the Carolina RWWTP SIUs is included in PRASA's Annual Pretreatment Report submitted to EPA. The report included all non- compliance issues detected during the reporting period and the enforcement actions performed by PRASA. From January through December 2018 all SIUs discharging to the Carolina RWWTP were in compliance with their pretreatment permits.

EPA considers the implementation of an industrial pretreatment program to be adequate for purposes of a 301(h) waiver if no more than 15 percent of its SIUs are in Significant Non-Compliance (SNC).[33] Violating industries are not included in the 15 percent non-compliance criteria when the permitting authority has issued a formal enforcement action to the industrial user.[34] PRASA has demonstrated that the pretreatment program for maintained a 100 percent compliance with pretreatment requirements for the Carolina RWWTP has been adequately implemented for the last 5 years.

7. Nonindustrial Source Control Program [Section 301(h)(7), 40 CFR §125.66(d)]

Pursuant to 40 CFR §125.66(d), which implements Section 301(h)(7) of the Act, all applicants must propose a public education program designed to minimize the entrance of nonindustrial toxic pollutants into the wastewater treatment system, which shall be implemented no later than 18 months after issuance of a section 301(h) modified permit.

PRASA has developed a public education program designed to minimize the entrance of non-industrial toxic pollutants and pesticides into the Carolina RWWTP within 18 months after the approval of the waiver. Following EPA's tentative approval of the 301(h) waiver for Carolina, PRASA prepared a wide-ranging, island-wide, non-industrial source control program including a public education program.[35] While the regulations only required the program to begin after the final approval of the waiver, PRASA started its public education program prior to waiver approval. In 1993, PRASA included a program about the control of toxic substances from domestic uses in its island-wide "Aguamóvil" Educational Program, a mobile learning center that traveled throughout the island providing literature, illustrations, and models of the wastewater treatment processes. Today, the Educational Program uses PRASA's website and lectures throughout the Island as the main tools to provide information and education to the public.

PRASA's website (http://acueductospr.com/) provides information to the public about the availability of PRASA's Educational Program. The website has available educational material and brochures about drinking water, wastewater, and water conservation, and a link to request educational lectures for schools, communities, and/or any particular group. Further, as part of PRASA's annual "Water Week," PRASA distributes information concerning the wastewater treatment process as well as household toxic substances disposal at major shopping centers throughout the island.

Another non-industrial control initiative that PRASA has implemented is the Fats, Oils, and Grease (FOG) Program. This program covers the food service establishments (FSEs) across the island, including fast foods, restaurants, bakeries, etc. that discharge to the Carolina RWWTP. An educational phase started in 2006 that consisted of providing a Best Manufacturing Program Manual to FSEs and courtesy inspections to evaluate the FOG management and disposal Program. During 2017 and 2018, a total of 495 and 516 FSEs, respectively, were inspected in the Canóvanas, Carolina, and Trujillo Alto areas, which are served by the Carolina RWWTP.

Based on the above, EPA has concluded that the applicant has met the requirements of 40 CFR §125.66(d) for a nonindustrial source control program. EPA has proposed in the modified permit that PRASA to continue to implement its nonindustrial source control program and modify the program, as necessary, within 18 months of the effective date of the renewed permit.

8. Effluent Volume and Mass Loadings [Section 301(h)(8), 40 CFR §125.67]

Under 40 CFR §125.67, which implements Section 301(h)(8) of the Act, EPA may not issue a section 301(h) modified permit unless the applicant demonstrates there will be no new or substantially increased discharges from the point source of the pollutant to which the modification applies above the volume of discharge specified in the permit. Pursuant to 40 CFR§125.67(b), where pollutant discharges are attributable to combined sewer overflows, the applicant shall minimize existing overflows and prevent increases in the amount of pollutants discharged. Since the Carolina RWWTP is not a combined sewer system, the applicant is exempt from the requirements of 40 CFR §125.67(b). However, 40 CFR §125.67(c) requires that the applicant provide projections of annual average effluent volume in m^3/sec and mass loadings in metric tons/year for any pollutants to which the modification applies in five-year increments for the design life of its facility. The Carolina RWWTP first began operations in the late 1980s and the design life of the facility is considered to be 40 years.

In the renewal application, PRASA has applied for a modified permit with a variance from secondary treatment requirements for BOD_5 and TSS and has requested an average monthly flow rate of 45 MGD (1.98 m^3/sec) for the new permit term (PRASA 2018). The applicant has not requested a change in existing permit limits for flow or BOD_5 and TSS based on mass loading.

EPA calculated the projected annual average mass loadings for BOD_5 and TSS at the end of the permit term and assumed that these loadings would be constant for the design life of the facility over the next 15 years. Based on PRASA's requested mass-based monthly average effluent limitations of 22,166 kg/day and 11,935 kg/day for BOD_5 and TSS, EPA determined that annual average loadings for BOD_5 and TSS are predicted to be 8,091 and 4,356 metric tons/year, respectively.[8] However, based on DMR data from January 2014 through December 2018, EPA determined that annual monthly average flows ranged between 26 and 33 MGD, which is significantly below the design capacity of the Carolina RWWTP, and that actual annual mass loadings for BOD_5 and TSS were below those predicted during the next permit period.

As a result, EPA has concluded that the applicant has satisfied the requirements of 40 CFR§125.67 based on the following: the applicant has indicated that there will be no new or substantially increased discharges of BOD_5 and TSS above those requested in the permit; and there are no plans for expansion

of the Carolina RWWTP collection system in the near future. PRASA has indicated that the existing annual monthly average loadings of BOD_5 and TSS are to remain the same over the design-life of the facility.

9. Minimum level of treatment [Section 301(h)(9), 40 CFR §125.60]

Section 301(h) (9) of the Act was amended by Section 303(d)(1) and (2) of the WQA. Under Section 303(d)(1), the applicant's effluent must be receiving at least primary or equivalent treatment at the time its section 301(h) modified permit becomes effective. Section 303(d)(2) defines primary or equivalent treatment as a means of treatment by screening, sedimentation, and skimming adequate to remove at least 30 percent of the biological oxygen demanding material and of the suspended solids in the POTW's influent, and disinfection, where appropriate. To ensure that the effluent discharge has received primary or equivalent treatment, 40 CFR §125.60 requires that the applicant perform monitoring of influent and effluent and assess BOD_5 and TSS removal rates based on a monthly average.

Based on review of DMR data from 2013 through 2018, monthly average removal rates for BOD_5 ranged between 26 percent and 73 percent, with only two months falling below the 30 percent removal requirement. Monthly average concentrations of BOD_5 ranged between 32 mg/l and 104 mg/l. For TSS, removal rates during this same period ranged between 35 and 86 percent, with monthly average TSS concentrations ranging between 23 mg/l and 88 mg/l. As a result, monthly average removal rates for BOD_5 and TSS are generally significantly above the primary treatment requirements.

In the renewal application, the applicant proposed an effluent limitation of 30 percent for BOD_5 based on a monthly average removal rate and, since the Carolina RWWTP can achieve a higher removal rate for TSS due to chemical addition, proposed a 60 percent monthly average removal rate for TSS. In addition, PRASA also proposed concentration-based effluent limitations of 130 mg/l and 70 mg/l for BOD_5 and TSS, respectively. The proposed limitations reflect those established in the current modified permit for the Carolina RWWTP and are consistent with the requirements of section 301(h) for primary treatment of influent based on a minimum of 30 percent removal of BOD_5 and TSS**. As a result, EPA has concluded that the applicant has satisfied the requirements of section 301(h)(9), 40 CFR §125.60.**

COMPLIANCE WITH APPLICABLE PROVISIONS OF COMMONWEALTH, LOCAL, OR OTHER FEDERAL LAW OR EXECUTIVE ORDERS

Under 40 CFR §l25.59(b)(3), a modified permit may not be issued if such issuance would conflict with applicable provisions of Commonwealth, local, or other Federal laws or Executive Orders. As part of the application renewal, the applicant must demonstrate compliance with all applicable Commonwealth and Federal laws and regulations, and Executive Orders which include the Coastal Zone Management Act, Marine Protection Research and Sanctuaries Act, and the Endangered Species Act.

Coastal Zone Management Act

Under 40 CFR §125.59(b)(3), a modified permit must comply with the Coastal Zone Management Act (CZMA) of 1972, as amended, 16 U.S.C. 1451 et seq. In accordance with 16 U.S.C. 1456(c)(3)(A), and its implementing regulations, a section 301(h) modified permit may not be issued unless the proposed discharge is certified by the Commonwealth of Puerto Rico to be consistent with the Commonwealth's Coastal Zone Management Program. In the renewal application, PRASA indicated that the Carolina RWWTP's outfall and diffuser are located in a coastal area managed by the Commonwealth's Coastal Zone Management Program. On February 11, 2015, the Puerto Rico Planning Board granted a CZMA consistency certification for the modified discharge from the Carolina RWWTP.

Marine Protection, Research and Sanctuaries Act

40 CFR §l25.59(b)(3) provides that issuance of a section 30l(h) modified permit must comply with Title III of the Marine Protection, Research and Sanctuaries Act (MPRSA), l6 U.S.C. l43l et seq. In accordance with 16 U.S.C. 1434(d), a 30l(h) modified permit may not be issued for a discharge located in a marine sanctuary designated pursuant to Title III of the MPRSA if the regulations applicable to the sanctuary prohibit issuance of such a permit.

In the renewal application, PRASA indicated that the Carolina WWTP outfall and diffuser are not located in a marine or estuarine sanctuary designated under Title III of the MPRSA. This has been confirmed in a March 17, 1989 letter from the National Oceanic and Atmospheric Administration (NOAA) that the modified discharge is not located in a marine or estuarine sanctuary designated under Title III of the MPRSA.

Endangered Species Act

Under 40 CFR §l25.59(b)(3), a section 30l(h) modified permit may not be issued if the proposed discharge will adversely impact threatened or endangered species or critical habitat listed pursuant to the Endangered Species Act (ESA), 16 U.S.C. 1531 et seq. In the application, PRASA indicated that there are threatened or endangered species that may occur in the vicinity of the Carolina RWWTP outfall. On May 16 and 19, 2007, the applicant requested a certification from USFWS and NMFS, respectively, that the modified discharge will comply with the ESA. In a letter dated November 3, 2014, USFWS concludes that the 301(h) Waiver would not likely adversely affect the endangered Species of concern.

Magnuson-Stevens Fishery Conservation and Management Act

Under 40 CFR §125.59(b)(3), a modified permit must comply with applicable provisions of Federal laws including the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) of 1976, 16 U.S.C. 1801 et seq., which protects against adverse impacts to Essential Fish Habitat (EFH). As required by MSFCMA, EPA must demonstrate that an approval of a section 301(h) waiver for the Carolina RWWTP will not result in adverse impact to any EFH or species included in Caribbean or Federal Fisheries Management Plans. In a letter dated August 7, 2013 from NMFS concluded that the Carolina project is not likely affect any EFH or species included in Caribbean or Federal Fisheries Management Plans.

Executive Order on Coral Reef Protection

On June 11, 1998, the President issued an Executive Order on Coral Reef Protection, directing federal agencies to expand research, preservation and restoration activities for the protection of coral reef ecosystems. As described previously, there is naturally isolated sparse coral growth in the vicinity of the Carolina RWWTP's discharge that EPA has determined is not impacted by the discharge. In a letter dated August 13, 2013 from NMFS concluded that the Carolina project is not likely affect corals in critical habitat.

Therefore, EPA has determined that modified discharge is consistent the Executive Order on Coral Reef Protection. At this time, EPA is not of aware any additional Commonwealth or local laws that need to be addressed prior to issuance of a final modified permit for the Carolina RWWTP.

COMMONWEALTH CONCURRENCE OF WAIVER

Under 40 CFR §§125.61(b)(2) and 125.64(b), the applicant must provide a determination signed by the state or interstate agency authorized to provide certification under 40 CFR §§124.53 and124.54 that the modified discharge will comply with applicable provisions of Commonwealth law including water quality standards. The state determination shall include a discussion of the basis for its conclusion. Furthermore, pursuant to 40 CFR §§124.53 and 124.54, the Commonwealth of Puerto Rico must either grant a certification pursuant to Section 40l of the Act or waive this certification before EPA may issue a modified permit.

In May 2018, PRASA requested a determination from PRDNER that the modified discharge from the Carolina RWWTP will comply with all applicable provisions of Commonwealth law. In response, PRDNER issued a draft Water Quality Certification for the Carolina RWWTP on December 20, 2018 that the modified discharge will comply with all applicable provisions of Commonwealth law including applicable water quality standards and will not result in any additional treatment requirements on any point or nonpoint sources. In a letter dated January 24, 2020, the Puerto Rico DNER issued a final Water Quality Certification for the Carolina RWWTP.

REFERENCES

Burkholder, P.R., R.W. Brody, and A.E. Dammann. 1972. Some Phytoplankton Blooms in the Virgin Islands. Carib. J. Sci. 12:23-28.

EPA. 1985. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms (3rd edition). EPA-600/4-85-013. EPA, Environmental Monitoring and Support Laboratory, Cincinnati, OH.

EPA. 1986a. Ambient water quality criteria for bacteria, 1986. EPA-440/5-84-002. EPA, Office of Water, Washington, DC.

EPA. 1986b. Quality Criteria for Water, 1986. EPA-440/5-86-001. EPA, Office of Water, Regulations and Standards, Washington, DC.

EPA. 1987. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to marine and estuarine organisms. EPA-600/4-87/028.

EPA. 1994a. Amended Section 301(h) Technical Support Document. EPA-842-B-94-007. EPA Office of Wetlands, Washington, D.C.

PRASA 2012. Quality Assurance Project Plan (QAPP) and Sampling and Analysis Protocols for the Carolina RWWTP 301(h) Waiver Demonstration Studies (March 2012).

PRASA 2014. 2013 Wet Season Report for the Carolina RWWTP 301(h) Waiver Demonstration Studies, October 2013 (submitted January 2014)

PRASA 2014. 2014 Dry Season Report for the Carolina RWWTP 301(h) Waiver Demonstration Studies, March 2014 (submitted June 2014)

PRASA 2015. Application for a Water Quality Certificate and Definition of a Mixing Zone for the Carolina RWWTP, October 2015

PRASA 2016. 2015 Wet Season Report for the Carolina RWWTP 301(h) Waiver Demonstration Studies, October 2015 (submitted January 2016)

PRASA 2016. 2016 Dry Season Report for the Carolina RWWTP 301(h) Waiver Demonstration Studies, March/April 2016 (submitted June 2016)

PRASA 2018. 2018 Dry Season Report for the Carolina RWWTP 301(h) Waiver Demonstration Studies, March 2018 (submitted September 2018).

PRASA 2019. Renewal Application for 301(h) Waiver for the Carolina RWWTP, June 2019