U.S. EPA REGION 2

DECISION DOCUMENT

ANALYSIS OF THE SECTION 301(h) MODIFICATION OF SECONDARY TREATMENT APPLICATIONS FOR THE BAYAMON AND PUERTO NUEVO REGIONAL WASTEWATER TREATMENT PLANTS, NPDES PERMIT NOs. PR0023728 AND PR0021555

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EXECUTIVE SUMMARY

Under section 301(h) of the Clean Water Act, publicly-owned wastewater treatment plants that discharge into deep ocean waters can apply for a modification of secondary treatment requirements and be granted a waiver by EPA provided that the applicant demonstrates that it meets nine statutory criteria. In 2007, EPA issued a final decision approving the Puerto Rico Aqueduct and Sewer Authority's (PRASA) applications for two modified permits for the Bayamón and Puerto Nuevo Regional Wastewater Treatment Plants (RWWTPs), two publicly owned treatment works (POTW) located on the island of Puerto Rico that share a common outfall with the Bacardi Corporation's wastewater treatment plant (WWTP). Subsequently, EPA issued permits for each plant that became effective on July 1, 2008, and will expire on June 30, 2013. In 2010, PRASA submitted new applications requesting modifications to the permitted flow limitations in the current permits for the Bayamón and Puerto Nuevo RWWTPs to meet the needs of an expanded service area and specific flow transfer requirements from a 2010 Mega Consent Decree entered into with PRASA by EPA and the U.S. Department of Justice. EPA has determined that a modification in flow is subject to a new EPA decision to grant or deny a 301(h) waiver from secondary treatment requirements since the basis of the 2007 Final Decision has changed. In this Decision Document, EPA has determined that the discharges from the Bayamón and Puerto Nuevo RWWTPs, alone and in combination with industrial wastewater from the Bacardi WWTP, meet all the 301(h) statutory and regulatory criteria, including, but not limited to, the primary treatment requirements for BOD_5 and TSS removal rates, water quality criteria for DO, turbidity, toxics and bacteria, and pretreatment requirements. Therefore, EPA recommends that PRASA be granted two section 301(h) modified permits in accordance with the findings described in the Decision Document, and that a public notice of intent to issue the modified permits be prepared in accordance with all applicable provisions of 40 CFR Parts 122 and l24.

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INTRODUCTION

The Puerto Rico Aqueduct and Sewer Authority (hereinafter, the applicant or PRASA) has requested a renewal of its waivers under section 301(h) of the Clean Water Act (the Act), 33 U.S.C. 1311(h), from the secondary treatment requirements contained in section 301(b)(1)(B) of the Act, 33 U.S.C. 1311(b)(1)(B) for the Bayamón and Puerto Nuevo Regional Wastewater Treatment Plants (RWWTPs), two publicly owned treatment works (POTW) located on the island of Puerto Rico that share a common outfall. [National Pollutant Discharge Elimination System (NPDES) Permit Nos. PR0023728 and PR0021555, respectively.] The facilities are owned and operated by PRASA.

The applicant is seeking two section 301(h) modifications to discharge wastewater receiving less-than-secondary treatment from the Bayamón and Puerto Nuevo RWWTPs joint outfall to the Atlantic Ocean. The joint outfall also is shared by the Bacardi Corporation distillery, which contributes industrial wastewater from its Wastewater Treatment Plant (WWTP; NPDES Permit No. PR0000591). Secondary treatment is defined in regulations at 40 CFR Part 133 in terms of effluent quality for total suspended solids (TSS), five-day measure of biochemical oxygen demand (BOD_5) and pH. Pursuant to 40 CFR 133.102, secondary treatment requirements for TSS, BOD_5 and pH are listed below:

TSS: (1) The 30-day average concentration shall not exceed 30 mg/l;
(2) The 7-day average concentration shall not exceed 45 mg/l; and
(3) The 30-day average percent removal shall not be less than 85 percent.

BOD_5: (1) The 30-day average concentration shall not exceed 30 mg/l;
(2) The 7-day average concentration shall not exceed 45 mg/l; and
(3) The 30-day average percent removal shall not be less than 85 percent.

pH: The pH of the effluent shall be maintained within the limits of 6.0 to 9.0 pH standard units.

The original applications for a section 301(h) modification of secondary treatment requirements at the Bayamón and Puerto Nuevo RWWTPs were submitted to the U.S. Environmental Protection Agency (EPA) Region 2 in 1979, and were tentatively approved in 1990. In 2001, EPA issued a Final Decision Document approving PRASA's applications for two section 301(h) modified permits for the Bayamón and Puerto Nuevo RWWTPs based, in part, on a re-evaluation of the 1990 Tentative Approval as well as additional information in the EPA's relevant files. In 2007, the EPA issued a second Final Decision Document approving PRASA's application for renewal of its waiver from the secondary treatment requirements, and subsequently issued two individual modified permits that became effective on July 1, 2008, and will expire on June 30, 2013. In 2010, PRASA submitted applications requesting modifications to the permitted flow limitations in the current permits for the Bayamón and Puerto Nuevo RWWTPs to meet the needs of an expanded service area and specific flow transfer requirements from a 2010 Mega Consent Decree issued to PRASA by the EPA and the U.S. Department of Justice.[1] Pursuant to

[1] *U.S. v Puerto Rico Aqueduct and Sewer Authority*, Civil Action No. 06-1624

40 CFR 125.59(i)(4), the EPA has determined that a modification in flow is subject to a new EPA decision to grant or deny a section 301(h) modification from secondary treatment requirements since the basis of the 2007 Final Decision has changed. Consequently, the EPA proposes that the 2008 modified permits for both PRASA facilities be revoked and reissued for a new term in accordance with the findings of this Decision Document and 40 CFR 122.62.

Since wastewater discharged from the joint outfall consists of effluent from the Bayamón RWWTP, Puerto Nuevo RWWTP and the Bacardi WWTP, characterizing the discharge from Bayamón RWWTP and Puerto Nuevo RWWTP individually, and combined with Bacardi WWTP, is necessary to determine whether to grant or deny a section 301(h) waiver for the PRASA facilities pursuant to section 301(h) of the Act.[2] The applicant is a large applicant and has requested a modification of secondary treatment requirements for the Bayamón and Puerto Nuevo RWWTPs based on an improved discharge within the meaning of 40 CFR 125.58(c) and (i). The applicant has requested a change in concentration effluent limits and not in mass-based effluent limits for BOD_5 and TSS that are established in the current permit.

This Decision Document presents the EPA's findings, conclusions, and recommendations as to whether both modified discharges 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, as amended (Regulation Number 7837).

DECISION CRITERIA

Under section 30l(b)(l)(B) of the Act, 33 U.S.C. 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[3] 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:
>
> (l) 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] Effluent from the three facilities is herein referred to as the combined discharge.
[3] Section 502(3) of the Act defines "State" to include the Commonwealth of Puerto Rico. 33 U.S.C. 1362(3).

(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 nonindustrial 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 each modified discharge and the combined discharge's compliance with statutory and regulatory criteria:

1. The modified discharges 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 discharges from each facility, alone or in combination with pollutants from other sources, will not impact public water supplies. Each

modified discharge as well as the combined 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 discharges from each facility. The terms of this program will become enforceable conditions of the modified permits to be issued to the applicant. [section 30l(h)(3), 40 CFR l25.63]

4. The applicant's modified discharges 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 for both facilities and each 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 area 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 permits. [section 30l(h)(8), 40 CFR 125.67]

9. The applicant has demonstrated the modified discharges from the Bayamón and Puerto Nuevo RWWTPs 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 each modified discharge from the Bayamón and Puerto Nuevo RWWTPs, and the modified discharges combined with wastewater from the Bacardi Corporation WWTP, 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 two section 301(h) modified permits in accordance with the above findings, and that a public notice of intent to issue the modified permits be prepared in accordance with all applicable provisions of 40 CFR Parts 122 and l24. In accordance with 40 CFR 125.68, each section 301(h) modified permit for the Bayamón RWWTP (NPDES Permit No. PR0023728) and Puerto Nuevo RWWTP (NPDES Permit No. PR0021555)

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 Environmental Quality Board as part of its Modified Water Quality Certificates for the Bayamón and Puerto Nuevo RWWTPs to ensure that the modified discharges 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 presented in Table 1, in accordance with 40 CFR Parts 122 and 125;

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 Bayamón and Puerto Nuevo RWWTPs' 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 Bayamón and Puerto Nuevo RWWTPs section 301(h) Waiver Demonstration Studies, in accordance with 40 CFR 125.68(d);

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

Parameter		Units	Bayamón RWWTP	Puerto Nuevo RWWTP
Flow				
	Daily Maximum	MGD	88	144
	Monthly Average	MGD	52	80
BOD_5				
	Weekly Average	kg/d	33,343	63,837
	Monthly Average	mg/l	100	117
	Monthly Average	kg/d	19,703	35,465
	Minimum Removal	%	30	30
TSS				
	Weekly Average	kg/d	19,339	37,102
	Monthly Average	mg/l	75	75
	Monthly Average	kg/d	14,777	22,734
	Minimum Removal	%	60	60

6. Requirements to modify, as necessary, and implement a toxics control program upon the effective date of each 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 FACILITIES

The Bayamón RWWTP is located on the north coast of the island of Puerto Rico, within the town of Cataño. The facility provides wastewater treatment services to the towns of Bayamón, Cataño, Rio Piedras, Toa Alta, and part of Guaynabo. The Bayamón RWWTP first began operations in May 1983 and is designed to provide advanced primary treatment of wastewater through screening, grit removal, polymer-enhanced sedimentation, disinfection (chlorination), and sludge thickening. The facility is designed for a maximum daily flow of 80 MGD and monthly average flow of 40 MGD. In 2008, PRASA re-assessed the flow capacity of the facility and proposed facility modifications to accommodate population growth in the surrounding area and also comply with a consent decree (*U.S. v. Puerto Rico Aqueduct and Sewer Authority*, Civil Action No. 06-1624) to accept wastewater flows from the Toa Alta Heights WWTP (PRASA 2008a). In the renewal application for the Bayamón RWWTP, PRASA has proposed an increase in flow capacity from a maximum daily flow of 68 to 88 MGD and an average monthly flow of 40 to 52 MGD. Based on flow monitoring data from January 2007 through December 2010, actual maximum daily flows ranged between 36 and 105 MGD, and average monthly flows ranged between 29 and 50.4 MGD.

The Puerto Nuevo RWWTP is located in the town of San Juan, and provides wastewater treatment services to the towns of San Juan, Rio Piedras, Trujillo Alto, and parts of Bayamón, Carolina, and Guaynabo. The Puerto Nuevo RWWTP first began operations in 1957 and discharged to San Juan Bay until it was connected to the Bayamón RWWTP's ocean outfall in August 1985. The Puerto Nuevo RWWTP is designed to provide advanced primary treatment of wastewater through screening, grit removal, polymer-enhanced sedimentation, disinfection (chlorination), and sludge dewatering. In addition, the facility's collection system includes the Santurce Combined Sewer System (Santurce CSS). In 2008, the EPA issued an enforcement order (Administrative Order CWA-02-2008-3155) to address several combined sewer overflows that were attributed to the Santurce CSS. Since then, the EPA has been working with PRASA to comply with the enforcement order and the EPA's 1994 CSO Control Policy.[4] The 1994 CSO Control Policy, adopted in section 402(q) of the Act on December 15, 2000, pursuant to the Wet Weather Water Quality Act, requires permits, orders and decrees issued to a discharger after December 21, 2000, to conform to the CSO Control Policy, which includes the immediate implementation of the nine minimum controls, including the elimination of all dry weather overflows, as well as the development of a Long Term Control Plan. The facility was originally designed for a maximum daily flow of 144 MGD and average monthly flow of 72 MGD. To accommodate the need for increased collection capacity at the Bayamón RWWTP, PRASA also re-assessed the flow capacity of the Puerto Nuevo RWWTP and has proposed facility modifications that would enable the diversion of up to 10 MGD of untreated sewage from the Bayamón RWWTP to the Puerto Nuevo RWWTP via the reconstruction and expansion of the La Rabúa pump station. In the renewal application for the Puerto Nuevo RWWTP, PRASA has proposed an increase in flow capacity from an average monthly flow of 72 MGD to 80 MGD. There is no change to the maximum daily flow of 144 MGD. Based on flow monitoring data

[4] Under EPA's 1994 CSO Policy, a CSO permittee should begin a process to accurately characterize its CSS and CSO dischargers, demonstrate implementation of the nine minimum technology-based controls and develop a long-term control plan.

from January 2007 through December 2010, actual maximum daily flows ranged between 55.3 and 126.5 MGD, and average monthly flows ranged between 46.6 and 78.1 MGD.

Effluent from the Bayamón RWWTP and Puerto Nuevo RWWTP is combined with wastewater from the Bacardi WWTP and discharged through a joint outfall system directly into the Atlantic Ocean. Table 2 provides a summary of effluent limitations and monitoring data for flow, BOD_5, TSS and pH for each facility. The Bacardi WWTP is located within the town of Cataño on the coast of San Juan Bay and treats domestic and industrial wastewater from the Bacardi Corporation distillery. The facility has an average daily design flow of 2 MGD and a maximum daily design flow of 4 MGD and generally contributes less than one percent of the total combined flow through the joint outfall system. The joint outfall system consists of a "Y-shaped" high-rate diffuser with the terminus located approximately 7,365 ft (2,245.7 m) from the shoreline into the Atlantic Ocean, at a location approximately 3,600 ft (1,097 m) north of Isla de Cabras, at a depth of 141 ft (43 m). The design characteristics of the outfall and diffuser system are described in Table 3. In general, the diffuser consists of two diffuser legs that extend in a Y shape from a 10-foot diameter ocean outfall. Each diffuser leg is approximately 1,010 ft (308 m) long and consists of variable-sized ports spaced 10 ft (3.05 m) apart that are located on alternating sides of the diffuser barrel. On the west diffuser leg, there are 80 inshore ports that have a diameter of 6 in (15.2 cm), 19 offshore ports that have a diameter of 7 in (17.8 cm), and 1 10-inch (port. On the east diffuser leg, there are 81 inshore ports that have a diameter of 6 in (15.2 cm), 20 offshore ports that have a diameter of 7 in (17.8 cm), and 1 10-inch (25.4 cm) port. The diffuser is currently operated with all 202 ports open. Based on hydraulic modeling by PRASA, the outfall and diffuser system, with all 202 ports open, has the capacity to transport and discharge a peak maximum daily flow of 301 MGD.

Initial Dilution. For the purpose of section 301(h) evaluations, dilution is defined as the ratio of the total volume of the sample (ambient water plus effluent) to the volume of effluent in the sample. A dilution of 100 is, therefore, a mixture of 99 parts of ambient water to 1 part of effluent. At the time a section 301(h) modification becomes effective, 40 CFR 125.62 requires that the applicant's outfall and diffuser 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 Zone of Initial Dilution (ZID), all applicable water quality standards. The ZID is defined as a region of mixing surrounding, or adjacent to, the end of the outfall or diffuser, provided that the ZID is not larger than allowed by mixing zone restrictions in applicable water quality standards (see 40 CFR 125.58(dd)). Rule 1305 of PRWQS authorizes the use of mixing zones through a mixing zone approval process. Upon approval by the Puerto Rico Environmental Quality Board (EQB), an interim authorization for a mixing zone is granted based on the petitioner's demonstration that water quality standards are met at the boundary of the proposed mixing zone, after consideration of the lowest (i.e., critical) initial dilution determined for open coastal waters (Rule 1305 of PRWQS).

Table 2 - Summary of effluent limitations and monitoring data for the Bayamón and Puerto Nuevo RWWTPs, and Bacardi WWTP

Parameter	Units	Current Effluent Limitations			Proposed Effluent Limitations			Effluent Monitoring Data[1]		
		Bayamón RWWTP	Puerto Nuevo RWWTP	Bacardi WWTP	Bayamón RWWTP	Puerto Nuevo RWWTP	Bacardi WWTP	Bayamón RWWTP	Puerto Nuevo RWWTP	Bacardi WWTP
Flow										
Daily Maximum	MGD	68	144	2	88	144	2	36 - 105	55.3 - 126.5	1.38
Monthly Average	MGD	40	72	--[2]	52	80	--	29 – 50.4	46.6 – 78.1	--
BOD_5										
Daily Maximum	mg/l	--	--	17,700	--	--	17,700	--	--	15,495
Average Weekly	kg/d	33,436	70,930	--	33,343	63,837	--	10,506 - 20,776	19,879 - 37,559	--
Average Monthly	mg/l	130	130	--	100	117	--	64 - 112	57 - 92	--
	kg/d	19,668	35,465	--	19,703	35,465	--	6,383 - 16,518	14,766 - 20,275	--
Minimum Removal	%	30	30	--	30	30	--	21 - 72	25 - 65	--
TSS										
Average Weekly	kg/d	19,783	40,920	--	19,339	37,102	--	--	9,020 - 22,717	--
Average Monthly	mg/l	75	75	--	75	75	--	29 - 53	42 - 66	--
	kg/d	11,637	20,460	--	14,777	22,734	--	1,977 - 7,278	6,093 - 11,683	--
Minimum Removal	%	60	60	--	60	60	--	77 - 93	62 - 94	--
pH	Std Units		6.0 to 9.0			6.0 to 9.0		5.47 - 7.93	5.98 - 8.86	--

[1]Effluent monitoring data are based on Discharge Monitoring Reports dated January 2007 to December 2010. Data provide the range between the minimum and maximum values reported.
[2]Limitations not required or data not available for review.

Table 3 - Design configuration of the joint outfall and diffuser system for the Bacardi WWTP/Bayamón RWWTP/Puerto Nuevo RWWTP combined discharge

Maximum daily design flow, MGD[1] (m^3/s)	234 (10.25)
Total outfall + diffuser length (submerged), ft (m)	7,365 (2,246)
Outfall diameter, ft (m)	10 (3.0)
Outfall depth, ft (m)	141 (43)
Diffuser leg number	2
Diffuser leg length, ft (m)	1,010 (308)
Diffuser diameter, in (cm)	84 (2.1)
Port number per West leg	100
Port number per East leg	102
Port spacing, ft (m)	10 (3.05)
Port diameter – in (cm); 19 West leg; 20 East leg	7 (17.78)
Port diameter – in (cm); 80 West leg; 81 East leg	6 (15.24)
Port diameter – in (cm); 1 per leg	10 (25.4)
Port vertical discharge angle, degrees	15
Port horizontal discharge angle, degrees	90
Port depth below the surface, ft (m)	141 (43)

[1]PRASA estimates that the design flow capacity of the outfall and diffuser system can reach flows as high as 300 MGD based on hydraulic calculations. Therefore, at a minimum, PRASA indicates that that the outfall and diffuser system has the capacity to carry a larger total flow than the combined design flow from all three dischargers even with consideration of the increased flow modifications (PRASA 2010f).

In January 2010, PRASA and the Bacardi Corporation submitted a request to EQB for individual Water Quality Certifications and a request for a mixing zone for the combined discharge (PRASA 2010f). On June 3, 2010, EQB issued a Final Water Quality Certificate (WQC) for each of the three facilities that included an authorization of a common Interim Mixing Zone (IMZ). The location of the outfall and monitoring stations are provided in Figure 1. In general, the IMZ can be considered a ZID that is geometrically sized to include the seafloor and the water column above it. In the renewal applications, PRASA has proposed new mixing zone boundaries from the existing mixing zone considered in the EPA's 2007 Final Decision based on an improved diffuser location and mixing zone geometry. The new IMZ is slightly larger than the IMZ described in the 2007 Final Decision. Consistent with EQB's 1988 Mixing Zone and Bioassay Guidelines, PRASA has determined the size of the new IMZ through dilution modeling to be two rectangular-shaped areas approximately 1,147 ft (350 m) long and 154 ft (47 m) wide that extend from each "Y"-shaped diffuser. PRASA also determined that the mixing zone would provide a Critical Initial Dilution (CID) of 102:1 for the combined discharge based on a total combined maximum daily flow of 234 MGD through the joint outfall with all 204 ports open (PRASA 2010e).[5] Pursuant to the current modified permits, PRASA and the Bacardi Corporation are required to maintain the opening of all 204 ports. Based on a May 2010 Mixing Zone Validation Study using dye to assess actual dilution of the combined discharge, PRASA estimated initial dilutions and average dilutions that ranged between 385:1 and 538:1 (PRASA 2010f).

[5] EPA's 2007 approval of PRASA's applications for renewal of the section 301(h) modified permits for the Bayamón and Puerto Nuevo RWWTPs were based on a CID of 104:1. In the 2010 renewal application, the revised CID of 102:1 is based on an increase in the total combined flow of 214 MGD to 234 MGD.

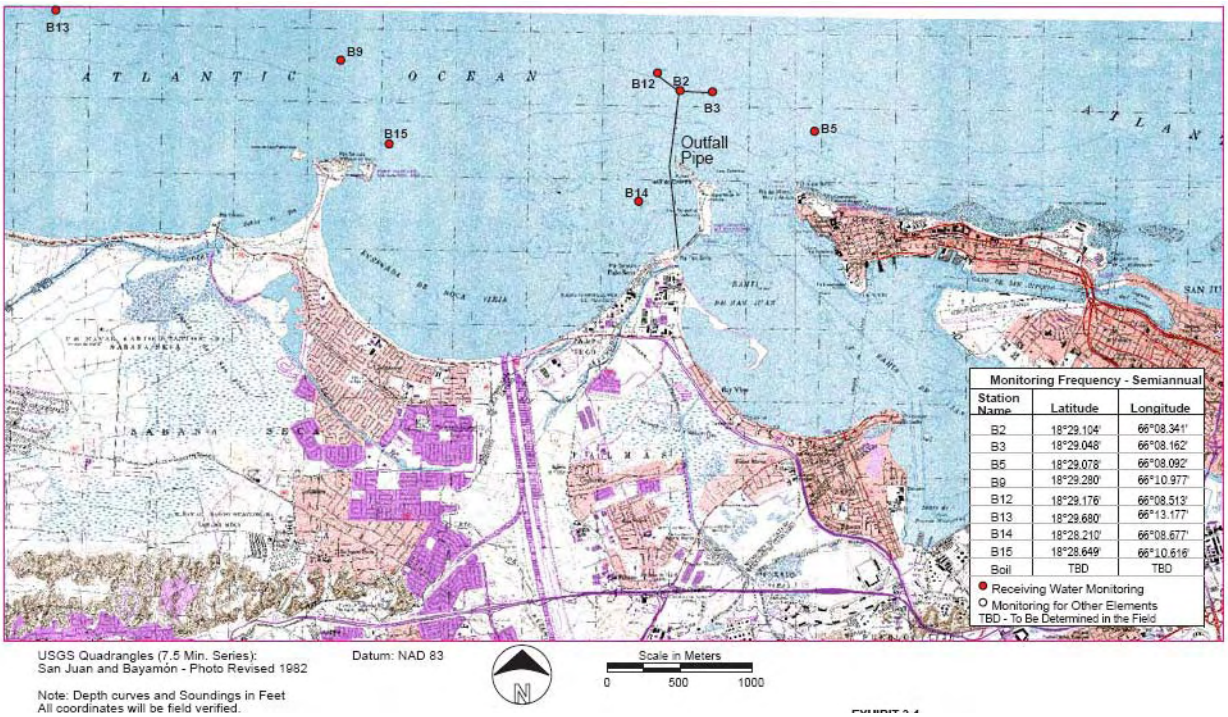

Figure 1. Location of ambient monitoring stations for the Bacardi WWTP/Bayamón RWWTP/Puerto Nuevo RWWTP joint outfall. Figure reprinted from the PRASA's Request for Water Quality Certificates and Definition of Mixing Zones for the combined discharge (PRASA 2010g).

Since 1999, PRASA has been conducting receiving water monitoring in the vicinity of the ZID. The current modified permits require the applicant to conduct annual section 301(h) Waiver Demonstration Studies at eight receiving water monitoring stations, which include locations within the ZID (B2), at the boundary of the ZID (B3 and B12), beyond the ZID (i.e., farfield stations B5 and B9), onshore (B14 and B15), and at a reference site (B13). PRASA is also required to conduct coral community monitoring surveys at two stations (BC14 and BC15) located south of the joint outfall. Receiving water monitoring under the section 301(h) Waiver Demonstration Studies consists of sampling at three depths: surface (10 ft), middle (50 ft), and bottom (90 ft). PRASA has conducted 24 receiving water monitoring events since the beginning of the section 301(h) monitoring program. In the 2007 Final Decision, the EPA approved the section 301(h) waivers for the Bayamón and Puerto Nuevo RWWTPs based on water quality data from 17 monitoring events conducted between August 2000 and January 2007. Since the 2007 Final Decision, PRASA has completed three additional receiving water monitoring events as part of the requirements of the current modified permits (PRASA 2008b; 2010a; 2010b). The most recent monitoring event was conducted in March 2010. Since PRASA has requested a change in permitted flow during the term of the current permits that has resulted in the need to re-evaluate the 2007 Final Decision, this Decision Document includes review of receiving water monitoring data from eight monitoring events conducted during the past five years (2005 to 2010) to better evaluate the potential impact to water quality and the marine environment and support re-issuance of the current permits.

DESCRIPTION OF RECEIVING WATERS

The Bayamón and Puerto Nuevo RWWTPs are located on the north coast of the island of Puerto Rico. The north coast consists of a narrow shelf 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 than 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 or compared to other Caribbean reefs (Glynn 1973). The nearest coral assemblage to the joint outfall is located approximately 0.5 miles southwest of the outfall, and consists of a rock reef with very sparse hard coral growth.

Currents in the vicinity of the joint 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. In the renewal applications, PRASA provided information on current speed and direction based on monitoring events conducted between November 1999 and March 2008, and an April 2009 dye study (PRASA 2010e, 2010f). Current data show that currents generally flow east to west, parallel to the coastline, and on average range in speeds between 11.27 and 18.18 cm/sec based on depth (PRASA 2010f, 2010g).

In the renewal applications, PRASA indicated that there is little seasonal variation in the water column with respect to temperature and salinity. Density profiles at the joint outfall taken during wet and dry seasons indicate that thermoclines and haloclines do not form, which allows for constant mixing of the water column throughout the year. Also, annual ambient water temperatures are shown to range between 25 and 29 degrees Celcius (ºC), with only minor seasonal and spatial differences. Annual temperature and salinity data indicate that surface-to-bottom differences of these parameters are small, and spatial differences are insignificant.

To protect the designated uses of surface waters of Puerto Rico, the Commonwealth of Puerto Rico has adopted water quality standards for marine waters depending on the level of protection required. Rule 1302.1 of PRWQS classifies the coastal waters of Puerto Rico from Punta El Morro (San Juan Port) to Playa Sardinera (Fajardo) as Class SB and Class SC waters. From the shoreline, Class SB waters are considered the boundary subject to the ebb and flow of tides (mean sea level) to 1,640 ft (500 m) seaward. Coastal waters beyond this area to a maximum distance of 10.35 mi (16.6 km) are considered Class SC waters. Rule 1303.2 of PRWQS identifies the following protected uses for Class SB and Class SC waters:

> Class SB. Coastal waters and estuarine waters intended for use in primary and secondary contact recreation, and for propagation and preservation of desirable species, including threatened and endangered species; and
>
> Class SC. Coastal waters intended for primary contact recreation use from the zone subject to ebb and flow of tides (mean sea level) to three miles seaward, and secondary contact recreation from three miles seaward to 10.35 miles seaward, and for the propagation and preservation of desirable species, including threatened or endangered species.

The joint outfall discharges wastewater approximately 3,600 ft (1,097 m) from the nearest shoreline off of the Isla de Cabras into Class SC waters. However, the combined discharge may affect both Class SB and SC waters. For the purpose of the section 301(h) evaluation, the EPA has assessed attainment of water quality standards for both Class SB and SC waters to ensure that the modified discharges, individually and combined, from the Bayamón and Puerto Nuevo RWWTPs do not impact beneficial uses in either area. Applicable water quality standards for Class SB and SC waters are summarized in Table 4.

Table 4 - Use Classification and Water Quality Standards for Class SB and SC Waters of Puerto Rico

	Class SB Waters	Class SC Waters
Class Uses and/or Description	Coastal waters and estuarine waters intended for use in primary and secondary contact recreation, and for propagation and preservation of desirable species, including threatened or endangered species.	Coastal waters intended for primary contact recreation use from the zone subject to ebb and flow tides (mean sea level) to 3 miles seaward, and secondary contact recreation from 3 miles seaward to 10.35 miles seaward, and for the propagation and preservation of desirable species, including threatened or endangered species.
DO	Shall not contain less than 5 mg/l, except when this value is depressed due to natural causes.	Shall contain not less than 4 mg/l except when this value is depressed due to natural causes.
Bacteria	The fecal coliform geometric mean of a series of representative samples (at least five samples) of the waters taken sequentially shall not exceed 200 colonies/100 ml, and not more than 20 percent of the samples shall exceed 400 colonies/100 ml. The enterococci density, in terms of geometric mean of at least five representative samples taken sequentially, shall not exceed 35 colonies/100 ml. No single sample should exceed the upper confidence limit of 75% using 0.7 as the log standard deviation until sufficient site data exist to establish a site-specific log standard deviation.	From the zone subject to ebb and flow of tides (mean sea level) to 3 miles seaward, the coliform geometric mean of a series of representative samples (at least five samples) of the waters taken sequentially shall not exceed 200 colonies/100 ml of fecal coliform. Not more than 20 percent of the samples shall exceed 400 colonies/100 ml of fecal coliforms. From 3 miles seaward to 10.35 miles seaward, the coliform geometric mean of a series of representative samples (at least five samples) of the waters taken sequentially shall not exceed 2,000 colonies/100 ml of fecal coliforms, and not more than 20 percent of the samples shall exceed 4,000 colonies/100 ml of fecal coliforms. From the zone subject to ebb and flow of tides (mean sea level) to 3 miles seaward, the enterococci density in terms of geometric mean of at least five representative samples taken sequentially shall not exceed 35 colonies/100 ml. No single sample should exceed the upper confidence limit of 75% using 0.7 as the log standard deviation until sufficient site data exist to establish a site-specific log standard deviation.
pH	In no case the pH will lie outside the range of 7.3 and 8.5, standard pH units, except when altered by natural causes.	
Color	Shall not be altered except by natural causes.	Shall not be altered by other than natural causes.
Turbidity	Shall not exceed 10 nephelometric turbidity units (NTU), except by natural causes.	
Surfactants	Shall not exceed 500 ug/l.	

APPLICATION OF STATUTORY AND REGULATORY CRITERIA

1. Attainment of Water Quality Standards related to BOD_5 and TSS [section 301(h)(1), 40 CFR 125.61]

Under 40 CFR 125.61, which implements section 301(h)(1), there must be water quality standards applicable to the pollutants for which the modification is requested, and the applicant must demonstrate that the modified discharge will comply with these standards. The applicant has requested modified secondary treatment requirements for BOD_5, which affects dissolved oxygen (DO), and TSS, which affects the color or turbidity in the receiving water. PRASA has not requested a permit modification from secondary treatment requirements for pH. PRWQS have established water quality criteria for DO, color, turbidity, and pH.

a. DO

The effect of the effluent discharge on DO can occur in the nearshore and farfield as effluent mixes with the receiving water and the oxygen demand of the effluent BOD load is exerted. Pursuant to 40 CFR 125.61(b)(1) and 125.62(a)(1), the applicant must demonstrate that the modified discharge will comply with water quality criteria for DO and that the outfall and diffuser are located and designed to provide adequate initial dilution, dispersion, and transport of wastewater such that the discharge does not exceed criteria at and beyond the ZID. Rule 1303.2(B) of PRWQS provides that the DO concentration in Class SB waters "shall not contain less than 5 mg/l, except when this value is depressed due to natural causes." For Class SC waters, the DO concentration shall contain not less than 4 mg/l except when natural conditions cause this value to be depressed (see Rule 1303.2(C) of PRWQS). In accordance with EPA's Amended section 301(h) Technical Support Document (ATSD), the EPA assessed attainment of the water quality criteria for DO based on review of receiving water monitoring data, and predictive modeling to further assess the impact of the combined discharge on DO concentrations in the receiving water under critical conditions (EPA 1994a).

Attainment of DO Criteria Based on Ambient Monitoring Data. To determine whether the combined discharge would attain the water quality criteria for DO, the EPA reviewed monitoring data provided by PRASA to assess levels of DO in the receiving water. The EPA compared concentrations of DO at receiving water monitoring stations for the current discharge to the DO criteria for Class SB and SC waters. In the 2007 Final Decision, the EPA determined that the combined discharge did not impact DO in the receiving water based on water quality data. Based on eight monitoring events from 2005 through 2010, concentrations of DO at all stations were consistently above the water quality criteria of 4 and 5 mg/l for Class SC and SB waters, respectively, with minimum concentrations of 5.45 and 5.5 mg/l reported at ZID stations B3 and B12 (November 2006).

Attainment of DO Criteria Based on Predictive Modeling. As wastewater is discharged through a diffuser, it forms a buoyant plume that rises during initial dilution. As the discharge plume rises, water from deeper parts of the water column is entrained into the plume and advected to the plume trapping level, which can result in an oxygen depression caused by entrainment if the DO level is lower at the bottom of the water column than at the trapping level or surface. In accordance with the EPA's ATSD (1994a), EPA assessed the attainment of water quality criteria

for DO upon initial dilution and in the farfield for both Class SB and SC waters using predictive modeling.

To assess whether the combined discharge would meet the DO criterion upon completion of initial dilution, EPA evaluated final DO concentrations predicted by the applicant. In the 2007 Final Decision, EPA determined that the levels of DO would not be depressed in the receiving water based on the applicant's predicted final DO concentration of 4.49 mg/l at the ZID, which is above the DO criterion of 4.0 mg/l for SC waters. Based on a revised CID and an increase in effluent flows from both facilities, PRASA calculated the potential DO demand from the combined outfall system based on the following: a combined effluent DO concentration of 0.0 mg/l; minimum average ambient DO concentration of 5.2 mg/l observed over the depth of the discharge to trapping level under critical conditions; immediate DO demand value of 9.0 mg/l; and CID of 102:1 (PRASA 2010g, 2010h). As a result, PRASA predicted a DO depression of 0.139 mg/l in the water column with a final DO concentration of 5.061 mg/l. Since the final DO concentration following initial dilution is predicted to be above the DO criteria of 4 and 5 mg/l for Class SB and SC waters, respectively, the combined discharge is predicted to attain the water quality criteria for DO at the ZID upon CID.

Subsequent to initial dilution, DO in the water column is consumed by BOD in the wastefield. As the discharge plume travels through the water column, the combined oxidation of organic material in the diluted effluent and receiving water can result in oxygen depression beyond the ZID in the farfield. BOD consists of a carbonaceous component (CBOD) and a nitrogenous component (NBOD), both of which can contribute to oxygen depression in the farfield. To assess DO concentrations after initial dilution, PRASA evaluated receiving water monitoring data and modeled the exertion of BOD in the farfield on DO concentrations under critical conditions. In the renewal applications, PRASA predicted the DO demand due to BOD_5 exertion in the farfield using procedures specified in EPA's ATSD (EPA 1994a; PRASA 2010g). PRASA applied an actual effluent DO concentration of 0.0 mg/l, ambient DO concentration of 5.2 mg/l, and a final DO concentration of 5.061 mg/l calculated at the end of initial dilution. Calculations were done for 10 days at 6-hour intervals and for one day at 0.5-hour intervals. Using these values, PRASA calculated a DO demand of 0.065 mg/l in the farfield and a subsequent predicted minimum farfield DO concentration of 4.995 mg/l. Because the farfield DO concentration is generally at or greater than DO criteria for Class SB and SC waters, the combined discharge is predicted to meet the water quality criteria for DO beyond the ZID.

In addition to causing DO depression in the water column, the deposition of suspended particles from the wastewater discharge can also impact ambient concentrations of DO near the seafloor. As specified in the EPA's ATSD, DO depletion due to steady sediment demand and sediment resuspension depends on many environmental conditions such as sediment composition (e.g., grain size distribution and organic content), sediment accumulation rates, current speeds, and circulation patterns. In the renewal applications, PRASA provided an analysis of the impact of the combined modified discharge on DO concentrations in the receiving water due to sediment oxygen demand (PRASA 2010g, 2010h). In the analysis, PRASA calculated a worst case DO depression of 0.0324 mg/l for steady-state sediment oxygen demand and 0.0743 mg/l DO depression for the 90-day critical period. The EPA subtracted these values from the final ambient DO concentration of 5.115 mg/l predicted upon initial dilution and determined a DO

concentration of 5.083 mg/l (steady-state) and 5.041 mg/l (90-day critical), which are above the DO criteria of 4 and 5 mg/l for Class SC and SB waters, respectively.

As suspended solids from the discharge are initially deposited on the seafloor, sediments can be resuspended due to disturbances in the water column or on the seafloor which can cause additional DO depression in the water column. In the renewal applications, PRASA calculated DO depression due to sudden resuspension of sediments during a 24-hour period in the region of highest accumulation (the area where sediment with a settling velocity of 0.1 cm/sec would accumulate). The worst case DO depression due to sudden resuspension was calculated by PRASA to be 0.108 mg/l for the 90-day critical period and 0.065 mg/l for steady state conditions. To further evaluate DO depression in the receiving water, EPA subtracted these values from the final DO concentration of 5.095 mg/l for 90-day critical period and 5.107 mg/l for steady-state conditions due to sediment oxygen demand and determined DO concentrations of 4.987 mg/l and 5.042 mg/l, respectively. Although the predicted DO concentration for the 90-day critical period is slightly below (or only 0.26 percent less than) the 5 mg/l criterion for Class SB waters, the EPA does not anticipate significant depressions of DO in the receiving water since effluent is discharged into Class SC waters, and the predicted DO concentration is above the DO criterion for these waters.

b. Color

Rule 1303.1 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 and SC waters, Rule 1303.2 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 combined discharge on color in the receiving water, the EPA reviewed effluent and ambient monitoring data. In the 2007 Final Decision, the EPA concluded that the combined discharge did not impact color in the receiving water based on monitoring data that reported no samples greater than the detection limit of 5 Pt-Co Units. Based on water quality monitoring data from 2007 to 2010, the level of color was reported between the detection limit of 5 Pt-Co and 10 Pt-Co for all monitoring stations. Maximum color levels in effluent of the Bayamón and Puerto Nuevo RWWTPs were reported as 75 and 55 Pt-Co, respectively. In accordance with EQB's Final WQCs, the EPA proposes an effluent limitation of 70 and 115 Pt-Co for color in the Bayamón and Puerto Nuevo RWWTPs' draft permits, respectively. Based on review of effluent data, the EPA believes that the facilities will be able to meet these limitations. For the combined discharge, the EPA calculated the maximum predicted color level of 128 Pt-Co. With consideration of dilution, the predicted color level at the boundary of the ZID is 0.55 Pt-Co. Since the predicted color value is below 10 Pt-Co observed in the receiving water, including the reference station, the EPA believes that the individual or combined discharge will not alter the color in the receiving water.

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 discharge. Significant amounts of suspended solids in the water column associated with the discharge can

cause turbidity, decrease light penetration, and harm sensitive marine ecosystems by interfering with the light available for photosynthesis. Pursuant to 40 CFR 125.61 and 125.62, section 301(h) applicants must demonstrate that the combined discharge 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. In addition, applicants must demonstrate that the outfall and diffuser are 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, these water quality standards. 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 provides that turbidity in Class SB and SC waters shall not exceed 10 nephelometric turbidity units (NTUs), except by natural causes.

Attainment of Turbidity Criterion Based on Ambient Monitoring Data. In the 2007 Final Decision Document, the EPA determined that the combined discharge did not impact turbidity in the receiving water. Based on water quality monitoring data from 2005 through 2010, the level of turbidity at all stations were consistently below the water quality criterion of 10 NTUs, with turbidity levels ranging between the 0.11 (March 2006 at onshore station B14) and 1.08 NTUs (January 2008 at onshore station B15).

Attainment of Turbidity Criterion Based on Effluent Monitoring Data. Pursuant to the EPA's ATSD, the EPA also evaluated potential turbidity impacts upon initial dilution using predictive modeling. As previously described, suspended solids in the effluent can result in a loading of solids in the water column that can cause significant turbidity that can adversely impact the marine environment. Although PRWQS do not have criteria specifically for suspended solids, PRWQS do have criterion for turbidity and, as a result, the EPA assessed whether the combined discharge would have a substantial effect on the level of turbidity in the receiving water based on predicted suspended solids concentrations. In accordance with the EPA's ATSD (1994a), PRASA estimated the concentration of suspended solids at the completion of initial dilution for the combined discharge. In the renewal applications, PRASA determined that turbidity would be below the water quality criterion of 10 NTU at the boundary of the mixing zone based on the following: the 90^{th} percentile ambient background turbidity value of 0.465 NTUs and CID of 102:1. Using these values, PRASA estimated a turbidity value of 3 NTUs at the edge of the ZID, which is below the water quality criterion of 10 NTUs. In accordance with the EPA's ATSD (1994a), the EPA also evaluated turbidity in effluent of each facility and predicted the level of turbidity at the edge of the mixing zone. Between 2007 and 2010, maximum effluent turbidity values for the Bayamón and Puerto Nuevo RWWTPs were 70 and 55 NTUs. With consideration of dilution, turbidity is predicted to be below the water quality criterion of 10 NTUs at the edge of the mixing zone based on each individual effluent. For the combined discharge, the EPA determined an effluent turbidity value of 17 NTUs and ambient water value of 0.167 NTUs at the boundary of the ZID. Since turbidity is predicted to be below the turbidity criteria for Class SB and SC waters under critical conditions, the EPA has concluded that the combined discharge is predicted to meet the water quality criterion for turbidity at and beyond the ZID.

In accordance with Rule 1305 of PRWQS, and as part of EQB's Final WQCs for each facility, EQB has determined that a mixing zone for turbidity is appropriate and that turbidity at the edge

of the mixing zone will comply with water quality standards. Therefore, in accordance with the Final WQCs, the EPA proposes effluent limitations of 98 NTUs and 119 NTUs for turbidity in the draft permits for the Bayamón and Puerto Nuevo RWWTPs, respectively. Based on review of effluent data, the EPA believes that these facilities will be able to meet the proposed effluent limitations for turbidity.

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 pH units. In the renewal applications, PRASA did not request a waiver from pH requirements (PRASA 2010f). Based on review of effluent monitoring data from 2007 to 2010, effluent values for pH ranged between 5.47 and 7.93 standard units for the Bayamón RWWTP and 5.98 to 8.86 standard units for the Puerto Nuevo RWWTP. During this period, 11 percent (or seven) of the effluent samples at the Bayamón RWWTP had pH concentrations that were below the minimum pH requirement of 6.0 standard units for secondary treatment. At the Puerto Nuevo RWWTP, only one effluent monitoring event (September 2008) or 1.6 percent of effluent samples reported a pH concentration below 6.0 standard units.

In addition to the secondary treatment requirements for pH, Rule 1302 of PRWQS has established water quality criteria for pH for Class SB and SC 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 altered by natural causes." In the 2010 Mixing Zone Application, PRASA calculated the levels of pH at the edge of the mixing zone based on the allowable effluent pH, a CID of 102:1, and minimum observed receiving water pH of 8.1 standard pH units (PRASA 2010f). As a result, PRASA predicted a pH range of 7.75 to 8.2 standard pH units at the edge of the mixing zone, which is within the pH range expressed in the water quality criteria for both Class SB and SC waters. Nevertheless, the EPA also evaluated receiving water monitoring data for pH at and beyond the edge of the mixing zone to ensure that the combined discharge will not cause or contribute to significant changes to pH levels in the receiving water. Based on review of monitoring data, concentrations of pH at all stations consistently met the pH criteria. The minimum and maximum levels of pH were reported as 7.97 and 8.2 standard pH units, respectively. Therefore, the EPA has concluded that the applicant has demonstrated that the combined discharge will consistently meet water quality criteria for pH at and beyond the boundary of the ZID.

In accordance with Rule 1305 of PRWQS, and as part of the Final WQCs for each facility, EQB has determined that a mixing zone for pH is appropriate and that pH at the edge of the mixing zone will comply with water quality standards. Therefore, in accordance with the Final WQCs, EPA proposes a pH effluent limitation of 6.0 to 9.0 standard units in the draft permits for the Bayamón and Puerto Nuevo RWWTPs. Based on review of effluent data for each facility, the EPA believes that these facilities will be able to meet the proposed effluent limitation for pH.

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 if the applicant demonstrates that the discharge of pollutants will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of water quality which assures protection of public water supplies and the 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), which implements section 301(h)(2), 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. Attainment of water quality criteria for DO, turbidity and pH was previously discussed. In accordance with 40 CFR 125.62(a), the EPA has assessed the impact of the combined discharge on the attainment of other water quality standards, including those for toxic pollutants, bacteria, and toxicity; and the impact on the protection and propagation of a BIP of shellfish, fish and wildlife; public water supplies and recreation.

a. Pollutant-specific Analysis [40 CFR 125.62(a)]

Pursuant to the existing modified permits, PRASA monitors the concentration of approximately 150 pollutants including metals and pesticides in effluent from the Bayamón and Puerto Nuevo RWWTPs and in the receiving water. In accordance with 40 CFR 125.62(a), the EPA has assessed the potential for each pollutant to cause or contribute to an exceedance of PRWQS or EPA water quality criteria at the edge of the mixing zone. Based on the definition of dilution in Rule 1301.1 of PRWQS, attainment of applicable water quality criteria is based on the following equation:

$$C = C_a + \frac{(C_e - C_a)}{CID}$$

where,

C = concentration at the boundary of the ZID;
C_a = background receiving water concentration;
C_e = effluent concentration; and
CID = critical initial dilution.

The EPA has applied a CID of 102:1 to assess attainment of water quality criteria (i.e., toxic pollutants, bacteria, and whole effluent toxicity) at the ZID. For several pollutants, the EPA was unable to adequately assess their impact on water quality since effluent and receiving water concentration values were reported as generally not detected at the detection limit, which was often above the respective water quality criterion. Based on review of data collected for the section 301(h) Waiver Demonstration Studies, the EPA determined that the detection limits for several pollutants, in particular pesticides, were generally not sensitive enough to adequately evaluate effluent and receiving water quality based on the criteria values specified in PRWQS. In response, the EPA considered several approaches for handling non-detect measurements because

if a pollutant is 'not detected', then the pollutant is either not present at all (i.e., the concentration is equal to zero) or has a concentration value somewhere between zero and the detection limit. For the purpose of the section 301(h) evaluation, the EPA took a conservative approach and performed a screening analysis with the comparison of the maximum concentration or detection limit reported for each pollutant, with consideration of CID, and the water quality criterion as a basis for assessing the attainment of water quality at the edge of the mixing zone. In general, pollutant concentrations were predicted to be below the water quality criteria at the ZID. A detailed discussion is provided below.

Trace Metals. To protect the beneficial uses of coastal waters, Rule 1303.1 of PRWQS provides the maximum allowable concentrations of trace metals in Class SB and SC waters. In the EPA's 2007 Final Decision, the EPA predicted concentrations of trace metals, such as arsenic, cadmium, copper, and mercury, at the edge of the mixing zone to be below water quality criteria for the combined effluent. For the purpose of the section 301(h) evaluation, the EPA assessed the concentrations of trace metals in effluent and the receiving water since the 2007 Final Decision to determine the impact of the combined discharge on the attainment of water quality criteria. A comparison of predicted pollutant concentrations at the ZID, based on maximum effluent concentrations from each facility, and water quality criteria is presented in Table 5.

Based on review of effluent monitoring data for each facility, several metals have been detected at concentrations above the water quality criterion. From January 2007 to December 2010, effluent data from the Bayamón RWWTP showed the maximum effluent concentrations of copper, mercury, nickel, silver and zinc above the water quality criteria. Similarly, except for zinc, effluent monitoring data from the Puerto Nuevo RWWTP reported elevated levels of these pollutants. With consideration of dilution and average background concentrations observed at reference station B13, however, the concentration of these pollutants were predicted to be below the water quality criterion at the edge of the ZID. Review of trace metals concentrations in the receiving water at and beyond the ZID also showed levels of all metals below water quality criteria at all monitoring stations.

In accordance with Rule 1305 of PRWQS, PREQB has determined that a mixing zone for copper, lead, mercury, nickel, silver, and zinc is appropriate and that the discharge will comply with water quality standards at the edge of the mixing zone. In accordance with EQB's Final WQCs, EPA has proposed effluent limitations for these pollutants in the draft modified permits for the Bayamón and Puerto Nuevo RWWTPs. Based on review of effluent and receiving water data, the EPA believes that the facilities will be able to meet these limitations and water quality standards at the edge of the mixing zone.

Conventional, Non-Conventional and Organic Pollutants. To protect the beneficial uses of coastal waters, Rules 1303.1 and 1303.2 of PRWQS provides the maximum allowable concentrations of conventional, non-conventional and organic pollutants in Class SB and SC waters. In EPA's 2007 Final Decision, the EPA predicted concentrations of these pollutants to be below water quality criteria for the combined effluent at the edge of the mixing zone. For the purpose of the section 301(h) evaluation, the EPA assessed the concentrations of trace metals in effluent and the receiving water since the EPA's issuance of the 2007 Final Decision to determine the impact of the combined discharge on the attainment of water quality criteria. As

part of the section 301(h) analysis, the EPA assessed effluent and receiving water concentrations of conventional, non-conventional and organic pollutants, including pesticides - since the 2007 Final Decision to determine whether water quality criteria will be met at the edge of the mixing zone. A comparison of predicted pollutant concentrations at the ZID, based on maximum effluent concentrations from each facility, and water quality criteria is presented in Table 5.

Based on review of effluent monitoring data for each facility, conventional, non-conventional and organic pollutants have been detected at concentrations above the water quality criterion. Effluent data from the Bayamón RWWTP and Puerto Nuevo RWWTP showed the maximum effluent concentration of several pollutants to be above the water quality criteria: cyanide (free), nitrogen (NO_2, NO_3, NH_3), sulfide (undissociated H_2S), surfactants (as methylene blue active substances), thallium and pesticides such as heptachlor and chlordane. With consideration of dilution and average background concentrations observed at reference station B13, the concentration of these pollutants were predicted to be below the water quality criterion at the edge of the ZID. In addition, review of these pollutants' concentrations in the receiving water at and beyond the ZID showed levels of all pollutants to be below water quality criteria at all monitoring stations.

In accordance with Rule 1305 of PRWQS, EQB has determined that a mixing zone for cyanide (free), nitrogen (NO_2, NO_3, NH_3), sulfide (undissociated H_2S), surfactants (as methylene blue active substances), and thallium is appropriate and that they will comply with water quality standards at the edge of the mixing zone. In accordance with EQB's Final WQCs, the EPA has proposed effluent limitations for these pollutants in the draft permits for the Puerto Nuevo and Bayamón RWWTPs. Based on review of effluent and receiving water data, EPA believes that the facilities will be able to meet these limitations and water quality standards at the edge of the mixing zone.

Whole Effluent Toxicity. Rule 1303.1(I) 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. This is generally referred to as a narrative water quality criterion "no toxics in toxic amounts". PRWQS do not provide a numeric criterion for toxicity. Since controls on individual pollutants may not always adequately protect water quality, toxicity testing is used to assess and control whole effluent toxicity (WET) which is necessary to reduce or eliminate the toxic impact of the effluent and meet narrative water quality criteria (54 FR 23868, June 2, 1989). NPDES regulations define WET as the whole or aggregate toxic effect of an effluent measured directly by a toxicity test.

Pursuant to the current modified permits, PRASA is required to conduct acute and chronic WET testing on the combined effluent and chronic only WET testing on individual effluent samples from the Bayamón RWWTP, Puerto Nuevo RWWTP, and the Bacardi WWTP. Since 2007, PRASA has conducted four acute WET monitoring events for the combined effluent using the mysid shrimp (*Mysidopsis bahia*) and sheepshead minnow (*Cyprinidon variegates*) and 11 chronic WET monitoring events using these WET test species and the sea urchin (*Arbacia punctulata)*. Five of the most recent 11 chronic WET monitoring events also included testing on individual effluent using the sea urchin. Since effluent toxicity is inversely related to the effect

Table 5. Evaluation of select pollutants based on PREQB's 2010 Modified WQCs

Parameter	PRWQS	Maximum Effluent Concentration[1]			Combined Discharge with Bacardi WWTP Effluent		Combined Discharge without Bacardi WWTP Effluent		Predicted ZID Concentration > PRWQS?
		Bayamón RWWTP	Puerto Nuevo RWWTP	Bacardi WWTP	Flow-wt Effluent Conc.[2]	Predicted ZID Conc.	Flow-wt Effluent Conc.	Predicted ZID Concentration	
Trace Metals (ug/l)									
Arsenic	36	2.1	4	20	0.04	1.11	0.02	1.11	No
Cadmium	8.85	1	3.31	32	0.069	0.01	0.01	0.01	No
Copper	3.73	131	158	7,870	16.8	0.37	1.49	0.22	No
Lead	8.52	2.2	7.4	32	0.069	0.024	0.025	0.023	No
Mercury	0.025*	14.9	0.1928	0.8761	0.0026	0.00059	0.169	0.0022	No
Nickel	8.28	19	18.9	242.8	0.52	0.31	0.22	0.30	No
Silver	2.24	28	7.84	16	0.036	0.005	0.318	0.008	No
Zinc	85.62	131	76	1,890	4.05	6.43	1.49	6.40	No
Conventional, Non-Conventional and Organic Pollutants (ug/l)									
Chlorine, Total Residual	Narrative[3]	20	5	-	-	-	0.23	0.002	No
Cyanide, Free	1.0	2,340	3.7	11	0.14	0.20	26.59	0.46	No
Nitrogen (NO_3+NO_2+NH_3)	5,000	24,997	19,460	330,000	706	24	285	20	No
Sulfide	2.0	43	54	68,990	147	1.45	20.53	0.2	No
Surfactants, as MBAS	500	5,290	3,610	3,490	7.85	25.3	67.38	25.9	No
Thallium	0.47	50	50	32	0.072	0.0046	0.57	0.0094	No

[1]The maximum effluent concentration is based on Discharge Monitoring Reports from January 2007 through December 2010.
[2]Flow-weighted concentration is based on the revised maximum daily design flow of 88 MGD for the Bayamón RWWTP, and maximum daily design flows of 144 and 2 MGD for the Puerto Nuevo RWWTP and Bacardi WWTP, respectively.
[3]Narrative water quality criterion interpreted using EPA's Recommended National Saltwater Water Quality Criteria for Chlorine
RWWTP – Regional Wastewater Treatment Plant
WQBEL –Water Quality-based Effluent Limitation
PRWQS – Puerto Rico Water Quality Standard
ZID – Zone of Initial Dilution

concentration (the lower the effect concentration, the higher the toxicity in the effluent), WET test data are typically expressed as toxic units (TUs) to better illustrate the magnitude of potential toxicity. Rule 1301.1 of PRWQS defines acute TU (TUa) and chronic TU (TUc) values as the Lethal Concentration (LC_{50}) of the tested effluent at which 50 percent of the test organisms die, where TUa = 100 ÷ LC_{50}; and the No Observed Effect Concentration (NOEC), where TUc = 100 ÷ NOEC, respectively.[6] To assess WET test data, EPA recommends a criterion maximum concentration (CMC) of 0.3 TUa and criterion continuous concentration (CCC) of 1.0 TUc be used to ensure aquatic life protection against toxicity in the receiving water (EPA 1994b). For the purpose of the section 301(h) evaluation, the EPA determined the maximum allowable level of effluent toxicity or wasteload allocation (WLA) at the edge of the mixing zone that would still ensure attainment of water quality criteria for toxicity. With consideration of dilution and CMC and CCC values, EPA calculated acute and chronic WLAs of 30.6 TUa and 102 TUc, respectively, and then compared the WLAs to effluent WET test data.

A comparison of acute and chronic WET test data and WLAs is presented in Appendix A. For the combined effluent, no acute toxicity was observed although several chronic WET tests reported TUc values based on the NOEC that exceeded the chronic WLA. Of the 30 chronic WET tests conducted on the combined effluent since 2007, 30 percent (or 10 tests) resulted in TUc values that exceeded the 102 TUc WLA. All of these tests were conducted on the sea urchin and 60 percent of them conducted in May 2007. When compared to the permit limitation of 1.00 percent effluent or 100 TUc derived from the IC_{25}, or the inhibition concentration at which a 25 percent effect occurs, no chronic toxicity is demonstrated. Based on the NOEC pursuant to PRWQS, since these tests were conducted on the combined effluent it is difficult to distinguish whether effluent from one facility or all was contributing to toxicity in these tests. In 2009, PRASA and the Bacardi Corporation began conducting chronic WET testing on individual samples of effluent from each facility in addition to the combined effluent. Between 2009 and 2011, five chronic WET tests using the sea urchin were conducted and results showed no toxicity observed in terms of the NOEC for the combined effluent but showed repeated toxicity in effluent samples from the Bacardi WWTP (PRASA 2009a; 2009b; 2010c-d; 2011). This may suggest that toxicity demonstrated in tests of combined effluent prior to 2009 may be attributed to effluent from the Bacardi WWTP. Nine WET monitoring events have been conducted since May 2007 and only one has demonstrated chronic toxicity on the combined effluent. Also no acute or chronic toxicity has been observed in effluent from the Bayamón RWWTP and only one effluent sample from the Puerto Nuevo RWWTP showed chronic toxicity.

Based on review of WET data, EPA has concluded that the applicant has consistently demonstrated that the combined discharge will meet water quality standards for toxicity in the receiving water as required by 40 CFR 125.62(a). However, in accordance with 40 CFR 122.44(d)(v), EPA has determined that the combined discharge will cause, has the reasonable potential to cause, or contributes to an excursion above the narrative criterion for chronic toxicity and has proposed effluent limitations for the combined discharge. With consideration of dilution, EPA has proposed a maximum daily effluent limitation of 83.32 TUc (or 1.2 percent effluent) for chronic toxicity in the draft modified permits for the Bayamón RWWTP, Puerto Nuevo

[6] 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).

RWWTP, and Bacardi WWTP. EPA believes that the combined discharge will meet this effluent limitation upon permit issuance.

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. Drinking water supplies in Puerto Rico are derived from inland surface and groundwater sources and thus drinking water (for human consumption) has not been established as a designated use for Class SB or SC waters (Rule 1303.2 of PRWQS). Consequently, the modified discharges from the Bayamón and Puerto Nuevo RWWTPs are not likely to affect public water supplies since ocean waters within the vicinity of the joint outfall are not considered a source of public water supply at the present time nor are expected to become one in the near future.

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. The EPA's 2007 Final Decision to approve section 301(h) waivers for the Bayamón and Puerto Nuevo RWWTPs was, in part, based on PRASA's demonstration that a BIP exists at and beyond the ZID and that the health and diversity of biological communities located near the joint outfall did not significantly differ from similar communities at the reference site. Since the 2007 Final Decision, PRASA has completed three receiving water monitoring events as part of the requirements of the current modified permits for the Bayamón and Puerto Nuevo RWWTPs, and 24 in total since the beginning of the section 301(h) monitoring program in 1999. For the purpose of this section 301(h) evaluation, monitoring data were reviewed to assess the biological conditions of phytoplankton, benthic invertebrate, fish, and coral reef communities in the vicinity of the Bayamón RWWTP/Puerto Nuevo RWWTP/Bacardi WWTP joint outfall. As part of the renewal applications, PRASA reviewed monitoring data collected between 1999 and 2010 to provide for a more robust statistical analysis.

Phytoplankton

Eutrophication of coastal waters and the occurrence of phytoplankton blooms can result in significant economic and ecological consequences. Increased levels of nutrients such as nitrogen and phosphorus are generally associated with conditions of eutrophication and phytoplankton blooms, with nutrient inputs largely resulting from anthropogenic sources such as agricultural runoff, and sewage and industrial discharges. Chlorophyll *a* (Chl-*a*) is often used as an indicator of eutrophication where high nutrient inputs are suspected or documented. There are no PRWQS or EPA-recommended water quality criteria for Chl-*a* in marine waters. The EPA has developed, however, Strategic Targets for nutrients and Chl-*a* for nearshore and coastal waters within the Florida Keys National Marine Sanctuary that can be useful in assessing phytoplankton

productivity in similar tropic and sub-tropic marine systems, such as in Puerto Rico (Boyer and Briceno 2009).

In the renewal applications, PRASA indicated that phytoplankton blooms have not been documented in the vicinity of the joint outfall. Since 2006, mean Chl-*a* concentrations in the vicinity of the joint outfall were generally below the Strategic Target Chl-*a* value of 0.35 mg/m^3. Over the six monitoring events conducted between 2006 and 2010, mean Chl-*a* concentrations ranged between 0.1 and 0.615 mg/m^3 at the within-ZID station B2 and ZID stations B3 and B12. Only the 2009 monitoring event at ZID station B3 showed a mean Chl-*a* concentration (0.615 mg/m^3) above the target level. Mean Chl-*a* concentrations at within-ZID station B2, and ZID-stations B3 and B12 were also comparable to or less than values measured at other stations, and did not appear to have an increasing or decreasing trend in concentration at each station over the six monitoring events. These values were also similar to, or in some cases considerably lower than, Chl-*a* values observed in other coastal waters of Puerto Rico (Gilbes et al. 1996; Otero and Carbery 2005; Hertler et al. 2009). Based on Chl-*a* monitoring in the receiving water, the discharge of nutrients from the combined discharge does not appear to be at levels that would result in excessive phytoplankton growth in the vicinity of the joint outfall.

Benthic Invertebrates

In aquatic systems, monitoring of benthic invertebrates adjacent to wastewater outfalls can provide useful information on the spatial extent and magnitude of impacts of the discharge 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 discharged pollutants or adversely affected by the organic enrichment of sediments from the discharge. To assess the effect of the modified discharges on the benthic infaunal community, sediment quality and accumulation were evaluated as an initial step toward understanding the impact of the modified discharges. The number of taxa and several biological indices (including the Shannon-Wiener diversity index, species evenness and species richness) were then used to describe the overall condition of the benthic community.

Sediment Quality and Accumulation. Many of the potential impacts of wastewater discharges are associated with the discharge of suspended solids and toxic pollutants that accumulate in the sediment. Suspended solids in the effluent can result in a significant loading of solids, in some cases with adsorbed pollutants, to the water column that subsequently deposit onto the seafloor and influence DO levels in near-bottom waters and pollutant concentrations in the sediments that can adversely impact benthic communities. Rule 1303.1(E) of PRWQS provides, for all waters of Puerto Rico, that "solids from wastewater sources shall not cause deposition in or be deleterious to the existing or designated uses of the waters." To assess the biological impact of sedimentation and sediment contamination, the EPA reviewed sediment quality data from 2006 through 2010 and suspended solids modeling results from PRASA to determine whether the accumulation of sediments or toxic pollutants present a significant risk to the benthic community in the vicinity of the joint outfall.

Analysis of sediment was based on annual surveys conducted by PRASA between 2006 and 2010. The EPA compared levels of pollutants to sediment quality guidelines including the

effects-range low (ERL) and effects-range medium (ERM) values developed by Long et al. (1995). Sediments were assessed for metals, pesticides, PAHs, and other organic compounds. Based on revisions to the QAPP in 2008, sediment surveys for dioxin, asbestos, volatile organic compounds (VOCs) and semi-volatile organic compounds were not conducted in 2009 and 2010 and therefore could not be assessed as part of this section 301(h) evaluation. In general, sediment in the vicinity of the joint outfall did not exhibit concentrations of pollutants above levels of concern, except for arsenic. Arsenic was frequently observed above the ERL at within-ZID station B2 and ZID stations B3 and B12. These levels were comparable to, and sometimes lower than, arsenic concentrations observed at stations beyond the ZID. The highest sediment concentrations were observed at farfield stations B5 and B9, and reference station B13. This suggests that other sources of arsenic may be contributing to elevated levels observed in sediments.

The accumulation of suspended solids in the vicinity of a wastewater outfall is influenced by several factors such as the amount of solids discharged (i.e., mass emission rate), the settling velocity distribution of the particles in the discharge, the plume height-of-rise, and current velocities. Suspended solids can vary in size, shape, and density and that can cause them to settle at different rates. In general, 50 percent of suspended solids in wastewater discharges are likely to settle and accumulate in the vicinity of a POTW's outfall (EPA 1994a). Biological effects are estimated to be minimal when the accumulation of suspended solids is estimated to be below 50 g/m^2, and organic deposition rates are below 548 $g/m^2/yr$ (EPA 1994a; Maughan and Oviatt 1993). For the combined loadings from the Bayamón and Puerto Nuevo RWWTPs and the Bacardi WWTP, PRASA calculated a total long-term or steady-state accumulation of suspended solids to be 26 g/m^2. The deposition rate was estimated to be 94 $g/m^2/yr$ over the primary depositional area of 12.61 km^2. This estimate is based on the maximum combined permitted TSS mass loading of 77,333 kg/day. PRASA also predicted that settleable solids transported beyond the primary depositional area would deposit over a 126 km^2 area, with a steady-state accumulation of the organic fraction estimated to be less than 1 g/m^2. Based on monitoring data for sediment chemistry and particle size, PRASA determined that there were no significant differences ($p = 0.05$) in nitrogen and phosphorus levels, or silt and clay content between within-ZID station B2 and reference station B13. Further, reference station B13 showed significantly less total organic carbon content than within-ZID station B2. This suggests that organic components of wastewater discharged from the joint outfall may not be resulting in sediment enrichment. Since there is no evidence of significant sedimentation and deposition rates of suspended solids are predicted to be below 50 g/m^2, the modified discharges are not likely to cause significant accumulation of suspended solids in the vicinity of the joint outfall.

Benthic Community Assemblage. Non-parametric statistical analyses were performed by PRASA on 23 monitoring events conducted between 1999 and 2009 to better determine whether changes to the benthic invertebrate community have occurred at the ZID as a result of the modified discharges.[7] For the purpose of the benthic invertebrate assessment, statistical comparisons were performed against data collected at within-ZID station B2 as a conservative evaluation of benthic impact. Benthic invertebrate communities within the ZID do not appear to significantly differ ($p = 0.05$) in the number of taxa and species at monitoring stations beyond the

[7] Statistical analyses were based on a comparison of the biological index means calculated for the 1999 to 2009 study period for the ZID, farfield and reference stations.

ZID although overall they appear less diverse relative to the other communities assessed. The mean number of taxa at within-ZID station B2 did not significantly differ from other monitoring stations except farfield station B5, which showed a statistically significant greater number of taxa. Also species richness did not appear to significantly differ between within-ZID station B2 and all other stations, including the reference station. Yet species diversity, based on the Shannon-Wiener diversity index, and species evenness were significantly greater at all stations compared to within-ZID station B2. The Shannon-Wiener diversity index provides a measurement of the rarity and commonness of species within a community, and accounts for both the abundance and evenness of the species present within a given period of time.

A trend analysis was also conducted on biological indices data to determine whether there were decreasing or increasing trends toward changes in the benthic invertebrate community at each monitoring site. Generally PRASA determined that there were no significant changes in the species richness or evenness over the 10-year period at any of the stations, including within-ZID station B2. PRASA also determined that there were no decreasing trends over this period in any of the benthic invertebrate indices at the monitoring stations. Except for the reference station, only species density showed an increasing trend at all stations near and beyond the ZID.

Fish Communities

EPA's issuance of the 2007 Final Decision and modified permits was, in part, based on PRASA's demonstration that there were moderate abundances of fish found in the hard-bottom environments located in the vicinity of the joint outfall; and that no physical defects or abnormalities were observed in fish samples collected at any of the monitoring stations located at and beyond the ZID. The EPA concluded that fish and epibenthic invertebrate communities did not appear to be adversely impacted. For the purpose of this section 301(h) evaluation, the EPA again reviewed fish data based on number of fish species, total fish abundance, Shannon-Wiener fish species diversity index, species evenness and species richness. Similar to the benthic invertebrate assessment, non-parametric statistical analyses were performed by PRASA on 23 monitoring events to better determine whether changes to the fish community have occurred at the ZID as a result of the discharges from the joint outfall.[8] PRASA has indicated that fish collected at monitoring stations showed no signs of any physical stress, lesions, fin rot, parasitism, or other indicators of potential effluent-dominated stress.

Generally fish communities within the ZID do not appear to significantly differ ($p = 0.05$) in the number of species, diversity, richness or evenness from monitoring stations beyond the ZID. PRASA determined that only onshore station B15 showed significantly less diversity and number of species compared to within-ZID station B2. PRASA also determined that no fish indices were significantly greater than those assessed at within-ZID station B2. Based on a trend analysis, PRASA determined that there were no significant increases or decreases in any of the fish indices over the 10-year period at any of the stations, including within-ZID station B2.

Bioaccumulation of Toxic Pollutants in Fish Tissue. The bioaccumulation of toxic pollutants in marine organisms can result in adverse impacts to the environment and human health. Rule

[8] PRASA was not required to conduct a fish community analysis as part of the March 2010 Bayamón and Puerto Nuevo RWWTP section 301(h) Waiver Demonstration study.

1303.1(I) of PRWQS provides that the waters of Puerto Rico shall not contain any substances at such concentrations, either alone or as a result of synergistic effects with other substances that are toxic or produce undesirable physiological responses in humans, fish, or other flora or fauna. The EPA's issuance of the 2007 Final Decision and modified permits for the Bayamón and Puerto Nuevo RWWTPs was, in part, based on PRASA's demonstration that fish in the vicinity of the joint outfall did not bioaccumulate toxic pollutants at levels that would adversely impact human health through the consumption of fish, and the marine environment. Since 2007, PRASA has not conducted a fish tissue bioaccumulation study as the existing modified permits only require a study once per the five-year permit term. However, for the purpose of this section 301(h) review, the EPA has reassessed the most recent fish tissue studies conducted in 2005 and 2006 to determine the potential impact of bioaccumulation of toxic pollutants on fish consumption and fish communities in the vicinity of the joint outfall. Fish were collected from the five collection sites: within-ZID station B2, farfield stations B5 and B9, reference station B13, and nearshore station B15. No fish were collected at ZID stations B3 or B12. A total of eight to ten fish were collected at each site. Due to very limited data, sample-by-sample comparisons were conducted.

EPA-recommended fish tissue screening values were used to assess the human health risk from consuming contaminated fish (EPA 2000). Levels of arsenic in fish tissue were routinely reported above the non-carcinogen and carcinogen screening values of 1.2 and 0.026 mg/kg, respectively, at all monitoring stations. No other toxic pollutants were detected above human health screening values. Between 89 and 100 percent of the fish tissue samples collected in the 2005 and 2006 monitoring events reported elevated arsenic levels. Overall arsenic concentrations in individual fish ranged between 0.86 and 11.6 mg/kg wet weight and did not appear to be significantly different between monitoring events at each site or within-ZID station B2 and other stations. Arsenic is a natural occurring metal and concentrations in the combined effluent are reported to be below the water quality criterion. EPA is not aware of any fishing restrictions or fish consumption advisories as a result of fish tissue levels.

There are no PRWQS or EPA-recommended criteria for fish tissue to assess the biological impacts of contaminant residues in fish tissue. For the purpose of the section 301(h) analysis, levels of toxic pollutants were evaluated for potential biological impacts based on fish tissue screening concentrations (TSCs) (electronic communication between Burt Shephard, EPA Region 10, and Sara Sorenson, EPA Region 2, unreferenced). TSCs were updated from Shephard (1998), which were utilized in the EPA's 2007 section 301(h) assessment, using the methodology provided in Dyer et al. (2000). Arsenic (100 percent detection in all samples at each site), copper (70 to 100 percent), mercury (100 percent), selenium (90 to 100 percent), and zinc (100 percent) were the more common detected trace metals at all five collection sites. Except for selenium, concentrations of these metals were at levels above TSCs. Heptachlor was the most commonly detected chlorinated pesticide at three of the five stations: within-ZID station B2 (90 percent detection in all samples), reference station B13 (67 percent), and onshore station B15 (50 percent). Tissue concentrations were below the TSC at all three sites. All other chlorinated pesticides and organic compounds were less commonly detected (less than 50 percent detection in all samples at each site) and routinely below TSCs. When data were compared among sites, there was no evidence that contaminates detected in fish collected near the joint outfall at within-ZID station B2 were different in type or more commonly detected,

including detection at levels routinely above ecological thresholds, than fish collected at other sites.

Coral Reef Communities as Distinctive Habitats of Limited Distribution

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 1994a). 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. Coral reefs on the North Coast of Puerto Rico are poorly developed due to the strong wind and wave action. The nearest coral community is located approximately 0.5 miles south of the joint outfall. Since 2006, PRASA has conducted three coral reef monitoring events at two onshore stations, B14 and B15. PRASA indicates that coral reefs in these areas are naturally poorly developed compared to coral reefs in the southern part of the island due to rough wave conditions. Based on coral reef monitoring, PRASA determined that the coral reef communities in these areas have generally remained unchanged in their total coral density, stony/hydrocoral species, and species evenness indices. Coral reef monitoring indicates that they are predominately composed of bare reef-rock covered with filamentous algae and/or coralline algae colonies. Percent coral cover for all coral types (stony and soft corals) are generally low for both coral reef monitoring locations, with less than four percent of the total area frequency observed. The low percent coral coverage and low coral species diversity and evenness frequently observed at both monitoring stations suggests sparse and poorly developed corals throughout the areas surveyed that are unlikely related to the modified discharges. The coral reefs monitored are located in a nearshore high energy environment and are not likely to be impacted adversely by the modified discharges from the Bayamón and Puerto Nuevo RWWTPs during the next five-year permit term.

Biological Impact of Discharge Conclusion

Biological monitoring data indicate that the modified discharges 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 discharges. Therefore, the EPA has concluded that PRASA has met the requirements of 40 CFR 125.62(c).

d. 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. Since issuance of the EPA's 2007 Final Decision and modified permits, effluent and receiving water monitoring data continue to indicate that the modified discharges from the Bayamón and Puerto Nuevo RWWTPs will provide for the attainment of water quality criteria for DO, turbidity, toxic pollutants, and toxicity, and maintenance of a BIP during the next permit term. The EPA is not aware of any phytoplankton blooms, fish kills, or other adverse impacts in the vicinity of the joint outfall, and does not anticipate any adverse impacts during the next permit term to rise to the level of being

extremely adverse as a result of the modified discharges. The modified discharges are to open coastal waters that provide a dynamic mixing zone unstratified in nature and influenced by large-scale, wind-driven ocean currents, and thus are not likely to cause conditions within the ZID that would contribute to extreme adverse biological impacts as a result of the discharges.

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

Under 40 CFR 125.62(a) and (d), 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, and that the 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. There must also 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 Bayamón or Puerto Nuevo RWWTPs were upgraded to secondary treatment (EPA 1994a). PRASA has indicated that the joint outfall is located more than 0.6 miles from any existing or potential recreational beaches and that the prevailing long-shore ocean currents creates rapid flushing and dispersion that result in little, if any, impacts to recreational activities.

To protect the beneficial uses of Class SB and SC waters for water contact recreation, Rule 1303.2 of PRWQS provides water quality criteria for fecal coliform and enterococci based on the geometric mean and single sample maximum concentrations. Specifically, fecal coliform and enterococci criteria are defined by the following:

> Fecal coliform: The geometric mean of a series of representative samples (at least five) of the waters taken sequentially shall not exceed 200 colonies per 100 ml, and not more than 20 percent of the samples shall exceed 400 colonies per 100 ml; and
>
> Enterococci: The enterococci density in terms of the geometric mean of at least five representative samples taken sequentially shall not exceed 35 colonies per 100 ml; and no single sample should exceed the upper confidence limit of 75 percent using 0.7 as the log standard deviation until sufficient site data exist to establish a site-specific log standard deviation.

The application of each criterion in terms of the geometric mean and single sample maximum concentrations is discussed below.

Application of Geometric Mean Criterion. PRWQS provide that bacteria criteria shall apply to the geometric mean of five samples that are taken sequentially; however, the standards do not specify the duration over which the geometric mean should be calculated, or how the geometric mean criteria, in general, should be applied for infrequently monitored waters. The current modified permits require PRASA to conduct annual receiving water monitoring and monthly effluent monitoring[9] for the Bayamón and Puerto Nuevo RWWTPs. As such, receiving water and

[9] 2007 Bayamón and Puerto Nuevo RWWTPs permits require effluent monitoring of bacteria based on a grab sample taken once per month.

effluent samples are not sequentially collected to derive a geometric mean for direct comparison with bacteria criteria based on the geometric mean. For the purpose of this section 301(h) evaluation, the EPA has taken a conservative approach and compared the geometric mean criteria to individual ambient and effluent samples taken during each monitoring event. To assess attainment of water quality criteria for bacteria, the EPA also compared the geometric mean criteria to a flow-weighted concentration of fecal coliform and enterococci predicted in the combined discharge of the Bayamón RWWTP, Puerto Nuevo RWWTP, and Bacardi WWTP.

Application of Single Sample Maximum Criterion. For fecal coliform, PRWQS provide that not more than 20 percent of the samples shall exceed 400 colonies per 100 ml. Since effluent and ambient monitoring frequency for bacteria is required on a monthly or annual basis, the EPA has taken a conservative approach and compared the single sample maximum criterion directly to individual samples taken during each monitoring event without allowing more than 20 percent to exceed the criterion. To ensure adequate attainment of recreational uses, EPA believes that individual samples that result from infrequent monitoring events should be compared directly to the single sample maximum criterion for fecal coliform.

For enterococci, the single sample maximum criterion is expressed as a statistical deviation of site-specific bacterial concentration in ambient waters. Since the EPA is not aware of EQB determining a site-specific criterion for enterococci in the waters of the North Coast of Puerto Rico, or for SB or SC waters in general, EPA has interpreted the narrative criterion, "no single sample should exceed the upper confidence limit of 75 percent using 0.7 as the log standard deviation until sufficient site data exist to establish a site-specific log standard deviation," to mean a single sample maximum of 104 colonies per 100 ml as explained in the preamble to the final rule of the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000, and EPA's Ambient Water Quality Criterion for Bacteria (69 FR 67226, November 14, 2004; EPA 1986a). Therefore, the EPA has compared the single sample maximum value of 104 colonies per 100 ml directly to individual samples taken during each monitoring event without establishing a site-specific single sample maximum criterion for enterococci.

Review of Effluent and Receiving Water Monitoring Data. In the 2007 Final Decision, EPA determined that the modified discharges from the Bayamón and Puerto Nuevo RWWTPs did not impact water quality criteria for bacteria in the receiving water. For the purpose of this section 301(h) evaluation, EPA again assessed the levels of bacteria in the effluents and in the receiving water based on review of monitoring data. A review of effluent concentrations is provided in Table 6. Based on effluent monitoring data from July 2008 through December 2010, fecal coliform concentrations for the Bayamón RWWTP and Puerto Nuevo RWWTP were routinely below permit limitations and both the geometric mean and single sample maximum criteria. Only one monthly sample from each facility showed levels of fecal coliform above the criteria (771 colonies per 100 ml reported in December 2010 for the Bayamón RWWTP and 880 colonies per 100 ml reported in July 2008 for the Puerto Nuevo RWWTP). With consideration of dilution and contributions from the Bacardi WWTP, fecal coliforms levels are predicted to be below the fecal coliform criteria at the boundary of the ZID. For enterococcus, the maximum concentrations

Table 6 – Attainment of PRWQS for bacteria in the receiving water based on effluent concentrations (2006-2010)

Parameter	Bayamón RWWTP	Puerto Nuevo RWWTP	Bacardi WWTP[1]	Flow-weighted Effluent Conc.	Bacteria Level at ZID	Attainment of PRWQS at ZID?
Fecal Coliform	771	880	341,006	3,746	42	Yes
Enterococcus	70.6	31	30,667	308	3	Yes

[1]Fecal coliform concentrations in the effluent from the Bacardi WWTP are based on PRASA's Request for Water Quality Certificates and Definition of Mixing Zones for the Bayamón RWWTP, Puerto Nuevo RWWTP, and Bacardi WWTP (PRASA 2010g); the effluent concentration of enterococcus from the Bacardi WWTP is based on the existing effluent quality limit proposed in the draft 2011 EPA and Bacardi Corporation Consent Decree modification.

in effluent from the Bayamón and Puerto Nuevo RWWTPs were 70.6 (December 2009) and 31 colonies per 100 ml (March 2009), respectively. Of the 22 effluent results reviewed from each facility, only two samples (nine percent) from the Bayamón RWWTP showed elevated levels of enterococcus based on the geometric mean criterion of 35 colonies per 100 ml. There were no elevated levels observed in effluent from the Puerto Nuevo RWWTP. With consideration of dilution and contributions of enterococcus from the Bacardi WWTP, levels of enterococcus are predicted to be above the water quality criteria at the boundary of the ZID based on the single sample maximum and geometric mean criteria. Because of the high levels of bacteria in the Bacardi WWTP effluent and the effluent's inability to meet final permit limitations for enterococcus, EPA has proposed an interim effluent limitation of 30,667 colonies per 100 ml based on the existing effluent limitation proposed in the draft 2011 EPA and Bacardi Corporation Consent Decree Modification to the 2008 Consent Decree with the Bacardi Corporation (*U.S. v Bacardi Corporation*, Civil Action No. 3:08-cv-1825). Based on the interim limitation for the Bacardi WWTP, EPA believes that the modified discharges from the Bayamón and Puerto Nuevo RWWTPs will meet water quality criteria for enterococcus at the boundary of the ZID (see Table 6).

Since bacterial contributions from the Bacardi WWTP are significant to the combined discharge, the EPA also reviewed bacteria concentrations in the receiving water at and beyond the ZID to further assess the potential impact of bacteria on water quality. Since 2006, PRASA has conducted six receiving water monitoring events. Monitoring data show elevated levels of fecal coliform and enterococcus in the vicinity of the joint outfall. Except for the 2008 monitoring event, samples collected at within-ZID station B2, and ZID stations B3 and B12, generally did not meet the water quality criteria for fecal coliform and enterococcus. Single sample maximum concentrations of fecal coliform ranged between levels below the detection limit to 26,000 colonies per 100 ml (March 2010). For enterococcus, single sample maximum concentrations ranged between the detection limit and 1,600 colonies per 100 ml. Although some bacterial exceedances were observed at stations located beyond the ZID, samples overall showed concentrations that were generally below detection limit. EPA believes that any elevated levels of bacteria observed in the receiving water are likely attributed to wastewater from the Bacardi WWTP since it has not yet been able to meet interim effluent limitations pursuant to its current permit. At this time, the Bacardi Corporation is operating under a draft compliance schedule to meet effluent limitations that will reduce the impact of bacteria on the receiving water and meet

water quality criteria at the boundary of the mixing zone. Although EQB has authorized a mixing zone for bacteria for the combined discharge, EQB's Final WQC requires that the modified discharges individually meet water quality criteria for bacteria prior to mixing with effluent from the Bacardi WWTP.

Effluent concentrations of bacteria from the Bayamón and Puerto Nuevo RWWTPs indicate that the modified discharges, alone and in combination with effluent from each other and the Bacardi WWTP, will consistently meet water quality criteria for bacteria at the ZID and allow for recreational activities such as water contact recreation (40 CFR 125.62(a) and (d)). To ensure continuing protection of Class SB and SC waters for recreational use, the EPA has proposed effluent limitations for both enterococci and fecal coliform in the draft permits for the Bayamón and Puerto Nuevo RWWTPs.

f. 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 BIP is caused solely by human perturbations other than the applicant's modified discharge. PRASA has indicated that the Bayamón and Puerto Nuevo RWWTPs do not discharge into stressed waters, as defined in 40 CFR 125.58(z). Since PRASA has demonstrated that a BIP exists in the vicinity of the joint outfall and that the modified discharges will provide for the attainment of water quality standards and criteria at and beyond the ZID, PRASA 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 Bayamón and Puerto Nuevo RWWTPs' 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)).

Since 1999, PRASA has implemented a section 301(h) monitoring program for the Bayamón and Puerto Nuevo RWWTPs that consists of effluent and water quality monitoring and biological and community assessments. The monitoring program is well-established and has been developed jointly between EPA, EQB and PRASA. PRASA has conducted 24 section 301 monitoring events at monitoring stations established at and beyond the ZID. In the renewal applications, PRASA has proposed continuation of the existing section 301(h) Waiver Demonstration Studies for the next five-year permit term. A description of the section 301(h) monitoring program is in Table 7. PRASA has not proposed any changes to the monitoring

Table 7 - Section 301(h) monitoring program for the Bayamón and Puerto Nuevo RWWTPs

Monitoring Type	Substrate and/or Parameter	Monitoring Frequency
Effluent Monitoring	Conventional and non-conventional pollutants (DO, TSS, oil and grease, nitrogen species, bacteria, etc.)	Annual
	Metals, Pesticides, and PCBs	Annual
	Dioxins, volatile and semi-volatile organic pollutants	Once per permit term
Water Quality Monitoring	Conventional and non-conventional pollutants (DO, TSS, oil and grease, nitrogen species, bacteria, etc.)	Annual
	Metals and Pesticides	Annual
	Dioxins, volatile and semi-volatile organic pollutants	Once per permit term
Biological Monitoring	Benthic Invertebrate Monitoring	Annual
	Sediment Quality Monitoring	Annual
	Fish Tissue Bioaccumulation	Once per permit term

program requirements described in the current modified permits and PRASA's 2008 Quality Assurance Project Plan and Sampling and Analysis Protocols (QAPP/SAP) for the Bayamón and Puerto Nuevo RWWTPs 301(h) Waiver Demonstration Studies (PRASA 2008c). The draft permits require that PRASA continue to implement a section 301(h) monitoring program for the Bayamón and Puerto Nuevo RWWTPs 301(h) Waiver Demonstration Studies. Any revisions to the section 301(h) monitoring program will be subject to the EPA's approval and modification of the 2008 QAPP/SAP. The EPA has concluded that the applicant has met the requirements of 40 CFR 125.63 based on design of the monitoring program to evaluate the impact of the modified discharges on the receiving water and PRASA's demonstration that it has the resources to implement such a monitoring program.

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, the 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 applications, PRASA indicated that the modified discharges will not cause additional treatment or control requirements for other point or nonpoint sources (PRASA 2010g). In January 2010, PRASA requested a determination from EQB that the modified discharges from the Bayamón and Puerto Nuevo RWWTPs will comply with all applicable provisions of Commonwealth law, as required by 40 CFR 125.64(b). On June 3, 2010, EQB issued Final WQCs for each facility that the modified discharges will not cause violations to the applicable water quality standards in the receiving water or result in additional treatment controls or other requirements on any other point or nonpoint sources. PRASA has requested a waiver from secondary treatment requirements for BOD_5 and TSS for the Bayamón and Puerto Nuevo RWWTPs. Although these facilities share a common outfall with the Bacardi Corporation, the modified discharges have not caused additional treatment or control requirements for any pollutant or parameter, including BOD_5 and TSS, for the Bacardi WWTP or any other point or nonpoint sources, and the EPA does not anticipate any additional treatment or control requirements resulting from an increase in discharge flows from the Bayamón and Puerto Nuevo RWWTPs during the next permit term.

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, the 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. 40 CFR 125.65, which implements section 301(h)(5) and (6) of the Act, requires that the applicant establish control of toxic pollutants that may be introduced by an industrial discharger by demonstrating that it has an applicable pretreatment requirement, that industrial sources are in compliance with the pretreatment requirement (including local limits), and that it will enforce the requirement.

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. As part of an Industrial Pretreatment Program, POTWs that seek a section 301(h) waiver 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. In evaluating the need for local limit development, a POTW must identify industries that might be subject to the pretreatment program and determine the character and volume of pollutants contributed to the POTW by these industries. The POTW then determines which pollutants have a reasonable potential for pass through, interference, or sludge contamination. To calculate the maximum allowable POTW influent loading for a pollutant of concern, treatment plant data and estimates of pollutant removal rates are used to calculate the total allowable pollutant load that would meet sludge requirements, permit limits, and water quality standards. After accounting for domestic sources, the remaining load is then evenly distributed among industries that contribute to the POTW. The EPA's approval of PRASA's pretreatment program in 1985 only contained general island-wide local limits for all of its wastewater treatment facilities. Since then, PRASA has assessed the need for facility-specific local limits for all facilities. For the Bayamón and Puerto Nuevo RWWTPs, PRASA has established both island-wide and facility-specific local limits, which are summarized in Table 8. PRASA has incorporated these limits into all applicable industrial pretreatment permits for industries that discharge to the Bayamón or Puerto Nuevo RWWTP in accordance with 40 CFR Part 403.

For several pollutants that were detected in industrial user wastewater and the Bayamón and Puerto Nuevo RWWTP influent, effluent, or sludge, PRASA determined that local limits were not necessary. According to PRASA's December 2010 Industrial Pretreatment Program Annual Report, which covers activities from September 1, 2009 through August 31, 2010, PRASA determined that local limits for bis(2-ethylhexyl)phthalate, diethyl phthalate, and phenol did not need to be established for the Bayamón RWWTP (PRASA 2010h). For the Puerto Nuevo RWWTP, PRASA determined that local limits for barium, boron, dichlorobromomethane, chloroform, bis(2-ethylhexyl)phthalate, diethyl phthalate, detergents, toluene, and fluoride also were not necessary at this time. PRASA is currently reviewing total nitrogen in more detail to determine whether it is necessary to establish a local limit for this parameter in the Puerto Nuevo RWWTP service area. Due to the diversion of wastewater from the Toa Alta Heights WWTP to the Bayamón RWWTP and the redistribution of up to 10 MGD of wastewater from the Bayamón

Table 8 - List of parameters and local limits for the Bayamón and Puerto Nuevo RWWTPs

Parameter	Bayamón RWWTP Local Limit (mg/l)	Puerto Nuevo RWWTP Local Limit (mg/l)
Arsenic	3.45	0.75
Beryllium	0.13	0.075
Biochemical Oxygen Demand	175*	175*
Cadmium	0.10*	0.077
Chromium, Total	1.0*	0.8
Copper	0.50	0.50
Cyanide	0.10*	0.10*
Lead	0.10	0.10
Manganese	2.0*	2.0*
Mercury	0.05*	0.02
Nickel	0.5*	0.5*
Oil & Grease	50*	50*
Phenols	0.5	0.5
Selenium	0.2*	0.2*
Silver	0.10	0.10
Thallium	--	13.3
Total Suspended Solids	250*	175
Zinc	0.50*	0.50*

*Island-wide Local Limit

RWWTP service area to the Puerto Nuevo RWWTP, the industrial and domestic contributions may change and affect local limit calculations. During the next permit term, PRASA will be required to re-evaluate the current local limits for each facility to determine whether or not they need to be updated to reflect the change in the service areas.

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 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 EPA's National Pretreatment Program. A POTW's enforcement program is considered adequate if not more than 15 percent of its industrial users meet the significant noncompliance (SNC) criteria in a single year. In situations where the POTW followed its procedures but the level of significant noncompliance among significant industrial users (SIUs) is 15 percent or greater, the adequacy of the enforcement procedures should be reviewed. A total of nine SIUs are monitored under the Pretreatment Program for the Bayamón RWWTP and twelve for the Puerto Nuevo RWWTP, and all currently have discharge permits. According to PRASA's December 2010 Industrial Pretreatment Program Annual Report covering the period from September 1, 2009 through August 31, 2010, the Bayamón RWWTP and Puerto Nuevo RWWTP service areas reported a SNC rate of 11 percent (one of nine SIUs) and 25 percent (three of twelve SIUs), respectively, for its SIUs (PRASA 2010h). The SNC rate for the Puerto Nuevo RWWTP service area is greater than the SNC criteria of 15 percent for determining the adequacy of the pretreatment program. Between September 2009 and August 2010, two of the non-compliant facilities in the Puerto Nuevo RWWTP service area have closed operations. The remaining non-compliant facility results in a SNC rate of less than the 15 percent in the Puerto Nuevo RWWTP service area.

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, the EPA has concluded that the applicant has demonstrated that it has met requirements of 40 CFR 125.65 for an urban area pretreatment program. The EPA has concluded that PRASA has demonstrated that it enforces its applicable pretreatment requirements in accordance with the section 301(h) requirement at 40 CFR 125.65.

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 the 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 (dry weather/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. In the renewal applications, PRASA indicated that there are potential industrial sources of toxic pollutants within the Bayamón and Puerto Nuevo RWWTP sewerage basin. PRASA indicated that these pollutants are monitored through the PRASA Pretreatment Program, and the section 301(h) monitoring program. PRASA did not provide a chemical analysis of the current modified discharge for each facility as part of the renewal application, as required by 40 CFR 125.66(a), but instead included 2009 priority pollutant screening data and a summary of effluent monitoring data from 2006 through 2010. EPA has concluded these data and information from PRASA's 2008 and 2009 annual pretreatment reports are sufficient to meet the requirements of 40 CFR 125.66(a).

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 non-industrial types. PRASA has indicated that there are eight industries permitted as SIUs that discharge to the Bayamón RWWTP and ten industries that discharge to the Puerto Nuevo RWWTP. Although PRASA did not categorize the sources of toxic pollutants according to industrial and nonindustrial types in the renewal application for each facility, as required by 40 CFR 125.66(b), EPA has concluded that the 2008 and 2009 annual pretreatment reports submitted to EPA are adequate to meet 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) modification from secondary treatment requirements that has known or suspected industrial sources of toxic pollutants must have an approved pretreatment program as described in 40 CFR Part 403. PRASA's Industrial Pretreatment Program was originally approved by the EPA on September 28, 1985, and its Enforcement Response Plan approved by the EPA on May 30, 1995 as part of this program. The program is implemented on an island-wide basis and includes the service areas of the Bayamón

and Puerto Nuevo RWWTPs. The Puerto Rico Rules and Regulations for the Supply of Water and Sewer Service were approved as part of the original program in 1985 and met the existing pretreatment requirements for legal authority at 40 CFR 403.8. On June 19, 2003, PRASA revised the Rules and Regulations in accordance with the 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 Bayamón and Puerto Nuevo RWWTPs, the EPA has concluded that the applicant has demonstrated that it has met the requirements of 40 CFR 125.66(c).

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. In the renewal applications, PRASA proposed the continuation of the "Aquamóvil" Education Program and the Fat, Oil and Grease (FOG) Program. Originally implemented in 1993, the "Aquamóvil" Education Program is an island-wide program designed to control toxic substances from nonindustrial sources through a mobile learning center that travels throughout the island providing literature, illustrations, and models of the wastewater treatment processes. During PRASA's Fiscal Year 2008 and 2009, PRASA conducted 414 education and public awareness activities at a variety of public and private schools, science and trade fairs, summer camps, and professional conventions. Information was provided on wastewater treatment processes and preventative measures for introducing toxics into the waste stream. In the FOG Program, PRASA focuses on educating commercial facilities across the island, such as food establishments that discharge specifically to the Bayamón and Puerto Nuevo RWWTPs, about the impact of FOG on wastewater infrastructure and treatment facilities. In 2006, PRASA developed a Best Manufacturing Program Manual for food service establishments to better control fats, oil and grease. During 2009, PRASA inspected 1,653 food service establishments in several municipalities that are served by both the Bayamón and Puerto Nuevo RWWTPs.

Based on review of PRASA's Nonindustrial Source Control Program, the EPA has concluded that PRASA has met the requirements of 40 CFR 125.66(d). EPA has proposed in the draft modified permit for each facility that PRASA be required to implement its Nonindustrial Source Control Program and modify the program, as necessary, within 18 months of the effective date of the permits.

8. Increase in effluent volume or amount of pollutants discharged [section 301(h)(8), 40 CFR 125.67]

Under 40 CFR 125.67, which implements section 301(h)(8) of the Act, the 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. PRASA has requested an increase in permitted effluent flow limitations for the Bayamón and Puerto Nuevo RWWTPs to accommodate changes in the service areas, and a reduction in concentration-based BOD_5 and TSS effluent limitations to reflect existing permitted loadings. Existing and proposed

effluent limitations are provided in Table 9. As part of their renewal application, PRASA has predicted that the increased flows will not result in treatment levels less than currently achieved throughout the design life of each facility. Through 2027, monthly average effluent volume and mass loadings of BOD_5 and TSS are predicted to be generally below monthly average effluent limitations proposed in the draft permits.

For the Bayamón RWWTP, PRASA projected a 1.2 to 3.9 percent increase in the effluent flow each year over the next 17 years resulting in flows that may range between 37 and 52 MGD. Mass loadings of BOD_5 are projected to increase from 14,038 kg/day in 2010 to 20,023 kg/day in 2027. Monthly average mass loadings for TSS were also predicted to increase over time from 8,142 kg/day in 2010 to 11,613 kg/day in 2027. For the Puerto Nuevo RWWTP, PRASA estimates that actual annual effluent flows will gradually increase over the 17 year period from 70 MGD to 80 MGD. BOD_5 loadings are projected to gradually increase up to approximately one percent per year from 30,893 kg/day in 2010 to 35,441 kg/day in 2027. TSS loadings are projected to generally increase from less than a percent each year to just over one percent. TSS loadings are predicted to range between 17,956 and 20,597 kg/day over the 17 year period.

However, PRASA has identified that the Puerto Nuevo RWWTP's collection system consists of both separate and combined sewer systems. Unlike the Bayamón RWWTP that only consists of a separate sewer system, Puerto Nuevo RWWTP's Santurce CSS conveys storm water in addition to sanitary domestic, commercial, and industrial wastewater through a single pipe to the treatment facility. During wet weather events, the Santurce CSS may substantially increase effluent volume and the amount of BOD_5 and TSS going to the treatment facility. In EPA's 2007 Decision Document, CSOs were not addressed since Puerto Nuevo RWWTP's collection system at the time was being assessed for the presence of a combined sewer system. Since then, EPA has confirmed the existence of a CSS and, in 2008, issued an enforcement order (Administrative Order CWA-02-2008-3155) to PRASA to address CSOs discharging to the Martin Peña Channel, San Juan Bay, and Atlantic Ocean that were attributed to the Santurce CSS. Currently, EPA is working with PRASA to identify locations, flow quantities, and frequency of overflows, and to comply with the enforcement order and the EPA's 1994 CSO Control Policy that includes a prohibition of overflows during dry weather. The EPA has proposed in the draft permit for the Puerto Nuevo RWWTP that PRASA develop and implement the nine minimum controls identified in the 1994 CSO Control Policy and a Long Term Control Plan to minimize the discharge of pollutants attributed to the Santurce CSS.

The increase in effluent volume along with a reduction in BOD_5 and TSS effluent limitations are predicted to result in mass loadings similar to those currently permitted. The EPA believes that PRASA has demonstrated that there will be no substantially increased discharges of BOD_5 and TSS from Bayamón and Puerto Nuevo RWWTPs above the volume of discharge specified in the draft modified permits in accordance with 40 CFR 125.67.

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 BOD_5 and TSS 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 monitoring data collected between 2007 and 2010, monthly average removal rates for BOD_5 and TSS at each facility were generally above the primary treatment requirement of 30 percent removal. For the Bayamón RWWTP, monthly average removal rates for BOD_5 ranged between 21 and 72 percent with only two (October 2008 and February 2009) of the 48 months falling below the 30 percent removal requirement. TSS removal rates were significantly greater than the 30 percent removal requirement and ranged between 77 and 93 percent. For the Puerto Nuevo RWWTP, monthly average removal rates for BOD_5 ranged between 25 and 65 percent with two months (December 2007 and May 2008) observed to have monthly average removal rates less than the 30 percent removal requirement. For TSS, removal rates ranged between 62 and 94 percent.

EPA also reviewed facility compliance with concentration and mass-based effluent limitations in the existing modified permits and evaluated whether each facility would be able to meet limitations for BOD_5 and TSS during the next permit term based on revised flow conditions. Existing permit limitations and proposed limitations are described in Table 9. For both facilities, levels of BOD_5 and TSS were below existing effluent limitations and are generally predicted to meet proposed effluent limitations over the next permit term. For the Bayamón RWWTP, monthly average concentrations and mass loadings of BOD_5 ranged between 64 and 112 mg/l, and 8,330 and 16,518 kg/day, respectively, with weekly average mass loadings of BOD_5 reported between 10,506 and 20,776 kg/day. Similarly, monthly average TSS concentrations and mass loadings were below permit limits and ranged between 29 and 53 mg/l, and 1,977 and 7,278 kg/day, respectively. For Puerto Nuevo RWWTP, monthly average concentrations of BOD_5 ranged between 57 and 92 mg/l and mass BOD_5 loadings ranged between 14,766 and 20,275 kg/day. Weekly average mass loadings of BOD_5 ranged between 19,879 and 30,500 kg/day. Monthly average TSS concentrations and loadings ranging between 42 and 66 mg/l, and 6,093 and 11,683 kg/day, with weekly average loadings reported between 9,020 and 22,717 kg/day.

Based on available data, the EPA has concluded that the Bayamón and Puerto Nuevo RWWTPs can consistently achieve at least primary or equivalent treatment with 30 percent removal of BOD_5 and TSS in the influent. Moreover, each facility has demonstrated that it is able to achieve greater percent removal for TSS, as required by the existing modified permits. In accordance with 40 CFR 125.60, the EPA proposes in the draft modified permits effluent limitations of 30 percent removal of BOD_5 and 60 percent removal of TSS from the influent of the Bayamón and Puerto Nuevo RRWTPs, in addition to other effluent limitations described in Table 9. The proposed percent removal limitations 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.

Table 9 - Current and Proposed Effluent Flows and Effluent Limitations for the Bayamón and Puerto Nuevo RWWTPs

Parameter	Bayamón RWWTP		Puerto Nuevo RWWTP	
	Existing	Proposed	Existing	Proposed
Daily Max. Flow, MGD	68	88	144	144
Avg. Monthly Flow, MGD	40	52	72	80
BOD_5 Avg. Monthly				
Percent Removal, %	30	30	30	30
Concentration, mg/l.	130	100	130	117
Loading , kg/day	19,668	19,703	35,465	35,465
BOD_5 Avg. Weekly Loading	33,436	33,343	70,930	63,837
TSS Avg. Monthly				
Percent Removal, %	60	60	60	60
Concentration, mg/l	75	75	75	75
Loading, kg/day	11,637	14,777	20,460	22,734
TSS Avg. Weekly Loading	19,783	19,339	40,920	37,102

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 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. PRASA has indicated that the joint outfall is located in a coastal area managed by the Commonwealth's Coastal Zone Management Program. On January 18, 2011, the Puerto Rico Planning Board issued a consistency certification for each of the modified discharges certification.

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 section 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. PRASA has

indicated that the joint outfall is not located in a marine or estuarine sanctuary designated under Title III of the MPRSA. On March 17, 1989, the National Oceanic and Atmospheric Administration (NOAA) determined that the joint outfall is not located in a marine or estuarine sanctuary designated under Title III of the MPRSA. Since then, the location of the outfall has not changed nor has there been a marine or estuarine sanctuary designated under Title III of the MPRSA in the area of the joint outfall. As a result, EPA has determined that the 1989 letter from NOAA is sufficient for the applicant to meet the requirements of 40 CFR l25.59(b)(3).

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 renewal applications, PRASA indicated that there are threatened or endangered species that may occur in the vicinity of the Bacardi WWTP/Bayamón RWWTP/Puerto Nuevo RWWTP joint outfall. According to the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS), the threatened or endangered species that may occur in the coastal waters of Puerto Rico are listed in Table 10. On October 8 and 25, 2010, the NMFS and USFWS, respectively provided concurrence that the modified discharge from each facility will comply with the ESA.

Table 10 - List of Threatened or Endangered Species in the vicinity of the Bacardi WWTP/Bayamón RWWTP/Puerto Nuevo RWWTP joint outfall

Finback Whale (*Balaenoptera physalus*)	Leatherback Turtle (*Demochelys coriacea*)
Humpback Whale (*Megaptera novaeangliae*)	Loggerhead Turtle (*Caretta caretta*)
Sperm Whale (*Physeter catodon*)	Olive Ridley Turtle (*Lepidochelys olivacea*)
Green Turtle (*Chelonia mydas*)	Hawksbill Turtle (*Eretmochelys imbricate*)

Other Federal, Commonwealth, and Local Laws and Executive Orders

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 Bayamón and Puerto Nuevo RWWTPs will not result in adverse impact to any EFH or species included in Caribbean or Federal Fisheries Management Plans. On August 17, 2010, NMFS issued a letter to EPA indicating that EFH consultation under the General Concurrence procedures of 50 CFR 600.920(g) is not required for issuance of a modified permit.

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 no coral growth in the vicinity of the joint outfall. EPA has determined that modified discharges from the Bayamón RWWTP and Puerto Nuevo RWWTP are consistent with 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 the final modified permits for the Bayamón RWWTP and Puerto Nuevo 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 and 124.54 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 the EPA may issue a modified permit.

On March 23, 2010, PRASA requested a determination from EQB that the modified discharges from the Bayamón RWWTP and Puerto Nuevo RWWTP, combined with the discharge from the Bacardi WWTP, will comply with all applicable provisions of Commonwealth law. On June 3, 2010, EQB issued Final WQCs for the Bayamón and Puerto Nuevo RWWTPs that certify that the modified discharges 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.

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APPENDIX

Evaluation of Acute and Chronic Whole Effluent Toxicity Data

Table A1 - Comparison of acute WET results (LC_{50}, TUa) and acute WLA of 30.6 TUa for the combined Bayamón RWWTP/Puerto Nuevo RWWTP/Bacardi WWTP discharge. Acute testing was no longer required for the combined discharge beginning in 2010

Test Date	Test Organism	LC_{50} (% Effluent)	Effluent TUa	Is Effluent TUa > 30.6 TUa
April 2007	Mysid Shrimp	55.90	1.79	No
	Mysid Shrimp	56.20	1.78	No
	Sheepshead Minnow	56.70	1.76	No
May 2007	Mysid Shrimp	53.60	1.87	No
	Mysid Shrimp	38.60	2.59	No
	Mysid Shrimp	43.3	2.31	No
	Sheepshead Minnow	53.30	1.88	No
	Sheepshead Minnow	57.00	1.75	No
	Sheepshead Minnow	67.8	1.47	No
September 2008	Mysid Shrimp	36.80	2.71	No
	Sheepshead Minnow	35.40	2.82	No
November 2009	Mysid Shrimp	24.9	4.02	No
	Sheepshead Minnow	78.1	1.28	No

Table A2 - Comparison of chronic WET results (NOEC, TUc) and chronic WLA (TUa) for effluent from the Bayamón RWWTP, Puerto Nuevo RWWTP, and Bacardi WWTP

Test Date	Test Organism	NOEC (% Effluent)	Effluent TUc[1]	Is Effluent TUc > 102 TUc?
Combined Bayamón RWWTP/Puerto Nuevo RWWTP/Bacardi WWTP Effluent				
April 2007	Mysid Shrimp	10.70	9.35	No
	Sheepshead Minnow	10.70	9.35	No
	Sea Urchin	0.29	344	Yes
	Sea Urchin	<0.09	>1,111	Yes
	Sea Urchin	<0.09	>1,111	Yes
May 2007	Mysid Shrimp	10.70	9.35	No
	Mysid Shrimp	10.70	9.35	No
	Sheepshead Minnow	10.70	9.35	No
	Sheepshead Minnow	10.70	9.35	No
	Sheepshead Minnow	10.70	9.35	No
	Sea Urchin	0.09	1,111	Yes
	Sea Urchin	0.96	104.17	Yes
	Sea Urchin	0.032	3,125	Yes
	Sea Urchin	0.09	1,111	Yes
	Sea Urchin	0.96	104.67	Yes
	Sea Urchin	0.29	344.83	Yes
	Sea Urchin	3.2	31.25	No
September 2008	Mysid Shrimp	8.00	12.5	No
	Sheepshead Minnow	16.00	6.25	No
	Sea Urchin	0.96	104.17	Yes
December 2008	Sea Urchin	3.20	31.25	No
February 2009	Sea Urchin	9.00	11.11	No
June 2009	Sea Urchin	3.00	33.33	No
August 2009	Sea Urchin	1.0	100	No
November 2009	Mysid Shrimp	16.0	6.25	No
	Sheepshead Minnow	16.0	6.25	No
	Sea Urchin	3.0	33.3	No
March 2010	Sea Urchin	3.0	33.3	No
May 2010	Sea Urchin	9.0	11.11	No
March 2011	Sea Urchin	9.0	11.11	No
Bayamón WWTP Effluent				
August 2009	Sea Urchin	2.7	37	No
November 2009	Sea Urchin	2.7	37	No
March 2010	Sea Urchin	2.7	37	No
May 2010	Sea Urchin	8.1	12.3	No
March 2011	Sea Urchin	2.7	37	No
Puerto Nuevo RWWTP Effluent				
August 2009	Sea Urchin	5.4	18	No
November 2009	Sea Urchin	5.4	18.5	No
March 2010	Sea Urchin	5.4	18.5	No
May 2010	Sea Urchin	<0.054	>1,851.8	Yes
March 2011	Sea Urchin	5.4	18.5	No
Bacardi WWTP Effluent				
August 2009	Sea Urchin	0.81	123	Yes
November 2009	Sea Urchin	0.27	370	Yes
March 2010	Sea Urchin	0.27	370	Yes
May 2010	Sea Urchin	<0.003	>33,333	Yes
March 2011	Sea Urchin	0.27	370	Yes

[1]Rule 1301.1 of PRWQS provides that chronic toxic units be calculated in terms of the NOEC expressed as a percent of effluent in dilution water.

Table A3 - Comparison of chronic WET results based on the IC_{25} and permit limitation of 100 TUc for effluent from the Bayamón RWWTP/Puerto Nuevo RWWTP/Bacardi WWTP

Test Date	Test Organism	IC_{25} (% Effluent)	Effluent Toxicity Value[1]	Is Effluent Toxicity Value > 100 TUc?
Combined Bayamón RWWTP/Puerto Nuevo RWWTP/Bacardi WWTP Effluent				
April 2007	Sea Urchin	3.09	32.36	No
	Sea Urchin	2.12	47.17	No
	Sea Urchin	4.47	22.37	No
May 2007	Sea Urchin	4.92	20.33	No
	Sea Urchin	14.80	6.76	No
	Sea Urchin	14.40	7.14	No
	Sea Urchin	4.88	20.49	No
	Sea Urchin	3.01	33.22	No
	Sea Urchin	5.23	19.12	No
	Sea Urchin	5.91	16.92	No
September 2008	Mysid Shrimp	13.5	7.41	No
	Sheepshead Minnow	>16.0	<6.25	No
	Sea Urchin	4.15	24.10	No
December 2008	Sea Urchin	5.57	17.95	No
February 2009	Sea Urchin	13.50	7.41	No
June 2009	Sea Urchin	9.51	10.51	No
August 2009	Sea Urchin	4.34	23	No
November 2009	Mysid Shrimp	14.5	6.90	No
	Sheepshead Minnow	>16.0	<6.25	No
	Sea Urchin	4.31	23.2	No
March 2010	Sea Urchin	4.68	21.37	No
May 2010	Sea Urchin	13.96	7.16	No
March 2011	Sea Urchin	13.9	7.19	No
Bayamón WWTP Effluent				
August 2009	Sea Urchin	5.12	19.5	No
November 2009	Sea Urchin	4.53	22.1	No
March 2010	Sea Urchin	3.79	26.39	No
May 2010	Sea Urchin	10.52	9.52	No
March 2011	Sea Urchin	9.35	10.7	No
Puerto Nuevo RWWTP Effluent				
August 2009	Sea Urchin	8.58	11.7	No
November 2009	Sea Urchin	8.84	11.3	No
March 2010	Sea Urchin	7.96	12.56	No
May 2010	Sea Urchin	17.77	5.62	No
March 2011	Sea Urchin	12.6	7.94	No
Bacardi WWTP Effluent				
August 2009	Sea Urchin	>2.43	<41	No
November 2009	Sea Urchin	0.41	244	Yes
March 2010	Sea Urchin	0.35	285.71	Yes
May 2010	Sea Urchin	0.91	110	Yes
March 2011	Sea Urchin	0.415	241	Yes

[1]Effluent toxicity values are calculated based on the reciprocal of the IC_{25} expressed in terms of the percent of the effluent in the dilution water, where the effluent toxicity value = $100 \div IC_{25}$.