ANALYSIS OF THE SECTION 301(h) MODIFICATION OF SECONDARY TREATMENT 2012 RENEWAL APPLICATION FOR THE AGUADILLA REGIONAL WASTEWATER TREATMENT PLANT NPDES PERMIT NO. PR0023736

U.S. Environmental Protection Agency, Region 2
Clean Water Division

Clean Water Regulatory Branch

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I. INTRODUCTION

The Puerto Rico Aqueduct and Sewer Authority (PRASA) has requested a renewal of its modification under Clean Water Act (CWA) section 301(h), 33 U.S.C. 1311(h), from the secondary treatment requirements contained in CWA section 301(b)(1)(B), 33 U.S.C. 1311(b)(1)(B) for the Aguadilla Regional Wastewater Treatment Plant (RWWTP), a publicly owned treatment works (POTW) located on the island of Puerto Rico. [National Pollutant Discharge Elimination System (NPDES) Permit No. PR0023736] The facility is owned and operated by PRASA.

PRASA is seeking a section 301(h) modification to discharge wastewater receiving less-than-secondary treatment from the Aguadilla RWWTP to the Atlantic Ocean. Secondary treatment is defined in federal regulations at Title 40 of the Code of Federal Regulations (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. The original application for a section 301(h) modification of secondary treatment requirements at the Aguadilla RWWTP was submitted to the U.S. Environmental Protection Agency (EPA) in 1979 and was denied by EPA in 1986 for failure to meet Puerto Rico mixing zone standards as determined by the Puerto Rico Environmental Quality Board (EQB). In 1987, PRASA re-applied for a section 301(h) modification of secondary treatment requirements, and in 1988, EPA tentatively approved PRASA's application for a section 301(h) modified permit (hereinafter a modified permit) for the Aguadilla RWWTP based, in part, on the approval and implementation of a pretreatment program, compliance with primary or equivalent treatment requirements, compliance with all applicable EPA and Puerto Rico Water Quality Standards, compliance with the Endangered Species Act, and development of a waiver monitoring program and non-industrial source control program. In 2000, EPA re-evaluated the 1988 tentative decision and issued a final decision to approve PRASA's application for a modification from the secondary treatment requirements. Subsequently, EPA issued a modified permit to PRASA in 2003 for the Aguadilla RWWTP that became effective on April 1, 2003, and expired on March 31, 2013. The terms and conditions of the modified permit have been administratively extended until issuance of a new permit.

In 2007, PRASA submitted an application for renewal of its modified permit for the Aguadilla RWWTP. PRASA requested a modification of secondary treatment requirements for the Aguadilla RWWTP based on an improved discharge (i.e., chemically-enhanced or "advanced" primary treatment) within the meaning of 40 CFR 125.58(c) and (i), and has requested the same effluent limits for flow, BOD_5 and TSS that are established in the existing modified permit. In 2012, PRASA submitted an updated application that modified dilution estimates and the mixing zone size based on more recent receiving water data and modeling. The new mixing zone, while similar to the sizes presented in the 1999 and 2008 mixing zone applications, is somewhat wider but shorter length with revised dimensions of 30.03 m in mixing zone length (L_{MZ}), 125.9 m total length each leg (TL), and 60.7 total width (TW). This document presents EPA's findings, conclusions, and recommendations as to whether the modified discharge will comply with the criteria set forth in section 301(h) of the CWA, 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).

II. DECISION CRITERIA

Under CWA section 301(b)(1)(B), POTWs in existence on July 1, 1977, were required to meet a minimum level of effluent quality attainable by secondary treatment in terms of TSS, BOD_5, and pH. The minimum level was promulgated as a national uniform effluent standard and is established as technology-based effluent limitations in permits for POTWs issued under CWA section 402. POTWs were required to comply with these limitations, in most circumstances, by July 1, 1977.

Congress subsequently amended the CWA, adding section 301(h), which authorized the EPA Administrator, with State[1] concurrence, to issue permits which modify the secondary treatment requirements of the CWA. [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 [CWA section 402] which modifies the requirements of subsection (b)(1)(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:
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> (1) there is an applicable water quality standard specific to the pollutant for which the modification is requested, which has been identified under [section 304(a)(6) of the CWA];
>
> (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;
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> (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;
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> (4) such modified requirements will not result in any additional requirements on any other point or nonpoint source;
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> (5) all applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced;
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> (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;
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> (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;
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> (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

[1] CWA section 502(3) defines "State" to include the Commonwealth of Puerto Rico. 33 U.S.C. 1362(3).

> [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 CWA sections 301(h)(2) and 101(a)(2). 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 modification from secondary treatment requirements 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 125, Subpart G. These regulations provide that a modified permit may not be issued in violation of 40 CFR 125.59(b), which requires, among other things, compliance with provisions of the Coastal Zone Management Act (16 U.S.C. 1451 *et seq*.), the Endangered Species Act (16 U.S.C. 1531 *et seq*.), Title III of the Marine Protection, Research and Sanctuaries Act (16 U.S.C. 1431 *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, the decision to grant or deny a section 301(h) modification shall be made by the Administrator and shall be based on whether PRASA has demonstrated it has met all the requirements of 40 CFR 125.59 through 125.68. EPA has reviewed all data submitted by PRASA in the context of applicable statutory and regulatory criteria and presents its findings and conclusions herein. This document includes review of effluent and receiving water monitoring data collected since issuance of the 2002 modified permit in addition to other relevant information to evaluate the potential impact of the modified discharge on water quality and the marine environment and to support re-issuance of the existing permit.

III. DESCRIPTION OF THE FACILITY

The Aguadilla RWWTP is located on the western coast of the island of Puerto Rico in the town of Aguadilla and provides wastewater treatment services to the municipalities of Aguadilla, Aguada, Moca, and Rincón. The Aguadilla RWWTP first began operations in 1986 and is designed to provide advanced primary treatment of wastewater through screening, grit removal, sedimentation, chlorination, and sludge dewatering. The plant disinfects effluent with chlorine before discharging it into the Atlantic Ocean. Aguadilla RWWTP sludge is dewatered and disposed of in an approved landfill. The facility is designed for an average monthly flow of 8 million gallons per day (MGD) and a design maximum daily flow of 16 MGD. Based on flow-monitoring data from 2000 to 2013, the facility routinely operates below these flows, with actual maximum daily flows ranging between 3.46 MGD (March 2004) and 10,976 MGD (December 2007) and actual average monthly flows ranging between

3.02 MGD (March 2004) and 5,831 MGD (September 2007). The facility discharges advanced primary-treated wastewater into the Atlantic Ocean into Class SC receiving waters through an outfall/diffuser system.

IV. DESCRIPTION OF THE RECEIVING WATER

The receiving water in the vicinity of the discharge is classified as a Class SC water. Class SC waters are defined in Rule 1302.1 of PRWQS as coastal waters beyond Class SB waters to a maximum distance of 16.6 km. Class SB waters are considered the boundary subject to the ebb and flow of tides (mean sea level) to 500 m seaward. The Commonwealth of Puerto Rico has adopted water quality standards for Class SB and SC waters to protect the designated uses of these waters, which include primary and secondary contact recreation and the propagation and preservation of desirable species, including threatened and endangered species. Because the Aguadilla RWWTP outfall is located near the boundary of Class SB and SC waters, the modified discharge can affect both water classifications. For the purpose of the section 301(h) evaluation, EPA has assessed attainment of water quality standards for both Class SB and SC waters to ensure that the modified discharge from the Aguadilla RWWTP does not impact designated uses in either area.

Since 1999, PRASA has conducted ambient monitoring as part of a section 301(h) receiving water monitoring program in accordance with section 301(h) requirements. Based on receiving water monitoring, PRASA has determined that there is little seasonal variation in the water column with respect to temperature and salinity. Density profiles taken near the outfall 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. Annual ambient water temperatures are shown to range between 26 and 29 degrees Celsius (ºC), with only minor seasonal and spatial differences such that temperatures are typically lower in the deeper part of the water column and the variability is higher in the surface layer, as expected. Measurements of salinity in the receiving waters in the vicinity of the discharge from 1999 through 2011 show a range of 35 practical salinity units (PSU) to 36 PSU. The seasonal variations are small and indistinct. Annual temperature and salinity data indicate that surface-to-bottom differences of these parameters are small, and spatial differences are insignificant. Local winds do not significantly affect the general hydrological flow patterns near the outfall, although they may influence surface currents. In the renewal application, PRASA indicated that principal tidal currents are aligned southwest-northeast, which is parallel to the shoreline. The overall circulation pattern is a consequence of the North Equatorial Current along the north coast of Puerto Rico, the Caribbean Current along the south coast, and the tidal and wind-driven exchanges through the Mona Passage on the west coast. Current speed averages 11.88 cm/sec as presented in 301(h) monitoring studies and MZVS sampling events and vary with depth. Tides in the vicinity of the Aguadilla RWWTP outfall are semi-diurnal, with an overall mean tide of 0.8 feet (0.24 meters) and a maximum spring tide range of 2.0 feet (0.61 meters).

As part of its section 301(h) receiving water monitoring program, PRASA also conducts coral reef monitoring. Two coral community monitoring stations, one located to the northeast (Station AGS2) and one to southwest (Station Alt. AGS3) of the Aguadilla outfall, were surveyed during the 2007 – 2011 study period. Station AGS2 was established on hard-ground reef habitat, approximately 3,050 feet (930 meters) northeast of the outfall (ZID Station A6), at a depth of 50 feet (15.2 meters). Station Alt. AGS3 was established on reef habitat approximately 3,228 feet (984 meters) southwest of the outfall, at a depth of 36 feet (11 meters). Coral communities in the study area are representative of both the typical hard-ground reef habitat common on many sections along the north coast of Puerto Rico (for example, Station Alt. AGS2) and the sparse and relatively small patch coral reef systems that have developed on top of rocky promontories (for example, Station Alt. AGS3) in this type of depositional environment. Total coral density and stony/hydrocoral species diversity indices are very low at Station AGS2, confirming that coral reefs are poorly developed in that area. Total coral density and stony/hydrocoral species diversity indices are moderately higher at Station AGS3 compared to Station AGS2.

1. Initial Dilution

At the time a section 301(h) modification becomes effective, 40 CFR 125.62 requires that the Aguadilla RWWTP'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. 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. 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. [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 EQB, an interim authorization for a mixing zone is granted based on the applicant'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.

In 2008, PRASA submitted a mixing zone application requesting a water quality certificate (WQC) and an interim mixing zone from the EQB. In 2012, PRASA submitted a revised request based on new information from dilution modeling. On March 6, 2015 the EQB issued a WQC for the Aguadilla RWWTP that included an authorization of an interim mixing zone. In general, the mixing zone is considered a ZID that is geometrically sized to include the seafloor and the water column above it. For the next permit term, PRASA has proposed new mixing zone boundaries from the existing mixing zone considered in EPA's 2000 approval of a modified permit due to the use of more recent density profile, current speed information, and new diffuser configuration. Therefore, the new mixing zone is slightly wider and shorter than the mixing zone authorized in the existing permit. PRASA has determined the size of the new mixing zone through dilution modeling to be a "V"-shaped area approximately 122 m long and 61 m wide surrounding the diffuser. PRASA also determined that the current mixing zone would provide a Critical Initial Dilution (CID) of 191:1 based on the diffuser design that is based on a maximum daily design flow of 33.5 MGD through the outfall and a modified diffuser configuration from 30 to 20 of the total 58 ports open to prevent seawater intrusion.[2]

2. Receiving Water Monitoring

Since 1999, PRASA has been conducting monitoring of the receiving water in the vicinity of the ZID. The existing permit requires PRASA to conduct section 301(h) Waiver Demonstration Studies at seven receiving water monitoring stations, presented in Exhibit 1, which include locations within the ZID (A6), at the boundary of the ZID (A1 and A2), beyond the ZID (farfield stations A3 and A4), and at a reference sites (A5 and A7). PRASA has also been required to conduct coral community monitoring surveys at two stations, AGS2 and AGS3, located both northeast (Station AGS2) and southwest (Station Alt. AGS3) of the Aguadilla outfall. Through the beginning of 2011, PRASA has conducted a total of 28 monitoring events under the 301(h) program.

[2] EPA's 2003 approval of PRASA's application for renewal of its modified permit for the Aguadilla RWWTP was based on a CID of 151:1.

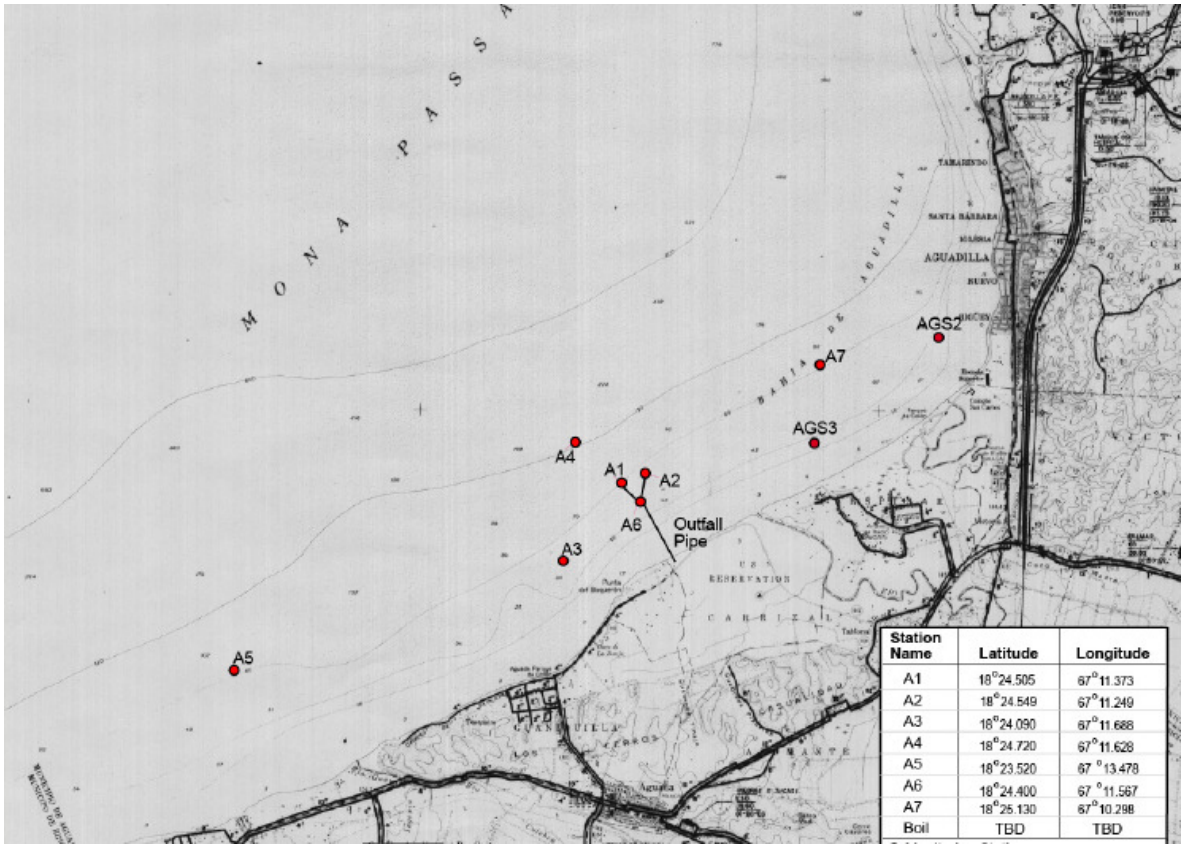

Exhibit 1. Location of Aguadilla Monitoring Stations

V. COMPLIANCE WITH STATUTORY AND REGULATORY CRITERIA

1. Attainment of water quality standards related to BOD_5 and TSS

Under 40 CFR 125.61, which implements section 301(h)(1), water quality standards must be applicable to the pollutants for which the modification is requested, and PRASA must demonstrate that the modified discharge will comply with these standards. PRASA has requested modified secondary treatment requirements for BOD_5, which affects dissolved oxygen (DO) and TSS and also influences the color and turbidity of the receiving water. The PRWQS include water quality criteria for DO, color and turbidity. As a result, EPA has evaluated receiving water data from PRASA's *301(h) Waiver Demonstration Studies* documents (2003 – 2013), effluent monitoring data (2004 – 2012) and other information to assess the impact of the modified discharge on the attainment of other water quality standards related to BOD_5 and TSS. A summary of the evaluation is provided below. Detailed information is provided in PRASA's 2012 *Renewal Application for 301(h) Waiver for the Aguadilla RWWTP* (CH2M HILL 2012b), PRASA's 2012 technical memorandum *Review of Potential Effluent Parameters of Concern: Aguadilla RWWTP* (CH2M HILL 2012c), PRASA's 2012 *Revised Application for a Water Quality Certificate and Definition of a Mixing Zone for the Aguadilla Regional Wastewater Treatment Plant Outfall System* (CH2M HILL 2012d), PRASA's 2012 *Supplemental 301(h) Waiver Application Information* (CH2M HILL 2012e), and EPA's *Aguadilla 301(h) Regional Wastewater Treatment Plant NPDES Permit PR0023736* (USEPA 2003).

a. Dissolved Oxygen

The effluent discharge affects DO in both the nearshore and farfield as effluent mixes with the receiving water and the oxygen demand of the effluent BOD load is exerted. 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. This horizontal flow 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. Pursuant to 40 CFR 125.61(b)(1) and 125.62(a)(1), PRASA must demonstrate that the modified discharge will comply with water quality criteria for DO and that the outfall and diffuser for the Aguadilla RWWTP are located and designed to provide adequate initial dilution, dispersion, and transport of wastewater such that the discharge does not exceed criteria at or 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." Rule 1303.2(C) of PRWQS provides that the DO concentration in Class SC waters, "shall not contain less than 4 mg/l except when natural conditions cause this value to be depressed."

Considering DO depression from all sources, PRASA predicted negligible effects on DO levels in the receiving water. Exhibit 2 provides the DO depression levels that were calculated at four locations and then totaled to provide the cumulative depression from all sources.

Exhibit 2. Potential DO Demand from All Sources – Aguadilla RWWTP

DO depression following initial dilution	-0.057 mg/l
Maximum DO depression in the farfield	-0.005 mg/l
Maximum DO depression due to sediment oxygen demand (critical 90-day conditions)	-0.005 mg/l
Maximum DO depression due to sediment re-suspension (critical 90-day conditions)	-0.016 mg/l
Cumulative potential DO depression	-0.083 mg/l

Upon initial dilution, PRASA predicted a DO depression of 0.057 mg/l in the water column with a final DO concentration of 5.77 mg/l based on the following: an effluent DO concentration of 0.00 mg/l, ambient DO concentration of 5.83 mg/l, immediate DO demand value of 5.00 mg/l, and CID of 191:1. Following initial dilution, PRASA predicted additional DO depression due to BOD exertion based on the current BOD_5 limitation of 106 mg/l, ambient DO concentration of 5.83 mg/l, and a final DO concentration of 5.77 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 and resulted in a DO depression of 0.005 mg/l. Because the deposition and re-suspension of particles from the wastewater discharge can impact concentrations of DO near the seafloor, PRASA calculated additional DO depression values of 0.005 mg/l and 0.016 mg/l due to sediment oxygen demand and sediment re-suspension, respectively. Considering the DO demand from initial dilution to sediment re-suspension, the cumulative potential DO depression is predicted to be 0.083 mg/l, with a final predicted DO concentration of 5.413 mg/l. This is above the water quality criteria for DO and generally consistent with findings from receiving water data. While DO levels in the effluent were generally reported low, below the 4 mg/l DO criterion, DO levels in the receiving water were consistently above the water quality criteria for Class SC waters at all stations, including the ZID and edge-of-ZID stations. Average DO concentrations ranged from 4.85 to 7.33 mg/l for all six stations combined. DO levels also generally met the DO criterion for Class SB waters. Therefore, the modified discharge is not anticipated to adversely impact DO concentrations in the receiving water during the next permit term.

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. Significant changes in color can adversely affect aquatic life by reducing light penetration, thereby limiting photosynthesis by phytoplankton and aquatic plants. In the WQC for the existing permit, the EQB determined a maximum daily effluent limitation of 48 on the Platinum-Cobalt Scale (Pt-Co) was necessary to ensure that narrative water quality criterion for color was met.

Review of effluent levels of color were consistently below 48 Pt-Co, with four exceedances occurring in January 2000, April 2004, June 2006, and June 2008. Receiving water monitoring data also showed levels below the

48 Pt-Co criterion with results reported consistently at or below the detection limit of 5 Pt-Co for all monitoring stations. Detected levels of 5-25 Pt-Co were observed at most receiving water monitoring stations on 10/13/1999, 10/14/1999, 11/17/2005, 11/18/2005, 3/7/2006, and 3/8/2006; however, as stated above, the reported results remained below applicable water quality criteria. Color did not appear to vary between the reference stations and other stations. Therefore, the modified discharge is not anticipated to adversely affect color levels in the receiving water during the next permit term.

c. Turbidity

Suspended solids in the effluent can result in a significant loading of particles to the water column and their subsequent deposition onto the seafloor in the vicinity of the modified discharge. Suspended solids 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, PRASA must demonstrate that the modified discharge from the Aguadilla RWWTP will comply with water quality standards for suspended solids, which may include criteria for turbidity, light transmission, light scattering, or maintenance of the euphotic zone. In addition, PRASA 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 Class SC waters shall not exceed 10 nephelometric turbidity units (NTUs), except by natural causes. In the WQC for the existing permit, the EQB determined a maximum daily effluent limitation of 84 NTU at the Aguadilla outfall and a maximum daily effluent limitation of 10 NTU at the edge of the interim mixing zone was necessary to ensure that applicable water quality criteria for turbidity was met.

Review of receiving water monitoring data indicates that the level of turbidity at all stations frequently met the water quality criterion of 10 NTU, with levels generally below 1.0 NTU. However, eight exceedances occurred in October 1999, October 2000, November 2000, January 2002, and October 2002, at stations near the ZID as well as farfield station A3, in samples taken at depths of approximately 90 feet. It should be noted that other results taken at 10-foot and 50-foot depths from the stations in question showed turbidity levels well below applicable water quality criteria. Receiving water samples taken after October 2002 showed levels of turbidity at all stations consistently met applicable water quality criteria.

A review of the effluent data showed turbidity values were reported greater than the criterion with levels ranging between 1.3 NTUs (November 2002) and 230 NTUs (October 2000)[3]. With consideration of dilution, turbidity from the effluent is not anticipated to adversely affect turbidity in the receiving water during the next permit term and it predicted to meet the water quality criterion at the edge of the mixing zone.

2. Attainment of other water quality standards and impact of discharge on public water supplies; shellfish, fish and wildlife; and recreation

CWA Section 301(h)(2) provides that EPA may issue a permit which modifies the requirements of secondary treatment if PRASA 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

[3] DMR data contained in Appendix D.1 of the 2012 Mixing Zone Application describes the Turbidity data set's effluent monitoring location as being the IMZ, not the Aguadilla outfall. However, the limit listed at the bottom of the table provides the effluent limitation at Aguadilla outfall.

implements section 301(h)(2), the Aguadilla RWWTP'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.

Since 1999, PRASA has implemented a section 301(h) monitoring program for the Aguadilla RWWTP that consists of effluent and water quality monitoring; the assessment of benthic invertebrates and coral reefs; and analysis of toxic pollutants in sediment and fish tissue. Information from PRASA's 2012 *Renewal Application for 301(h) Waiver for the Aguadilla RRWTP* (USEPA 2012b), *Aguadilla RWWTP 301(h) Waiver Demonstration Studies* documents (2002 – 2013), NPDES effluent discharge monitoring report (DMR) data downloaded from EPA's Integrated Compliance Information System (ICIS) (August 2000 – December 2013) (USEPA 2014), NPDES effluent DMR data reported in PRASA's documentation (January 2004 – April 2012) (CH2M HILL 2012b, 2012d),301(h) effluent monitoring data (October 1999 – February 2011) (CH2M HILL 2012d), and other information associated with the Aguadilla RWWTP's modified permit has been evaluated to assess the impact of the modified discharge on the attainment of other water quality standards, including those for toxic pollutants and toxicity; and the impact on the protection and propagation of a BIP of shellfish, fish and wildlife; public water supplies and recreation. A complete description of the section 301(h) monitoring program is provided in PRASA's 2007 *Quality Assurance Project Plan and Sampling and Analysis Protocols for the Aguadilla RWWTP 301(h) Waiver Demonstration Studies* (CH2M HILL 2007).

a. Parameter-specific analysis

The existing modified permit requires PRASA to monitor the concentration of approximately 150 pollutants in effluent from the Aguadilla RWWTP and in the receiving water. EPA has assessed the potential for each pollutant to cause or contribute to an exceedance of PRWQS 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 assessment of the effluent concentration and background concentration in the receiving water.

Detection Limits

An evaluation of laboratory detection limits provided in PRASA's 1999 and 2007 *Quality Assurance Project Plan and Sampling and Analysis Protocols for the Aguadilla RWWTP 301(h) Waiver Demonstration Studies* (QAPP/SAP) to applicable water quality criteria values was performed. This detailed analysis is provided in a separate Excel file (refer to Attachment 1). Exhibits 3 and 4 provide lists of compounds for which the laboratory detection limits exceed the corresponding water quality criteria. It should be noted that it cannot be determined whether monitoring data for these compounds meet the corresponding water quality criteria due to this issue.

Exhibit 3. Compounds for Which QAPP/SAP Laboratory Detection Limits Exceed Corresponding EPA Water Quality Criteria

Aldrin	Beta-Endosulfan	Azinphos methyl (Guthion)	Hexachlorobenzene
Chlordane	Endrin	Aroclor-1242	Benzidine
4,4'-DDT	Heptachlor	Aroclor-1254	3,3-Dichlorobenzidene
4,4'-DDE	Heptachlor epoxide	Aroclor -1221	Acrylonitrile
4,4'-DDD	Toxaphene	Chlorpyrifos	1,2-Diphenylhydrazine
Dieldrin	Mirex	Dioxin	Pentachlorophenol
Acrolein	Dibenzo(a,h)anthracene		

Exhibit 4. Compounds for Which QAPP/SAP Laboratory Detection Limits Exceed Corresponding EQB Water Quality Standards

Aldrin	Heptachlor	Azinphos methyl (Guthion)	Hexachlorobenzene
Chlordane	Methoxychlor	Chlorpyrifos	Benzidine
DDT	Toxaphene	Coumaphos	3,3-Dichlorobenzidine
Dieldrin	Mirex	Dioxin	Perthane

Metals

To protect the beneficial uses of coastal waters, Rule 1303.1 of PRWQS provides the maximum allowable concentrations of metals in Class SB and SC waters. Effluent data reported by PRASA show that concentrations of copper, lead, mercury, nickel, silver, thallium, and zinc to be above Puerto Rico's water quality criteria; in addition, effluent data show concentrations of manganese to be above National Recommended Water Quality Criteria[4]. Review of metal concentrations in the receiving water at and beyond the ZID showed levels of copper, lead, mercury, nickel, and thallium above water quality criteria at some or all of the monitoring stations.

Conventional, Non-Conventional and Organic Pollutants

To protect the designated 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. After reviewing effluent data submitted to EPA as part of the Aguadilla RWWTP's NPDES monitoring program and 301(h) monitoring program, Exhibit 5 lists pollutants that were detected at or estimated to be in the effluent at concentrations exceeding applicable water quality criteria. In addition, Exhibit 6 lists pollutants that were not detected in the effluent but were reporting method detection limits exceeding applicable water quality criteria, and Exhibit 7 lists pollutants that were detected in the receiving water at concentrations exceeding water quality criteria.

Exhibit 5. Pollutants Detected at or Estimated in the Effluent to be at Concentrations Exceeding Applicable Water Quality Criteria—NPDES and 301(h) Monitoring programs

Cyanide (as free CN)	alpha-BHC[5]	Dieldrin	Azinphos, methyl (Guthion)[5]
Nitrogen (NO_2, NO_3, NH_3)	Chlordane (alpha and gamma isomers)	Endrin	Chlorpyrifos
Sulfide[6]	4,4'-DDT	Heptachlor	Coumaphos
Surfactants (as methylene blue actives substances)	4,4'-DDE	Heptachlor epoxide	Malathion
Aldrin	4,4'-DDD	Lindane (gamma-BHC)[5]	Benzidine

[4] The DMR results reported by PRASA purportedly measured the following pollutants at the edge of the interim mixing zone: arsenic, lead, manganese, mercury, nickel, silver, and zinc (CH2M HILL 2012b, 2012d). On the other hand, similar DMR data retrieved from ICIS considered these data points to be measured at Outfall 001's "Effluent Gross" monitoring location (USEPA 2014). It would be useful to know whether these pollutants are being sampled at the end of the pipe or at the edge of the interim mixing zone.

[5] Maximum detected value is an outlier greater than 3 standard deviations from the mean (CH2M HILL 2012c).

[6] PRASA's 2012 technical memorandum, *Review of Potential Effluent Parameters of Concern: Aguadilla RWWTP,* does not specify whether sulfide was measured as Total Sulfide or as Undissociated H_2S (CH2M HILL 2012c).

Exhibit 6. Pollutants Not Detected in the Effluent Reporting Method Detection Limits Exceeding Applicable Water Quality Criteria—NPDES and 301(h) Monitoring Programs

Methoxychlor	Toxaphene	PCBs (total) (includes congeners Aroclor-1016, -1221, -1232, -1242, -1248, -1254, -1260, -1262, and -1268)[7]	3,3-dichlorobenzidene
Mirex	Dioxin	Acrylonitrile	Hexachlorobenzene

Exhibit 7. Pollutants Detected in the Receiving Water at Concentrations Exceeding Applicable Water Quality Criteria—301(h) Monitoring Program

Aldrin	4,4'-DDE	Endrin	Chlorpyrifos
Chlordane (alpha isomer only)	4,4'-DDD	Heptachlor	Coumaphos
4,4'-DDT	Dieldrin	Heptachlor epoxide	

PRASA's 2012 technical memorandum *Review of Potential Effluent Parameters of Concern: Aguadilla RWWTP* (CH2M HILL 2012c) provides a case for considering or not considering the pesticides identified above as having detected or estimated effluent concentrations exceeding applicable water quality criteria as "pollutants of concern" (POCs). In all cases, PRASA believes that these particular pollutants should not be considered POCs and EPA concurs. PRASA did not thoroughly review other conventional, non-conventional, or organic pollutants not detected in the effluent but having MDLs exceeding water quality criteria.

Whole Effluent Toxicity

The existing permit requires that PRASA conduct acute and chronic whole effluent toxicity (WET) testing on the modified discharge from the Aguadilla RWWTP. The EPA-evaluated bioassay results were based on the authorized dilution of 191:1 from PRASA's 2012 *Application for a Water Quality Certificate and Definition of a Mixing Zone for the Aguadilla Regional Wastewater Treatment Plant Outfall System* (2012 Aguadilla mixing zone document). WET testing results for sampling conducted from 2007 through 2012 were evaluated in the 2012 Aguadilla mixing zone document. The effluent samples were taken at a location downstream from all treated outflow and just prior to its leaving the plant through the outfall. As described in the 2012 Aguadilla mixing zone document, in order for the EQB to approve a mixing zone for any parameter, the applicant must demonstrate that the parameter will meet the PRWQS toxicity requirements (i.e., Criteria Maximum Concentration [CMC] and Criteria Chronic Concentration [CCC]) at the edge of the mixing zone:

- CMC: EPA national water quality criteria recommendation for the highest instream concentration of a toxicant or an effluent to which organisms can be exposed for a brief period of time without causing an acute effect. It is equal to: a CMC= 0.3TU
- CCC: EPA national water quality criteria recommendation for the highest instream concentration of a toxicant or an effluent to which organisms can be exposed indefinitely without causing an unacceptable effect. It is equal to: CCC =1.0TU_c

When adjusted for dilution (equal to 191:1) at the edge of the mixing zone, it was determined that the requested mixing zone would be in compliance with the whole effluent CMC of 0.02 TU_a and the whole effluent CCC of 0.12 TU_c.

During this period (2007 through 2012), PRASA conducted eight acute and chronic tests on *Mysidopsis bahia* (mysid shrimp), *Cyprinodon variegatus* (sheepshead minnow) and *Arbacia punctulata* (sea urchin).

Because neither acute nor chronic WET has been observed in exceedance of the CCC or CMC, EPA does not anticipate a biological impact of the discharge on fish, shellfish and wildlife at the edge of the ZID during the

[7] PRASA's 301(h) effluent results do not associate these Aroclor congeners with Total PCBs criteria (CH2M HILL 2012d).

next permit term. Receiving water monitoring has demonstrated that the modified discharge from the Aguadilla RWWTP has not adversely affected biological conditions of phytoplankton, benthic invertebrate, fish, and coral reef communities in the vicinity of the outfall. The outfall is equipped with a diffuser to ensure that the discharge receives a significant amount of dilution to minimize any potential adverse impacts.

b. Impact of discharge on public water supplies

Pursuant to 40 CFR 125.62(b), which implements CWA section 301(h)(2), the modified discharge from the Aguadilla RWWTP must allow for the attainment or maintenance of water quality that assures the protection of public water supplies. The 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 discharge from the Aguadilla RWWTP is not likely to affect public water supplies, as ocean waters within the vicinity of the outfall have not been designated as 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

Pursuant to 40 CFR 125.62(c), PRASA must demonstrate that the modified discharge from the Aguadilla RWWTP will allow for the attainment or maintenance of water quality which assures protection and propagation of a BIP of shellfish, fish and wildlife, and that a BIP of shellfish, fish and wildlife will exist in all areas beyond the ZID that might be affected by the modified discharge. EPA reviewed monitoring data collected to assess the biological conditions of phytoplankton, benthic invertebrate, fish, and coral reef communities in the vicinity of the modified discharge.

Eutrophication

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, are generally associated with conditions of eutrophication and phytoplankton blooms in marine waters, with nutrient inputs largely resulting from anthropogenic sources, such as agricultural runoff and wastewater (municipal and industrial) discharges. PRASA has conducted water quality monitoring for inorganic nitrogen constituents (NO_3, NO_2, NH_3; described as "Nitrogen" in the EQB water quality standards), and chlorophyll *a* (Chl-*a*), an indicator of phytoplankton abundance, to assess the potential nutrient impacts from the modified discharge. The PRWQS provide a water quality criterion for total nitrogen for Class SB and Class SC waters; however, there are no PRWQS- or EPA-recommended water quality criteria for Chl-*a*. Instead, EPA's Strategic Target for Chl-*a* for nearshore and coastal waters within the Florida Keys National Marine Sanctuary was used in assessing phytoplankton productivity, as the Florida Keys provide similar tropic and sub-tropic marine systems to Puerto Rico (Boyer and Briceño 2009).

Nitrogen data reported in receiving waters were not discussed in the 2012 301(h) renewal application. Appendix H-5 of the 2012 Mixing Zone Application provides receiving water monitoring data that show nitrogen levels (reported as total inorganic nitrogen [NO_2+NO_3+NH_3]), were consistently below the criterion of 5 mg/l limit at the edge of the mixing zone, and 65 mg/l limit at the end-of-pipe for at monitoring stations. Further, a large majority of samples (589 of the 590 samples) were well below applicable WQS (<0.74 mg/l), with only one result from farfield station A4-10 reporting a higher reading of 4.33 mg/L on 10/16/2001, which was still below the standard. Recent (2007-2011) receiving water concentrations of Chl-*a* also generally were below the Strategic Target Chl-*a* value of 0.35 mg/m^3 at all monitoring stations. Monitoring data from several periods showed concentrations of Chl-*a* above the Strategic Target, including July 2007 at ZID station (A2) and reference station (A7); November 2008 at ZID station (A5) and reference station (A7); October 2010 at ZID station (A2); and February 2011 at ZID station (A2). Average Chl-*a* data between years, from all monitoring stations were below the Strategic Target threshold. PRASA indicates that there are no consistent patterns to indicate any effect from the outfall discharge and the lack of significant spatial variability in Chl-*a* concentrations related to discharge

location serves to further document the lack of significant biotic response to effluent discharges from the Aguadilla RWWTP. EPA is not aware of any phytoplankton blooms occurring in the vicinity of the outfall during this period or in any other periods since issuance of the existing permit, as indicated in EPA's 2000 *Analysis of the Section 301(h) Secondary Treatment Waiver Application for the Aguadilla Wastewater Treatment Plant NPDES No. PR 0023736*. In addition, concentrations of nitrogen and Chl-*a* at stations nearest to the outfall are comparable to those levels observed at the farfield and background stations. Therefore, Aguadilla's discharge of nutrients is not likely to result in excessive phytoplankton growth at or beyond the edge of the mixing zone during the next permit term.

Benthic Invertebrate Communities

In aquatic systems, monitoring of benthic invertebrates adjacent to wastewater outfalls can provide useful information about 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 because 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. Rule 1303.1(E) of PRWQS provides that "solids from wastewater sources shall not cause deposition in or be deleterious to the existing or designated uses of the water body." Many of the potential impacts of wastewater discharges are associated with the discharge of suspended solids and toxic pollutants that accumulate in the sediment. Benthic community indices, sediment characteristics (quality and composition) and sediment accumulation were evaluated to determine whether the benthic community in the vicinity of the outfall may be adversely affected by the modified discharge.

- **Benthic Indices**. Analysis of benthic invertebrates was based on the number of taxa and five other biological indices (i.e., the number of individuals, number of taxa, estimated density, Shannon-Wiener diversity index, species evenness and species richness) to describe the overall condition of the benthic community. PRASA has been performing benthic invertebrate surveys for Aguadilla since 1999. Recently, community-level evaluations were performed by PRASA using biological survey data collected for the 2007 through 2011 study period. PRASA compared data collected from the within-ZID station to the other monitoring stations. Generally, communities did not change significantly from the within-ZID station and farfield and reference stations. Biological indices at farfield and reference stations were either less than or not significantly different from those at the edge of ZID station (A2). With respect to trends, an increasing trend was observed in individual counts, number of taxa, and density at all stations. Further, diversity and richness showed an increasing trend at farfield (A3 and A4) and reference (A7) stations. Increasing trends were also observed for richness at Station A5 (reference) and evenness at Station A7 (reference). No other trends were observed. The 2012 301(h) renewal application indicates that on the basis of the benthic monitoring, the environment surrounding the outfall is not polluted or adversely affected by the discharges from the Aguadilla outfall and that a BIP of benthic infaunal invertebrates is being maintained.

- **Sediment Quality**. Analysis of sediment quality was based on a comparison of the level of pollutants detected in sediment and sediment quality benchmarks developed by Long et al. (1995). Sediment quality benchmarks were used as a screening tool to determine whether further assessment is needed to better define the potential adverse impacts of pollutant concentrations. For pollutants with benchmarks available, concentrations of pesticides and other organic pollutants generally were not detected at any of the monitoring stations. Of the 13 organic constituents detected in sediment at the edge of ZID station during the 2007-2011, 5-year monitoring period (methylene chloride, toluene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, fluoranthene, indeno(1,2,3-c,d)pyrene, pyrene, 4,4'-DDT, 4,4'-DDD), all estimated concentrations were below applicable NOAA benchmarks. Of the 17 inorganic constituents monitored in sediments during the 2007 to 2011, 5-year monitoring period (antimony, arsenic, beryllium, barium, boron, cadmium, chromium, copper, lead, manganese, mercury,

nickel, selenium, silver, thallium, zinc, cyanide), concentrations of inorganic constituents in the sediments were generally approximately equal to or lower at the edge of ZID (A2) than at the reference (A5 and A7) and farfield (A4 and A5) stations. With respect to the sediment benchmark screening values, concentrations of the inorganic constituents found in the sediments were generally below levels associated with possible adverse effects. In all cases for which NOAA ER-M screening benchmarks are available (antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), concentrations in sediments from the edge of ZID did not exceed ER-M values. A total of 8 of the 17 inorganic constituents (arsenic, barium, cadmium, chromium, copper, manganese, nickel, and selenium) in sediments collected from the edge of ZID (A2) had concentrations greater than the NOAA ER-L, AET, or other screening benchmark values for marine sediments. However, all were found at both the reference and farfield stations in concentrations comparable to or greater than those from the edge of the ZID. Therefore, concentrations of these constituents that are above benchmark values are assumed to be not attributable to the Aguadilla RWWTP outfall discharge.

- **Sediment Composition**. Results showed overall sediment grain size distribution analysis indicating typical natural variation among the stations sampled during these surveys. Minor physical differences in sediment grain size distribution and texture in the vicinity of the Aguadilla outfall generally reflect the natural variability in the nearshore marine bottom types. Significant variation in particle size distribution was evident at farfield (A3 and A4) and reference (A5 and A7) stations when compared to the edge of ZID station (A2). With respect to trends, silt decreased during the study period at the reference (A7) station, but no other trends related to particle size were evident. The benthic chemistry data have shown that the outfall discharge is not resulting in the significant accumulation of fine sediments in its vicinity nor creating adverse effects on the populations of benthic infaunal organisms in its vicinity. Overall, total organic carbon (TOC) concentrations, which were monitored throughout the 2007 through 2011 period to support interpretation on the community assessment data, did not identify organic enrichment or indicate conditions that would adversely affect infaunal communities. Variation in sediment chemistry (TOC, TKN, and TP) was observed at all stations when compared to the edge of ZID station (A2), with the exception of Station A3 (farfield). During the study period, no significant trends in TKN and TOC concentrations were observed, with the exception of TOC at Station A4 (farfield), which showed an increasing trend. TP concentrations exhibited a decreasing trend at all five monitoring stations, with the exception of Station A3 (farfield), which showed no significant change. Sediment chemistry results found that the following monitoring stations showed significantly greater results compared to the edge of ZID (A2): TKN at farfield (A4); TOC at farfield and reference (A7), and TP at reference (A5). Sediment chemistry results found that significantly less TOC was observed at the reference station (A5) compared to the edge of ZID (A2).

- **Sediment Accumulation**. The accumulation of suspended solids in the vicinity of the 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, which can cause them to settle at different rates. EPA estimates that approximately 50 percent of suspended solids in wastewater discharges are likely to settle and accumulate in the vicinity of the outfall (USEPA 1994). 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/year (USEPA 1994; Maughan and Oviatt 1993). PRASA calculated a maximum permitted loading from the Aguadilla RWWTP as the total long-term accumulation of the organic fraction of the discharged sediment, which was estimated to be 3.64 grams per square meter (g/m^2) for steady-state conditions and 2.92 g/m^2 90-day critical conditions. The deposition rate was estimated to be 13.27 g/m^2/year over the primary deposition area of area of 2.45 square kilometers (km^2) under steady-state conditions. The calculations were based on the permitted TSS discharge of 4,678 kg/day; however, actual TSS discharge is typically much less. No change to this limit has been proposed by PRASA for the next

permit term. PRASA predicted smaller amounts of accumulation for areas outside the primary area of deposition. Steady-state accumulation of the organic fraction (80 percent of the total) was calculated to be less than 0.2 g/m2 outside of the primary deposition area.

The results of the benthic and sediment analyses indicate that the modified discharge is not likely to cause adverse impacts to benthic invertebrate communities in the vicinity of the Aguadilla RWWTP outfall during the next permit term. Benthic indices show that the number of taxa, number of individuals, density, diversity, richness and eveness for example, are generally increasing or showing no signs of significant change at all the stations, including the ZID stations, and are not generally significantly different between the stations. Pollutant concentrations in sediments were generally measured below levels of concern at the ZID and other monitoring stations or not shown to be different from other stations with similar detected pollutants. There was generally no trend in sediment composition. This is consistent with the prediction that the modified discharge will not significantly discharge suspended solids that will accumulate at levels that would impact benthic invertebrates.

Fish Communities

Rule 1303.1(l) 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. For the purpose of this section 301(h) evaluation, similar to the benthic invertebrate assessment, biological indices were used to evaluate whether the fish community in the vicinity of the outfall may be adversely affected by the modified discharge during the next permit term. In addition, contaminants in fish tissue were assessed.

- **Fish Community Indices**. Analysis of fish was based on the number of species, total abundance, species diversity, species richness, and species evenness to describe the overall condition of the fish community. Statistical analyses were performed by PRASA on 28 monitoring events conducted between 1999 and 2011 that compared data collected from the within-ZID station to the other monitoring stations. Generally fish community studies showed only slight variations among stations and monitoring events and indicate that the fish community structure within the ZID similar to farfield stations and the reference station. Fish indices such as diversity, richness and evenness, were either greater than those measured at within-ZID station, or not significantly different. The average values for number of taxa, diversity, and richness at the reference station (A5) were significantly greater than those reported for the edge of ZID (A2). In addition, individual counts were greater at the farfield and reference stations (A4 and A7, respectively). A decreasing trend was observed for all biological indices at the reference station (A7) over the study period; however, no significant difference was observed for all other stations and categories.

- **Fish Tissue Bioaccumulation**. Fish tissue bioaccumulation studies are required to be completed once during every 5-year permit cycle under the Aguadilla 301(h) waiver monitoring programs. Fish were collected in the vicinity of the Aguadilla outfall and retained for bioaccumulation studies in 2011. Analysis of pollutant concentrations in fish tissue was based on using fish tissue screening concentrations (TSCs) developed by Shephard 1998 and updated by Dyer et al (2000). Of the 17 inorganic constituents analyzed, 5 were detected in the tissues of fish collected at the edge of ZID (A2). Of these, average concentrations of four constituents— arsenic, cadmium, chromium, lead, and mercury —exceeded the respective benchmarks. Cadmium was estimated above the TSC benchmark (0.083 milligrams per kilogram [µg/kg]) in the tissue of a single specimen collected at the edge of ZID stations (A2; 0.193 µg/kg). Because cadmium concentrations were estimated at well below the TSC benchmark in the tissues of all other fish specimens collected in February 2011, including those at Station A2, this single elevated cadmium concentration is likely an anomaly. Lead was estimated in the tissues of two fish specimens collected at the edge of the ZID (A2) and were slightly above the TSC benchmark (0.059 µg/kg). All other lead concentrations estimated in the tissues of whole fish collected at edge of the ZID (A2) were well below the TSC benchmark and were comparable to concentrations in fish collected at the reference locations (A5 and A7). The remaining three constituents (arsenic, chromium, and mercury) were also found in greater than

or comparable concentrations in the tissues of fish collected at the reference and/or farfield stations and, therefore, are not attributable to the Aguadilla outfall discharge. For organic constituents, all concentrations in samples taken from the ZID were below the EPA benchmark values, indicating no risk to those species.

Results of the fish community analysis indicate that fish do not appear to be adversely impacted. There were moderate abundances of fish found in the environments located in the vicinity of the outfall and no physical defects or abnormalities were documented in fish samples collected at any of the monitoring stations located at and beyond the ZID. PRASA has indicated that fish collected at all the monitoring stations showed no signs of any physical stress, lesions, fin rot, parasitism, or other indicators of potential effluent-dominated stress. Bioaccumulation of some toxics in fish has been observed but not routinely above levels of concern; and the parameters and concentrations are found to be comparable to those found among the stations. EPA is not aware of any fishing restrictions or fish consumption advisories as a result of contaminants in fish tissue.

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 (USEPA 1994). Because of their nature, distinctive habitats of limited distribution may be highly susceptible to the potential effects of discharged suspended solids, nutrients, and other pollutants on the unique faunal components of marine communities.

Coral reef monitoring was conducted at two nearshore stations, one located to the northeast (Station AGS2, hard-ground habitat, approximately 3,050 feet northeast of the outfall ZID A6, depth 50 feet) and one to southwest (Station Alt. AGS3, reef habitat, approximately 3,228 feet southwest of the outfall, depth 36 feet) of the Aguadilla outfall. Monitoring data indicate that the reefs are predominately composed of abiotic substrates, algal turf, and associated fleshy and coralline alga colonies, and, to a lesser extent, sponge colonies. Percent coral cover for all coral types (stony and soft corals) is generally low at station AGS2 (2.9 percent of the total cover observed) and moderate at station AGS3 (16.5 percent of the total cover observed). Total coral density and stony/hydrocoral species diversity indices are very low at Station AGS2, confirming that coral reefs are poorly developed in that area. Total coral density and stony/hydrocoral species diversity indices are moderately higher at Station AGS3 compared to Station AGS2. The coral species evenness index for Station AGS3 is also similar for Station AGS2. This is likely a result of multiple numbers of colonies of the same species at Station AGS3. The low percent coral coverage and low coral species diversity and evenness frequently suggests sparse, poorly developed corals that are a minor component of the benthic community. This is likely related to the high energy environment characteristic under the estuarine influence of the Río Culebrinas and Río Guayabo plumes and not the modified discharge from the Aguadilla RWWTP.

In consultation with the National Oceanic and Atmospheric Administration under section 7 of the Endangered Species Act, EPA determined that coral reef communities are not likely to be adversely impacted by the modified discharge from the Aguadilla RWWTP and that the monitoring requirements for the Aguadilla RWWTP remain the same during the next permit term.

d. Absence of extreme adverse impacts within the ZID

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 that have severe adverse effects beyond the ZID. The macroinvertebrate sampling and analysis information provided in the *Quality Assurance Project Plan and Sampling and Analysis Protocols for the Aguadilla RWWTP 301(h) Waiver Demonstration Studies* (CH2M HILL 2007), *Biological Evaluation of the Effects of the Continued Operation of the Aguadilla Regional Wastewater Treatment Plant Ocean Outfall on Special Status Marine Species near*

Aguadilla, Puerto Rico (CH2M HILL 2012a), *Renewal Application for 301(h) Waiver for the Aguadilla RWWTP* (CH2M HILL 2012b) were reviewed as were the corresponding sampling and analysis reports for the years 2003 through 2013, and the sampling and analysis results, as presented, likely satisfy 301(h) reporting requirements. Recommendations for strengthening the analyses, elevating defensibility of decision-making, and to make this information potentially more useful for management actions are presented in Section IX.

On the basis of the *Renewal Application for 301(h) Waiver for the Aguadilla RWWTP* (CH2M HILL, 2012), effluent and receiving water monitoring continue to indicate that the modified discharge from the Aguadilla RWWTP will provide for the attainment of water quality criteria for DO, turbidity, and toxicity, and maintenance of a BIP. Refer to Section 2.a (Parameter-specific Analysis) of this document for a discussion of the toxic pollutants for which laboratory detection limits and/or measured concentrations exceed corresponding water quality criteria. EPA is not aware of any phytoplankton blooms, fish kills, or other adverse impacts in the vicinity of the outfall. The modified discharge is to open coastal waters that provide a dynamic mixing zone unstratified in nature and influenced by large-scale, wind-driven ocean currents, and thus is not likely to cause conditions within the ZID that would contribute to extreme adverse effects.

e. Impact of discharge on recreational activities

Under 40 CFR 125.62(a) and (d), the Aguadilla's RWWTP'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 outfall unless such restrictions are routinely imposed around sewage outfalls or would be lifted or modified if the facility was upgraded to secondary treatment (USEPA 1994).

Recreational activities in the general vicinity of the Aguadilla regional outfall include both primary contact activities, such as swimming, and secondary contact activities, such as fishing, boating, and picnicking. According to the applicant, the shoreline in the Aguadilla-Aguada area is a center for recreational activity. A resort is located at Punta Borinquen about 8 km (5 mi) northeast of the discharge site. Nearby beaches include Las Playuelas and Boqueron Beach, the nearest beach, which is about a mile from the Aguadilla RWWTP's ocean outfall. Review of quarterly monitoring reports and receiving water data from PRASA's 1999 Mixing Zone Study for end-of-pipe fecal and total coliform bacteria concentrations indicate, while factoring in the critical initial dilution of 151:1 (note this CID has been revised to 191:1 since PRASA's 1999 study), resultant fecal and total coliform concentrations at the edge of the mixing zone are calculated to consistently comply with water quality criteria for bacteria for Class SB and Class SC waters. Additionally, the prevailing water movements near the outfall site are alongshore and promote rapid flushing and dispersion that result in little, if any, impacts to nearby recreational activities. Monthly average fecal coliform concentrations in effluent from the Aguadilla RWWTP from January 2007 - October 2011 generally reported bacterial concentrations at all monitoring stations at levels at or below detection limits. No exceedances of the 400 colonies/100 mL EQB standard for fecal coliform bacteria were reported at the edge of the mixing zone from January 2007 – October 2011.

Two of the largest *Enterococcus* values measured at the edge of the mixing zone were 351 and 452 colonies/100 mL, respectively, in October 2010. These values would have caused an exceedance of the corresponding EQB geometric mean criteria value of 35 colonies/100 mL from mean sea level to 3 miles seaward. As discussed above in the description of the receiving water, the water quality standards for Class SB and SC waters are intended to protect the designated uses of these waters, which include primary and secondary contact recreation. According to the renewal application, there are no existing or potential future impacts on recreational activities, including those that might be affected by fecal coliform bacteria. EPA is not aware of any regulatory restrictions imposed on recreational activities in the area of the discharge and does not anticipate any

during the next permit term. Effluent concentrations of fecal coliform from the Aguadilla RWWTP indicate that the modified discharge, alone and in combination with current receiving water background levels, will consistently meet water quality criteria for fecal coliform at the ZID and allow for recreational activities at and beyond the ZID. Although enterococcus is currently not regulated in the existing modified permit due to an 2010 PRWQS update to the bacteria criteria, EPA anticipates that effluent concentrations of enterococcus also consistently will meet water quality criteria at the ZID and not impact recreational activities during the next permit term, because the Aguadilla RWWTP provides chlorinated wastewater disinfection and the wastewater is discharged through a high-rate diffuser resulting in significant dilution.

f. Stressed waters

Under 40 CFR 125.62(f) PRASA must demonstrate that the modified discharge from the Aguadilla RWWTP 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. Stressed waters are defined in 40 CFR 125.58(z) as 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 Aguadilla RWWTP does not discharge into stressed waters, and has demonstrated that a BIP exists in the vicinity of the outfall and that the modified discharge will provide for the attainment of water quality standards and criteria at and beyond the ZID. Therefore, as described in Section 3.3.2 of the *Revised Application for a Water Quality Certificate and Definition of a Mixing Zone for the Aguadilla Regional Wastewater Treatment Plant Outfall System* (CH2M HILL 2012), the modified discharge from the Aguadilla RWWTP is not likely to contribute to or perpetuate stressed conditions in the receiving water.

3. Establishment of a monitoring program

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

Since 1999, PRASA has implemented an EPA-approved section 301(h) monitoring program for the Aguadilla RWWTP that consists of effluent and receiving water quality monitoring; the assessment of benthic invertebrates and coral reefs; and analysis of toxic pollutants in sediment and fish tissue. A complete description of the section 301(h) monitoring program is provided in PRASA's 2007 QAPP/SAP. The monitoring program is well-established and has been developed jointly between EPA, the EQB and PRASA to meet the requirements of 40 CFR 125.63. PRASA has conducted a total of 28 monitoring events at receiving water stations established at and beyond the ZID. Through these monitoring events and based on the 2007 QAPP/SAP, PRASA has demonstrated that it has the resources to implement and maintain a monitoring program during the next permit term.

4. Effect of discharge on other point and nonpoint sources

In accordance with CWA section 301(h)(4), EPA may not issue a modified permit unless PRASA can demonstrate that such modified requirements will not result in any additional requirements on any other point or nonpoint source. Effluent and receiving water monitoring show that the modified discharge has not caused additional treatment or control requirements for any pollutant or parameter, including BOD_5 and TSS, for any other point or nonpoint sources in the vicinity of the outfall. As part of its WQC, PRASA requested that the EQB provide a determination that the discharge will not cause violations to applicable water quality standards in the receiving

water or result in additional treatment controls or other requirements on any other point or nonpoint sources in the vicinity of the outfall. The EQB determined in the draft Aguadilla WQC, issued on November 26, 2013, that the discharge will not cause violations to applicable water quality standards in the receiving water or result in additional treatment controls or other requirements on any other point or nonpoint sources (PR EQB 2013). Therefore, EPA does not anticipate any additional treatment or control requirements on any other point or nonpoint source to result during the next permit term.

5. Establishment of an urban area pretreatment program

In accordance with CWA sections 301(h)(5) and (6), EPA may not issue a 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 sections 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 a local limit), and that it will enforce the requirement. PRASA has an Industrial Pretreatment Program that was approved by EPA on September 28, 1985, and an Enforcement Response Plan approved by EPA on May 30, 1995, as part of this program. Revisions to PRASA's sewer use ordinance were approved by EPA on September 8, 2003.

a. Establishment of local limits

As part of an Industrial Pretreatment Program, POTWs that apply for a modified permit must assess the need for local limits and set local limits in accordance with 40 CFR Part 403 based on an analysis of toxic pollutants known or suspected of being introduced by industrial sources. Local limits are developed for pollutants that may cause interference, pass through, sludge contamination, and/or worker health and safety problems, if discharged in excess of the receiving POTW's capabilities and/or receiving water quality standards. EPA's original approval of PRASA's Industrial Pretreatment Program in 1985 contained general island-wide local limits for all of its wastewater treatment facilities. PRASA assesses the need for facility-specific local limits for the Aguadilla RWWTP on an annual basis. According to PRASA's most recent Industrial Pretreatment Program Annual Report, which covers activities from September 1, 2012 through August 31, 2013, PRASA has established local limits for pollutants discharging to the Aguadilla RWWTP service area, as presented in Exhibit 8.

Exhibit 8. Local Limits for Pollutants Discharging to the Aguadilla RWWTP Service Area

Arsenic	Fluoride	Oil & Grease	TSS
BOD_5	Lead	Phenolics	Total Toxic Organics
Cadmium	Manganese	Selenium	Zinc
Chromium	Mercury	Silver	
Copper	Molybdenum	Surfactants	
Cyanide	Nickel	Thallium	

PRASA has incorporated limits for these pollutants into all applicable industrial pretreatment permits for industries that discharge to the Aguadilla RWWTP. Sampling in 2013 detected bis(2-ethylhexyl phthalate [also known as di(2-ethylhexyl)phthalate] in the influent and diethyl phthalate in the effluent; however, PRASA determined that local limits were not necessary for the Aguadilla RWWTP service area because these pollutants were detected in the influent and effluent at levels below the water quality criteria.

b. Compliance and enforcement of local limits

For urban area pretreatment programs with significant numbers of industrial users, at any given time, it is reasonable to expect that at least one or more of those users might be out of compliance (59 Federal Register 152, August 9, 1994, page 40656). EPA determines a facility's continuing eligibility for a modified permit under section 301(h)(6) by measuring industrial user compliance and the POTW's enforcement activities against existing criteria in EPA's National Pretreatment Program. A POTW's enforcement program is considered adequate if not more than 15 percent of its significant industrial users (SIUs) meet the significant noncompliance (SNC) criteria in a single year. Under the Industrial Pretreatment Program for the Aguadilla RWWTP, there are three SIUs that have pretreatment permits authorizing discharges to the facility. According to PRASA's *2013 Industrial Pretreatment Program Annual Report September 2012-August 2013*, none of the facilities met the SNC criteria. Therefore, PRASA's enforcement program has met the criteria for adequate enforcement of its pretreatment program for the Aguadilla RWWTP.

PRASA has established local limits to control toxic pollutants that may be introduced by an industrial discharger and demonstrated that it is able to enforce these limits; therefore EPA concluded that PRASA demonstrated that it has met requirements of 40 CFR 125.65 for an urban area pretreatment program and that it enforces its applicable pretreatment requirements.

6. Implementation of a Toxics Control Program

a. Chemical analysis

Pursuant to 40 CFR 125.66(a), PRASA must submit a chemical analysis of its current discharge for all toxic pollutants and pesticides defined in 40 CFR 125.58(p) and (aa). PRASA has conducted priority pollutant screening for toxics pollutants and pesticides on an annual basis as part of its industrial pretreatment and section 301(h) monitoring programs. These data**, with the exception of those listed in Exhibits 3 and 4,** are sufficient to assess pollutants that may be present in the Aguadilla RWWTP effluent and to meet the requirements of 40 CFR 125.66(a).

b. Toxic pollutant source identification

Under 40 CFR 125.66(b), PRASA must submit 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, PRASA must also categorize the sources according to industrial and nonindustrial types. In PRASA's *2013 Industrial Pretreatment Program Annual Report*, PRASA identified three industries as significant industrial users that may contribute toxic pollutants.

c. Industrial pretreatment program

Under 40 CFR 125.66(c), PRASA must have an approved pretreatment program as described in 40 CFR Part 403 for the entry of known or suspected industrial sources of toxic pollutants into the Aguadilla RWWTP. Since 1985, PRASA has implemented an EPA-approved industrial pretreatment program, and since 1995, incorporated an EPA-approved enforcement response plan as part of this program. The program is implemented on an island-wide basis and includes the service areas of the Aguadilla RWWTP. The Puerto Rico Rules and Regulations for the Supply of Water and Sewer Service were approved as part of the original program and met the existing pretreatment requirements for legal authority at 40 CFR 403.8. In 2003, PRASA revised the Rules and Regulations in accordance with the changes made to the federal pretreatment regulations (e.g., additional prohibitions, revised definitions, and notification requirements).

7. Establishment of an nonindustrial source control program

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

nonindustrial source control program, PRASA proposes to continue implementation of its "Aquamóvil" Education Program and the Fat, Oil and Grease (FOG) Program during the next permit term. 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. Created in 1988 by PRASA's Communications Office, the objective of the program is to provide information to PRASA's clients and the general public about the drinking water and sanitary sewer systems.

The program provides information to the public about:

- The history of PRASA and the services it provides
- Areas where drinking water and sanitary sewer services are provided
- Drinking water and wastewater treatment processes
- Water conservation, including promotion of responsible use of the resource, including responsible use of hydrants
- Infrastructure protection, including promoting prevention of contamination, vandalism, and illegal discharges
- New infrastructure and rehabilitation projects
- Serving as resources to school and universities science fairs
- Emphasizing preventive measures to protect water bodies and avoid contamination

The program covers all municipalities, putting more emphasis on, among others: universities, public and private schools, housing developments, industrial and governmental agencies, community groups, health and service fairs, and religious groups. As part of its annual "Water Week," PRASA distributes information concerning the wastewater treatment process as well as household toxic substances disposal at major shopping centers throughout the island.

In the FOG Program, PRASA focuses on educating commercial facilities across the island, such as food establishments that discharge to the Aguadilla RWWTP, 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 and continues to implement a FOG program through its nonindustrial source control program. PRASA also provides information on its website (http://acueductospr.com) to educate the public on pollution prevention. Therefore, the development and implementation of the "Aquamóvil" Education Program and the FOG Program demonstrates that PRASA has a nonindustrial source control program that is designed to minimize the entrance of nonindustrial toxic pollutants into the Aguadilla RWWTP.

8. Increase in effluent volume or amount of pollutants discharged

Under 40 CFR 125.67, which implements CWA section 301(h)(8), EPA may not issue a modified permit unless PRASA 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 not requested an increase in the permitted effluent flow limitations for the Aguadilla RWWTP or a change in concentration-based BOD_5 and TSS effluent limitations that would affect permitted loadings. For BOD_5, the existing permit establishes effluent limitations of 106 mg/l (average monthly), 3,213.07 kg/day (average monthly), and 6,426.14 kg/day (average maximum daily). For TSS, the existing permit establishes effluent limitations of 70 mg/l (average monthly), 2,121.84 kg/day (average monthly), and 4,243.68 kg/day (average maximum daily). The existing concentration-based effluent limitations are proposed for the next permit term. Mass-based effluent limitations for the next permit term are based on the monthly average flow of 8 MGD

(design flow) and maximum daily flow of 16 MGD (maximum hydraulic capacity)[8]. The facility typically operates below this flow. Effluent flow data (August 2000 – December 2013) indicated average monthly flows ranged between 3.02 MGD (March 2004) and 9.404 MGD (August 2011). Furthermore, actual concentrations of BOD_5 and TSS were typically less than permitted limitations, resulting in lower loadings. However, the facility did exceed their concentration-based average monthly TSS limitations five times between August 2000 and December 2013: 71 mg/l (April 2009), 73 mg/l (February 2006), 76.7 mg/l (March 2009), 88 mg/l (December 2008), and 111 mg/l (January 2010). Maximum average monthly concentrations of BOD_5 and TSS were reported as 97 mg/l (January 2004) and 111 mg/l (January 2010), respectively. PRASA does not anticipate any changes in the service area or population over the term of the next permit that would result in substantially increased effluent volume or discharges of BOD_5 and TSS from the Aguadilla RWWTP above those specified in the modified permit.

9. Minimum level of treatment

CWA section 301(h)(9) was amended by section 303(d)(1) and (2) of the WQA. Under CWA section 303(d)(1) and 40 CFR 125.60, wastewater from the Aguadilla RWWTP must be receiving at least primary or equivalent treatment at the time its 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. Since 2000, the Aguadilla RWWTP has shown it can achieve at least primary or equivalent treatment with 30 percent removal of BOD_5 and 50 percent removal of TSS in the influent, with some exceptions. Although the facility was compliant with their BOD_5 removal limitations, they did exceed their TSS removal effluent limitation in June 2002 (46 percent) and in January 2010 (41 percent). Between August 2000 and December 2013, monthly average removal rates for BOD_5 ranged between 36 percent (January 2004) and 97 percent (January 2013) and removal rates for TSS ranged between 41 percent (January 2010) and 100 percent (October 2013).

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

Under 40 CFR 125.59(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. PRASA 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.

1. 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 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 outfall is located in a coastal area managed by the Commonwealth's Coastal Zone Management Program. The Puerto Rico Planning Board issued a consistency certification on <INSERT DATE> for the modified discharge from the Aguadilla RWWTP.

[8] According to the *Renewal Application for 301(h) Waiver for the Aguadilla RWWTP* (CH2M HILL 2012b), the average monthly and maximum daily flows are design and maximum hydraulic capacity flows, respectively. Similar information couldn't be found in the 301(h) renewal application to verify what was stated in the *Revised Application for a Water Quality Certificate and Definition of a Mixing Zone for the Aguadilla Regional Wastewater Treatment Plant Outfall System* (CH2M HILL 2012d).

2. Marine Protection, Research and Sanctuaries Act

40 CFR 125.59(b)(3) provides that issuance of a modified permit must comply with Title III of the Marine Protection, Research and Sanctuaries Act (MPRSA), 16 U.S.C. 1431 *et seq*. In accordance with 16 U.S.C. 1434(d), a 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 outfall is not located in a marine or estuarine sanctuary designated under Title III of the MPRSA. This has been confirmed in a June 4, 1987 letter from the National Oceanic and Atmospheric Administration. 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 outfall for the Aguadilla RWWTP. As a result, EPA has determined that NOAA's 1987 determination is sufficient to meet the requirements of 40 CFR 125.59(b)(3).

3. Endangered Species Act

Under 40 CFR 125.59(b)(3), a 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 2012, PRASA prepared a Biological Evaluation (BE) that assessed the potential effects of the modified discharge of advanced primary treated effluent from the Aguadilla RWWTP on federally- listed threatened, endangered, proposed, candidate, or species of concern and any designated or proposed critical habitats potentially occurring in the area of the discharge. In the BE, PRASA indicated that the species or critical habitat presented in Exhibit 9 may occur in the vicinity of the modified discharge.

Exhibit 9. 2012 BE Threatened and Endangered Species, Critical Habitat, and Species of Concern

Threatened and Endangered Species and Critical Habitat	Species of Concern
Leatherback sea turtle (*Dermochelys coriacea*)	Ivory tree coral (*Oculina varicose*)
Hawksbill sea turtle (*Eretmochelys imbricate*)	Dusky shark (*Carcharhinus obsurus*)
Green sea turtle (*Chelonia myda*)	Sand tiger shark (*Carcharias taurus*)
Elkhorn coral (*Acroporo palmata*)	Speckled hind (*Epinephelus drummondhayi*)
Staghorn coral (*Acropora cervicornis*)	Striped croaker (*Bairdiella sanctaeluciae*)
Humpback whale (*Magaptera novaeangliae*) *	
* Critical habitat has not been designated in Puerto Rico for the humpback whale.	

In 2012, NOAA proposed the following additional coral species as threatened or endangered (Exhibit 10) for the Caribbean (77 Federal Register 236, December 7, 2012, pages 73220-73262). Note that the final listing decision regarding the additional corals and the reclassification of two *Acropora* corals is expected in June 2014. This may affect the listing of seven species in the Caribbean and may reclassify elkhorn and staghorn corals from threatened to endangered.

Exhibit 10. Proposed Threatened or Endangered Coral Species

Boulder star coral (*Montastraea annularis*)	Staghorn coral (*Acropora cervicornis*) *
Elkhorn coral (*Acropora palmata*) *	Star coral (*Montastraea franksi*)
Mountainous star coral (*Montastraea faveolata*)	Lamarck's sheet coral (*Agaricia lamarcki*)
Pillar coral (*Dendrogyra cylindrus*)	Elliptical star coral (*Dichocoenia stokesii*)
Rough cactus coral (*Mycetophyllia ferox*)	
* proposed to be reclassified from threatened to endangered	

No colonies of ESA-listed corals have been observed during monitoring studies by CH2M HILL under contract to PRASA conducted in the area of the Aguadilla outfall since monitoring began in 1999. The nearest colonized hardbottom and reef areas near Aguadilla outfall that contain the essential features of coral critical habitat are located in the area of the coral monitoring stations, which were selected as being the nearest hardbottom areas to the diffuser. These coral monitoring stations are approximately 3,050 northeast and 3,228 feet southwest of the Aguadilla outfall. CH2M HILL also provided information indicating that *Montastraea annularis, M. faveolata,* and *Dichocoenia stokesii*, all of which are proposed for listing under the ESA, have been observed at the Aguadilla coral monitoring sites, but these sites are not in the vicinity of the outfall.

EPA has reviewed the BE and previous coral reef studies and has determined that the modified discharge from the Aguadilla RWWTP may affect, but is not likely to affect, federally-listed or proposed threatened or endangered species, critical habitat for the elkhorn or staghorn corals or any species of concern. Also, EPA has determined that the modified discharge will not affect critical habitat for the green, loggerhead, leatherback, and hawksbill sea turtles. On August 13, 2013, NOAA provided concurrence that the modified discharge from the Aguadilla RWWTP will comply with the ESA.

4. 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) modification from secondary treatment requirements for the Aguadilla RWWTP will not result in adverse impact to any EFH or species included in Caribbean or Federal Fisheries Management Plans. In 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 are no significant coral reefs in the vicinity of the outfall. EPA has determined that modified discharge from the Aguadilla RWWTP is consistent with the Executive Order on Coral Reef Protection. At this time, EPA is not of aware any additional Commonwealth laws that need to be addressed prior to issuance of a modified permit for the Aguadilla RWWTP.

VII. COMMONWEALTH CONCURRENCE OF SECTION 301(h) MODIFICATION

Under 40 CFR 125.61(b)(2) and 125.64(b), PRASA 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[9]. Furthermore, pursuant to 40 CFR 124.53 and 124.54, the Commonwealth of Puerto Rico must either grant a certification pursuant to CWA section 401 or waive this certification before EPA may issue a modified permit.

In July 2012, PRASA requested a determination from the EQB that the modified discharge from the Aguadilla RWWTP will comply with all applicable provisions of Commonwealth law. On November 26, 2013, the EQB issued a draft WQC that proposes to certify that the modified discharge will comply with all applicable provisions of Commonwealth law including applicable water quality standards and will not result in any

[9] The regulations at 40 CFR 125.61(b)(2) and 125.64(b) appear to infer that a statement of basis (or fact sheet) should be provided by EQB along with issuing its WQC. EQB doesn't usually provide such information with issuing the draft or final WQCs.

additional treatment requirements on any point or nonpoint sources (PREQB 2013). No timeline has been established on when the EQB will grant the final WQC.

VIII. SUMMARY OF FINDINGS

EPA reviewed information provided by PRASA and other supporting documents and makes the following findings for the Aguadilla RWWTP modified discharge's compliance with all applicable statutory and regulatory criteria:

1. The modified discharge will not cause violations of PRWQS standards for DO, color, or turbidity.

2. The modified discharge will consistently achieve PRWQS at and beyond the ZID. The modified discharge, alone or in combination with pollutants from other sources, will not impact public water supplies; interfere with the protection and propagation of a balanced indigenous population of fish, shellfish, and wildlife; or affect recreational activities.

3. PRASA has demonstrated it has an adequate effluent and receiving monitoring program to assess the impact of the modified discharge on the marine environment.

4. The modified discharge will not result in additional treatment requirements on any other point or nonpoint sources.

5. PRASA has a pretreatment program to limit the entrance of toxic pollutants from industrial sources into the Aguadilla RWWTP.

6. PRASA has an urban area pretreatment program that establishes local limits to control toxic pollutants from industrial sources and has demonstrated that it is able to enforce these limits.

7. PRASA has a toxics control program to limit the entrance of toxic pollutants from nonindustrial sources into the Aguadilla RWWTP.

8. There will be no new or substantially increased discharges from point sources of pollutants to which the modification applies above those specified in the modified permit.

9. The modified discharge will receive at least primary or equivalent treatment and meets the requirements established under section 304(a)(1) of the CWA after initial mixing.

In conclusion, EPA believes that the modified discharge from the Aguadilla RWWTP will not adversely impact the marine environment and the designated uses of the receiving water, and will comply with the requirements of section 301(h) of the CWA and 40 CFR Part 125, Subpart G.

IX. RECOMMENDATIONS

EPA recommends that PRASA be issued a modified permit for the Aguadilla RWWTP and that a public notice of intent to issue a modified permit be prepared in accordance with all applicable provisions of 40 CFR Parts 122 and 124. As required by 40 CFR 125.68, the modified permit shall contain, in addition to all applicable terms and conditions required by 40 CFR Part 122 and 124.53, the following special conditions:

1. All requirements determined necessary by the EQB as part of its WQC for the Aguadilla RWWTP to ensure that the modified discharge will comply with all applicable provisions of

Commonwealth law, including water quality standards.

2. Effluent limitations and mass loadings for BOD_5 and TSS in accordance with 40 CFR Part 125, Subpart G.

3. Requirements for the use of chemical addition (e.g., polymer) to increase solids removal to achieve a 50 percent removal rate, on a monthly average basis, for TSS.

4. Requirements to implement a section 301(h) monitoring program that include, but are not limited to, effluent, water quality, and biological monitoring that are consistent with 40 CFR 125.60, 125.62, 125.63, and 125.68(c). To address the detection limit issues described in Section 2.a of this document, these requirements include implementing a 301(h) monitoring program that uses a laboratory(ies) capable of detecting compounds at levels below the corresponding water quality standards.

5. Reporting requirements for the section 301(h) monitoring program in accordance with 40 CFR 125.68(d).

6. Requirements to modify, as necessary, and implement a toxics control program upon the effective date of the modified permit to limit the entrance of toxic pollutants from nonindustrial sources into the Aguadilla RWWTP. To address the detection limit issues described in Section 2.a of this document, these requirements include implementing a 301(h) monitoring program that uses a laboratory(ies) that is capable of detecting compounds at levels below the corresponding water quality standards.

7. Requirements to implement a pretreatment program and nonindustrial control program in accordance with 40 CFR 125.65, 125.66, and 125.68(b). These requirements include:

- Implementing a 301(h) monitoring program that uses a laboratory(ies) capable of detecting compounds at levels below the corresponding water quality standards.
- Providing comparisons to all local reporting limits for pollutants discharging to the Aguadilla RWWTP Service Area (refer to Exhibit 8 above).
- Providing a definition/listing of TTOs to describe what organic samples are designated as TTOs.

8. Recommendations for strengthening the analyses, elevating defensibility of decision-making, and to make the biological monitoring information potentially more useful for management actions include:

- Perform sample-based taxonomic quality control (QC) checks using separate taxonomist(s) in a different, independent laboratory. Calculate percent disagreement, and discuss differences (errors) and corrective actions. Present quantitative results in body of report.
- Use sort residue recheck results to calculate percent sorting efficiency (sorting bias). Discuss errors, in particular, those taxa most likely to be missed in sorting, and the designed/implemented corrective actions. Present quantitative results in body of report.
- Use sample replicate data to calculate field sampling precision. Calculate coefficient of variability (CV), relative percent difference (RPD), and/or 90-95% confidence intervals (CI).
- Use multivariate analyses to investigate the environmental factors (variables) that are most likely influencing benthic characteristics, and then, whether those factors originate as a result of the discharge point. Potentially useful techniques include non-metric multidimensional scaling (NMDS), principal components analysis (PCA), and random forests.

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