

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 Broadway
New York, New York 10007-1866

**FACT SHEET
FOR DRAFT NPDES PERMIT TO DISCHARGE
INTO THE WATERS OF THE UNITED STATES**

NPDES Permit No. **PR0023752**

Name and Address of Applicant:

Puerto Rico Aqueduct and Sewer Authority
P.O. Box 7066
Barrio Obrero Station
San Juan, Puerto Rico 00916

Name and Address of Facility where
Discharge Occurs:

Carolina Regional Wastewater Treatment Plant
Loíza, Puerto Rico

Receiving Water: **Atlantic Ocean**

Classification: **SC**

Permit Writer: Yasmin Laguer, Caribbean Environmental Protection Division

I. LOCATION OF DISCHARGE

The above-named applicant has applied for a National Pollutant Discharge Elimination System (NPDES) permit, to the U.S. Environmental Protection Agency (EPA) to discharge into the designated receiving water. The approximate U.S.G.S. coordinates for the effluent sampling point 001 are:

Latitude **18° 27' 44"** North
Longitude **66° 53' 24"** West

II. DESCRIPTION OF FACILITY

The Carolina Regional Wastewater Treatment Plant (RWWTP) started operations in May 1985. The facility is owned and operated by the Puerto Rico Aqueduct and Sewer Authority (PRASA). It is located in Torrecillas Alta Ward in Loíza, Puerto Rico. The Carolina RWWTP serves the municipalities of Carolina, Loíza, Rio Grande, Canóvanas, and some portions of San Juan.

The Carolina RWWTP is designed to treat an average hydraulic loading of **45** Million Gallons per Day (MGD) and a peak hydraulic loading of **90** MGD. Currently, the average daily and maximum flows are approximately 37.5 MGD and 76 MGD, respectively.

The facility's layout includes mechanical bar screen, grit removal mechanism, primary clarifiers, sludge handling facilities and disinfection area. Wastewater collected and transported to the Carolina RWWTP enters a common headwork structure prior to the three (3) bar screens. Coarse bar screens are designed to remove large debris such as rags, paper, rocks and material from wastewater stream. Removal of this material is necessary to protect mechanical equipment such as pumps and augers from excessive wear and tear. The discharge is through a high-rate diffuser of 6,234 feet long that has a constant diameter of seventy-two (72) inches. A total of thirty-four (34) diffuser ports discharging horizontally. Only thirteen (13) of the available ports were used in 1999 because the permitted capacity was limited to an average flow of 20.5 MGD. No additional ports have yet been opened. Based on the anticipated growth needs increased flow authorization for a maximum daily average flow of 45 MGD the proposed configuration with this renewal is to eventually have twenty-nine (29) open ports.

The Carolina RWWTP was designed to provide advanced primary treatment of wastewater prior to discharge to the Atlantic Ocean. Basic primary treatment involves the physical separation of solid matter in the wastewater by gravitational forces. Raw wastewater is composed of discrete and organic solid particles. Primary sedimentation basins are designed to remove a large fraction of the discrete or settleable solid particles. The organic fraction of solid particles, suspended solids, are minute in size and are not readily removed in the liquid-solid separation phase of the primary sedimentation basins. PRASA currently uses chemical addition to enhance sedimentation and the proposed permit requires the continued use of chemical addition.

III. DESCRIPTION OF DISCHARGE AND DRAFT PERMIT CONDITIONS

A description of the type and quantity of pollutants which are discharged or proposed to be discharged are appended as Attachment I. The effluent limitations, monitoring requirements, schedules of compliance and other conditions of the draft permit are also described in Attachment I.

IV. COMMONWEALTH CERTIFICATION REQUIREMENTS

Commonwealth Certification requirements are based upon an Intent to Issue a Water Quality Certificate (IWQC) issued by the Puerto Rico Environmental Quality Board (EQB) on November 2, 2009 and are described in Part I of the draft permit. Review and appeals of limitations and conditions attributable to Commonwealth Certification shall be made through the applicable procedures of the Commonwealth of Puerto Rico and may not be made through EPA procedures.

V. SECTION 301(h) MODIFIED PERMIT REQUIREMENTS FOR THE CAROLINA RWWTP

On December 1, 2006, the Puerto Rico Aqueduct and Sewer Authority (PRASA) submitted an application for renewal of its NPDES permit for the Carolina RWWTP, NPDES No. PR 0023752. The current NPDES permit was issued to this facility in 2002, effective date June 1, 2002, contains modifications of the secondary treatment requirements contained in Section 301(b)(1)(B) of the Clean Water Act (CWA, § 1311(b)(1)(B), which were made pursuant to Section 301(h) of the CWA, 33 U.S.C. §1311(h).

A detailed discussion of EPA's findings, conclusions and recommendations on compliance of the Carolina RWWTP discharge with the criteria under Section 301(h) of the CWA, as implemented by regulations contained in 40 CFR Part 125, Subpart G (47 Fed. Reg. 53666, November 26, 1982) is presented in EPA Region 2's tentative decision document. But it can be summarized that EPA, with the concurrence of the EQB, is proposing a draft section 301(h) modified permit under Section 402 of the CWA which modifies the requirements of subsection 301(b)(1)(B) with respect to the discharge of any pollutant from a publicly owned treatment works into marine waters. The applicant has demonstrated compliance with the following provisions of Section 301(h):

(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 protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife, and allows recreational activities, in and on the water;

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

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

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

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

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

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

(9) the applicant at the time such modification becomes effective will be discharging effluent which has received at least primary or equivalent treatment and which meets the criteria established under Section 304(a)(1) of this CWA after initial mixing in the waters surrounding or adjacent to the point at which such effluent is discharged . . .

VI. EPA CONTACT

Additional information concerning the draft permit and the proposed 301(h) determination may be obtained between the hours of 8:00 A.M. and 4:30 P.M., Monday through Friday from:

Mr. Carl Soderberg, Director
Caribbean Environmental Protection Division
U.S. Environmental Protection Agency

Region 2
Centro Europa Building, Suite 417
1492 Ponce de Leon Avenue, Stop 22
San Juan, Puerto Rico 00909
(787) 977-5870

ATTACHMENT I

DESCRIPTION OF DISCHARGE AND DRAFT PERMIT CONDITIONS

Discharge No. 001

The treatment plant effluent is discharged through Outfall No. 001 into the **Atlantic Ocean (Classification SC)**.

The following are the proposed effluent limitations and permit conditions:

1. The proposed effluent limitations for BOD and TSS are based on the Federal definition of primary or equivalent treatment, 40 CFR 125.60, EPA's section 301(h) determination, the Intent to Issue a Water Quality Certificate (IWQC) issued by EQB on November 3, 2009 for the facility and an evaluation of existing effluent quality performed by EPA.
2. Average Monthly BOD₅ Concentration - **130** mg/l
Percent Removal - **30** %
3. Average Monthly Suspended Solids Concentration - **70** mg/l
Percent Removal - **60** %
4. Maximum Daily Discharge: **90** MGD
Average Monthly Discharge: **45** MGD

The draft permit includes a Mixing Zone (MZ) which has been defined and authorized by the Puerto Rico Environmental Quality Board (EQB) pursuant to Article 5 of the Puerto Rico Water Quality Standards Regulations (PRWQSR). The MZ is delineated by the following points:

Geographic Coordinates

Point 1	Lat. 18° 27' 46.8" Lon. 65° 53' 25.3"
Point 2	Lat. 18° 27' 46.8" Lon. 65° 53' 22.7"

Point 3 Lat. 18°27' 38.8"
 Lon. 65°53' 22.7"

Point 4 Lat. 18°27' 38.8"
 Lon. 65°53' 25.3"

Wastewater from the Carolina RWWTP is discharged into the receiving water through a high-rate diffuser of 6,234 feet long and a constant diameter of seventy two (72) inches. A total of thirteen (13) diffuser ports discharging horizontally.

6. The MZ has been defined by EQB and has been included in the draft permit for the following parameters: **Arsenic, Color, Copper, Free Cyanide, Dissolved Oxygen, Mercury, Nickel, Nitrogen (NO₂, NO₃, and NH₃), pH, Silver, Sulfide, Surfactants, Thallium, Turbidity and Zinc.**
7. The water quality-based effluent limitations from the previous permit for **Arsenic, Color, Copper, Cyanide, Lead, Mercury, Nitrogen, Surfactants, and Thallium** have been replaced with less stringent water quality-based limitations as specified in the IWQC issued by the EQB. EPA has determined that it is appropriate to relax the effluent limitation for these parameters without violating anti-backsliding provisions of the CWA, in accordance with section 402(o), since one of the exceptions to the provisions has been satisfied. The EQB water quality certificate, which was developed in accordance with the section 301(h) Waiver Demonstration Studies, constitutes a determination that the limit is sufficient to assure that the water quality standards are or will be attained.
8. The water quality-based effluent limitations from the previous permit for **Antimony, Barium, Cadmium, Fluoride, Manganese, Phenolic Substances, Selenium, and TKN** are not included in the IWQC issued by the EQB. EPA has determined that it is appropriate to remove the effluent limitations for these parameters without violating the anti-backsliding provisions of the CWA, in accordance with section 402(o), since one of the exceptions to the provisions has been satisfied. CWA section 402(o)(2)(B)(i) allows backsliding if information is available which was not available at the time of permit issuance and would have justified a less stringent effluent limitation at the time of permit issuance. Information submitted indicates that the discharge from outfall 001 is not reasonably expected to contribute to a water quality exceedance for these parameters. Therefore, a water quality-based effluent limitation is not necessary for these parameters. Antidegradation requirements are not violated by removing the limits for these parameters. The permittee will be maintaining the same level of treatment and discharging the pollutants at the same level. Therefore, the discharge would not contribute to further degradation of the receiving water and existing uses would be maintained.

9. The water quality-based effluent limitations from the previous permit for **Nickel, Oil and Grease, Silver, Turbidity, and Zinc** have been replaced with more stringent water quality-based limitations as specified in the IWQC issued by the EQB. Pursuant to Section 401 (d) of the CWA and 40 C.F.R. 122.44 (d) and 124.55, all State certified limitations and requirements contained in a Section 401 certification must be incorporated into a NPDES permit issued by EPA. The water quality-based effluent limitations referenced in this paragraph have been included in the draft NPDES permit, based on EQB's IWQC .
10. The water quality-based effluent limitations from the previous permit for **Fecal Coliform** has been replaced with more stringent water quality-based limitation than specified in the IWQC issued by the EQB. EPA understands that there is sufficient data from the facility that proves that Carolina RWWTP is able to comply with the water quality-based limitation from the 2003 PR Water Quality Standards Regulation.
11. Pursuant to Section 401 (d) of the CWA and 40 C.F.R. 122.44 (d) and 124.55, all State certified limitations and requirements contained in a Section 401 certification must be incorporated into a NPDES permit issued by EPA. The water quality-based effluent limitations referenced in this paragraph have been included in the draft NPDES permit, based on EQB's IWQC .
12. Effluent limitations for **Arsenic, Color, Copper, Cyanide, Dissolved Oxygen, Enterococci, Lead, Mercury, Nickel, Nitrogen, Oil & Grease, pH, Residual Chlorine, Silver, Solids and other Matter, Sulfide, Surfactants, Suspended, Colloidal or Settleable Solids, Taste and Odor-producing Substances, Temperature, Thallium, Turbidity, and Zinc** are based on EQB's IWQC.
13. The following Special Condition was included as written in the IWQC issued by the Puerto Rico EQB dated June 12, 2007, with the following additions/clarifications:

EPA has included an effluent limitation for **Whole Effluent Toxicity (WET)** for the Carolina RWWTP discharge on Special Condition 21. As well as a final limit for Chronic Toxicity in Table A-1. The data obtained by PRASA shows evidence of toxicity in the Carolina RWWTP discharge. For this reason, EPA has included final chronic limitation of **100.47** in the permit. Additional information is included in Attachment II of this document.
14. The draft permit requires the permittee to comply with the requirements of the **Urban Area Pretreatment Program** as established in 40 CFR 125.65 and 40 CFR 403. The implementation of an Urban Area Pretreatment Program is a requirement of the section 301(h) program and is established to control the entrance of toxic pollutants into the Carolina RWWTP.

15. The draft permit requires the permittee to comply with the **Sanitary Sewage Sludge** requirements as established in 40 CFR 503. As required by the CWA amendments of 1987, EPA developed this regulation to protect public health and the environment from any reasonably anticipated adverse effects of certain pollutants that might be present in sewage sludge biosolids.
16. As required in 40 CFR 125.62, the draft permit includes the requirement for the permittee to continue to implement a **Post-Waiver Monitoring Program**. This monitoring program is designed to provide data to demonstrate compliance with applicable PRWQSR and CWA Section 301(h) criteria, to evaluate the impact of the facility's discharge on the marine biota, and to measure the potential toxic substances in the discharge. Under 40 CFR 125.62, the goals of this program are to: document short and long term effects of the modified discharge in the receiving waters, sediments, biota and on beneficial uses of the receiving waters; determine compliance with NPDES permit terms and conditions and the applicable PRWQS and EPA marine criteria; and to assess the effectiveness of the applicant's toxic control program.
17. As required in 40 CFR 125.66, the draft permit requires the permittee to implement a **Non-Industrial Source Control Program** to the permittee can eliminate the entrance of toxic pollutants from non-industrial sources into such treatment works.
18. The permittee shall continue with the use of chemical addition to enhance solids sedimentation, this addition shall be flow proportional. PRASA may use other components to enhance sedimentation as long as it does not affect the quality and/or composition of the facility's effluent.
19. All effluent sampling shall be performed at the effluent sampling point 001 identified at the facility. All section 301(h) related samples shall be performed as established in the approved QAPP.

ATTACHMENT II

Special Condition No. 21: Whole Effluent Toxicity Requirements

Water quality based permitting requirements at 40 CFR 122.44(d)(1) require EPA and delegated states to evaluate each National Pollutant Discharge Elimination System (NPDES) permit for the potential to exceed state numeric or narrative water quality standards, including those for toxics, and to establish effluent limitations for those facilities with the "reasonable potential" to exceed those standards. Federal regulations require both chemical specific limits, based on the state numeric water quality standards or other criteria developed by EPA, and whole effluent toxicity effluent limits if reasonable potential to exceed water quality standards is determined.

EPA examined the results submitted by PRASA for their potential to cause or contribute to an excursion of the Puerto Rico water quality criterion for chronic and acute toxicity. The results of the recent testing are summarized below in Tables 1, 2, and 3.

TABLE 1				
Comparison of acute WET results (LC₅₀, TUa) and acute WLA (36.9 TUa)				
Test Date	Test Organism	LC₅₀ (% Effluent)	Effluent TUa	Is Effluent TUa > 36.9 TUa
December 2002	Mysid Shrimp	<100	>1	No
	Sheepshead Minnow	<100	>1	No
March 2003	Mysid Shrimp	32.99	3.03	No
	Sheepshead Minnow	42.05	2.38	No
June 2003	Mysid Shrimp	35.36	2.83	No
	Sheepshead Minnow	35.36	2.83	No
August 2004	Mysid Shrimp	15.51	6.45	No
	Sheepshead Minnow	48.77	2.05	No
December 2006	Mysid Shrimp	48.3	2.07	No
	Sheepshead Minnow	38.4	2.60	No
April 2007	Mysid Shrimp	54.8	1.82	No
	Mysid Shrimp	46.9	2.13	No
	Sheepshead Minnow	45.7	2.19	No
January 2009	Mysid Shrimp	48.6	2.06	No
	Sheepshead Minnow	22.2	4.51	No

April 2009	Mysid Shrimp	17.5	5.71	No
	Sheepshead Minnow	55.0	1.82	No
July 2009	Mysid Shrimp	52.0	1.92	No
	Sheepshead Minnow	40.5	2.47	No

Test Date	Test Organism	NOEC (% Effluent)	Effluent TUc ¹	Is Effluent TUc > 123 TUc?
December 2006	Mysid Shrimp	<0.79	>127	Yes
	Sea Urchin	<0.78	>128	Yes
	Sea Urchin	<0.78	>128	Yes
	Sea Urchin	0.78	128	Yes
	Sheepshead Minnow	12.5	8	No
April 2007	Mysid Shrimp	9.0	11.1	No
	Sea Urchin	0.07	1429	Yes
	Sea Urchin	<0.07	>1429	Yes
	Sea Urchin	2.7	37	No
	Sheepshead Minnow	9.0	11.1	No
January 2009	Mysid Shrimp	9.00	11.1	No
	Sea Urchin	14.4	7.63	No
	Sheepshead Minnow	9.00	11.1	No
April 2009	Mysid Shrimp	2.71	36.9	No
	Sea Urchin	0.81	123.5	No
	Sheepshead Minnow	30.0	3.33	No
July 2009	Mysid Shrimp	9.00	11.1	No
	Sea Urchin	2.70	37.0	No
	Sheepshead Minnow	9.00	11.1	No

¹Pursuant to Article 1 of PRWQS, chronic toxic units are calculated based on the NOEC expressed in terms of the percent of the effluent in the dilution water.

TABLE 3 Comparison of chronic WET results based on IC ₂₅ and chronic WLA (123 TUC)				
Test Date	Test Organism	IC ₂₅ (% Effluent)	Effluent Toxicity Value ¹	Is Effluent Toxicity Value > 123 TUC?
December 2006	Mysid Shrimp	9.87	10.13	No
	Sea Urchin	0.36	277.78	Yes
	Sea Urchin	2.25	44.44	No
	Sea Urchin	0.64	156.25	Yes
	Sheepshead Minnow	17.9	5.59	No
April 2007	Mysid Shrimp	21.6	4.63	No
	Sea Urchin	1.21	82.64	No
	Sea Urchin	6.34	15.77	No
	Sea Urchin	3.85	25.97	No
	Sheepshead Minnow	23.2	4.31	No
January 2009	Mysid Shrimp	13.8	7.25	No
	Sea Urchin	14.4	6.94	No
	Sheepshead Minnow	13.1	7.63	No
April 2009	Mysid Shrimp	9.95	10.05	No
	Sea Urchin	3.61	27.70	No
	Sheepshead Minnow	37.5	2.67	No
July 2009	Mysid Shrimp	11.3	8.85	No
	Sea Urchin	4.26	23.47	No
	Sheepshead Minnow	14.7	6.80	No

¹Effluent toxicity values are calculated based on the reciprocal of the IC₂₅ expressed in terms of the percent of the effluent in the dilution water, where the effluent toxicity value = $100 \div IC_{25}$.

Where Reasonable Potential exists for a parameter to exceed a water quality criterion, EPA must include a limitation in the NPDES permit for that discharge. It is clear to EPA from the above analysis that both the NOEC values and IC₂₅ values for fertilization indicate reasonable potential to exceed the water quality criterion of 1.0 TUC at the edge of the mixing zone. The toxicity data also indicates toxicity levels above the numeric interpretation of EQB's water quality standard of "no toxics in toxic amounts" at the discharge, which is 0.3 TUa for acute toxicity, and 1.0 for chronic toxicity. Additionally, this facility has been granted a mixing zone conditioned upon the absence of a toxic condition at the edge of the mixing zone, and EPA's Clean Water Act §301(h) Determination is also conditioned on the absence of a toxic condition after mixing.

Calculation of Waste Load Allocation (WLA)

The WLA is used to determine the level of effluent concentration that will comply with water quality standards in receiving waters. Using the information available for dilution, WLAs were calculated for WET using the complete mix equation:

$$WLA (C_d) = \frac{[C_r(Q_d + Q_s)] [(C_s)(Q_s)]}{Q_d}$$

Which simplifies to $WLA = C_r \times \text{Dilution Ratio}$

where C_r = the water quality criterion concentration. In Puerto Rico, a criterion continuous concentration of 1.0 TU_c, and a criterion maximum concentration (CMC) of 0.3 TU_a is used as the numeric interpretation of the water quality standard for toxicity.

PRASA has calculated the critical initial dilution (CID) to afford a dilution ratio of 123:1. Therefore, the chronic WLA would be

$$WLA_c = C_r \times 123 = 1.0 \times 123 = 123.0 \text{ TU}_c$$

$$WLA_a = 0.3 \times 123 = 36.9 \text{ TU}_a$$

$$WLA_{a,c} = WLA_a \times ACR = 36.9 \times 10 = 369 \text{ TU}_{a,c}$$

Calculate Long-term Averages (LTAs).

To calculate the long term average (LTA):

$$LTA = WLA \times e^{\frac{2}{[0.05\sigma^2 - z\sigma]}}$$

$$LTA_{a,c} = 369 \times 0.321 = 118.45 \text{ TU where:}$$

0.321 is the acute WLA multiplier for $C_v = 0.6$ at the 99th percentile (from Table 5-1, pg. 102 of the TSD)

$$LTA_c = WLA_c \times e^{\frac{[0.5\sigma^2 - z\sigma]}{4}}$$

$$LTA_c = 123 \times 0.527 = 64.82 \text{ where:}$$

0.527 is the chronic WLA multiplier at the 99th percentile for $C_v = 0.6$ (from Table 5-1, pg. 102 of the TSD)

Select the minimum LTA.

The LTA based on the chronic WLA more limiting and will be used to develop permit limits.

Limit Calculation:

Using the 95th percentile and monthly sampling, the effluent limit is calculated as:

$$LTA \times e^{\left[\frac{z\sigma}{n} - 0.5\frac{\sigma^2}{n}\right]} \text{ where } e^{\left[\frac{z\sigma}{n} - 0.5\frac{\sigma^2}{n}\right]} = \text{AML LTA multiplier}$$

$z = 1.645$ for the 95th percentile occurrence probability for the AML is recommended

$n =$ number of samples/month (the TSD recommends that a minimum n of 4 be used, even if monitoring is less frequent).

From Table 5-2, on pg. 102 of the TSD, for $Cv = 0.6$ and $n=4$,

$$\text{AML} = 64.82 \times 1.55 = \mathbf{100.47 \text{ TUc}}$$

EPA has included the numeric limitation of 100.47 TUc for chronic toxicity.

EPA is also requiring that the discharger develop a plan for a toxicity reduction evaluation (TRE) within the first three months of the permit term. During the accelerated testing period an additional violation of the limitation on the discharge would require the permittee to activate its TRE workplan, and implement its strategy to identify and abate the source of toxicity.

ATTACHMENT III

Ocean Discharge Criteria

Under Section 403(c) of the Clean Water Act, Ocean Discharge Criteria regulations (45 FR 65942, October 3, 1980, modified at 40 CFR Part 125, Subpart M), provide that no permit for a discharge to the territorial sea, the contiguous zone, or the ocean may be issued except in compliance with the Ocean Discharge Criteria. Since Carolina RWWTP wastewater discharges to the territorial sea (i.e., the Atlantic Ocean), compliance with the Ocean Discharge Criteria has been evaluated as part of the NPDES renewal process.

The Carolina RWWTP's discharge has been evaluated for impacts as part of the EPA decision making process for the granting of section 301(h) waiver from secondary treatment requirements. Sufficient information is available to establish that the modified discharge will not cause unreasonable degradation to the marine environment.