United States Environmental Protection Agency
Region 2
Clean Water Division
New York, New York 10007

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PUERTO RICO ELECTRIC POWER AUTHORITY
COSTA SUR POWER PLANT
PERMIT No. PR0001147

This Fact Sheet sets forth the principle facts and technical rationale that serve as the legal basis for the requirements of the accompanying draft permit. The draft permit has been prepared in accordance with Clean Water Act (CWA) section 402 and its implementing regulations at Title 40 of the *Code of Federal Regulations* (CFR), Parts 122 through 124, and the final Water Quality Certificate (WQC) issued by the Puerto Rico Environmental Quality Board (EQB) pursuant to CWA section 401 requirements.

Pursuant to 40 CFR 124.53, the Commonwealth of Puerto Rico must either grant a certification pursuant to CWA section 401 or waive this certification before the U.S. Environmental Protection Agency (EPA) may issue a final permit. **On** November 1, 2017**, the** EQB provided in the WQC that the allowed discharge will not cause violations to the applicable water quality standards at the receiving water body if the limitations and monitoring requirements in the WQC are met. In accordance with CWA section 401, EPA has incorporated the conditions of the final WQC into the draft permit. The WQC conditions are discussed in this Fact Sheet and are no less stringent than allowed by federal requirements. Additional requirements might apply to comply with other sections of the CWA. Review and appeals of limitations and conditions attributable to the WQC were made through the applicable procedures of the Commonwealth of Puerto Rico and not through EPA procedures.

Background

A. Permittee and Facility Description

The Puerto Rico Electric Power Authority (PREPA) (referred to throughout as the Permittee) has applied for renewal of its National Pollutant Discharge Elimination System (NPDES) permit. The Permittee is discharging pursuant to NPDES Permit No**.** PR0001147. The Permittee submitted Application Form 1, and Forms and 2F on March 28, 2014, applying for an NPDES permit to discharge **treated** wastewater from the Costa Sur Power Plant in Guayanilla, Puerto Rico, referred herein as the facility. The applicant later provided a supplement to their NPDES renewal application on March 16, 2015, providing updated storm water characteristics data. The facility is classified as **a** major discharger by EPA in accordance with the EPA rating criteria.

The Permittee owns and operates a steam electric generating station. Attachment A of this Fact Sheet provides a map of the area around the facility and a flow schematic of the facility.

The applicant has provided the following description of the facility and treatment system:

> The facility is an onshore steam electric power generation facility located at the south coast of Puerto Rico in Guayanilla municipality. The facility consists of two 410 MW dual fuel oil/natural gas units for a total of 820 MW, two 85 MW oil-fired units (170 MW total) and two 22 MW gas turbine generator power units (44 MW total). The total electric generating capacity of the complex is 1034 MW.
>
> The SCPP uses sea water from Guayanilla Bay for cooling purposes. EcoElectrica Multistep Distilled Seawater and/or well water from nearby groundwater wells is used to producte demineralized water needed for the electric generation process. Once-through Cooling water, treated process wastewater, and stormwater is discharged through Outfall 001 to a small cove located at the sourth part of the facility, and then into the Guayanilla Bay. Stormwater is discharged through Outfalls 002 and 003 into the Guayanilla Bay. (March 2014 NPDES Renewal Applicaion, Section 2)

Summary of Permittee and Facility Information

Permittee	Puerto Rico Electric Power Authority
Facility contact, title, phone	Luisette X. Ríos Castañer, Environmental Compliance Supervisor, (787) 521-4966 email: L-RIOS@AEEPR.COM
Permittee (mailing) address	P.O. Box 364267, San Juan, Puerto Rico 00936-4267
Facility (location) address	Costa Sur Power Plant, State Road No. 127, Cedros Ward, Guayanilla, Puerto Rico 00656
Type of facility	Steam Electric Power Generating Station, SIC Code 4911
Pretreatment program	N/A
Facility maximum daily flow	1,156 million gallons per day (MGD)
Facility permitted flow	751.5 MGD
Facility classification	Major

B. Discharge Points and Receiving Water Information

Wastewater is discharged from Outfalls 001, 002, and 003 to Guayanilla Bay, a water of the United States. Guayanilla Bay is classified as "SC" (coastal waters intended for uses where the human body may come in indirect contact with the water (e.g. fishing and boating) and for use in propagation and preservation of desirable species) by the Puerto Rico Environmental Quality Board (EQB).

The draft permit authorizes the discharge from the following discharge point(s):

Outfall	Effluent description	Outfall latitude	Outfall longitude	Receiving water name and classification
001	Condenser cooling water, cooling towers blowdown, condensate from fuel heater system, miscellaneous water use, wastewater treatment plant effluent, storm water runoff, fire protection system test and hyydrostatic test waters	17.00°, 59.00', 20.00" N	66.00°, 45.00', 0.00" W	Guayanilla Bay, Class SC
002	Storm Water	18.00°, 0.00', 12.00" N	66.00°, 45.00', 20.00" W	Guayanilla Bay, Class SC
003	Storm Water	18.00°, 0.00', 13.00" N	66.00°, 45.00', 21.00" W	Guayanilla Bay, Class SC

Source and Receiving Water

As indicated in the Puerto Rico Water Quality Standards (PRWQS) Regulations, the designated uses for Class **SC** receiving waters include:

1. Primary and secondary contact recreation; and
2. Propagation and preservation of desirable species, including threatened and endangered species

CWA section 303(d) requires the Commonwealth of Puerto Rico to develop a list of impaired waters, establish priority rankings for waters on the list, and develop TMDLs for those waters. The receiving water has been determined to have water quality impairments for one or more of the designated uses as determined by section 303(d) of the CWA. Waterbody segment PRSC38, which includes Guayanilla Bay from Punta Guayanilla to Punta Verraco, is listed impaired due to Enterococcus Bacteria, Oil & Grease, Thermal

Modifications, and Turbidity *(Puerto Rico 2014 305(b) and 303(d) Integrated Report, Environmental Quality Board, p. 202)*

C. Mixing Zone/Dilution Allowance

A mixing zone or dilution allowance has not been authorized for the discharger.

D. Compliance Orders/Consent Decrees

A Consent Decree addressing all four NPDES permitted power plants has been in effect since 1999. The construction of all projects under Section VI, Park I, Item 2 of the CD, regarding the Costa Sur (South Coast) Power Plant was completed. PREPA has maintained compliance with all continuing requirements of the Decree.

E. Summary of Basis for Effluent Limitations and Permit Conditions - General

The effluent limitations and permit conditions in the permit have been developed to ensure compliance with the following, as applicable:

1. Clean Water Act section 401 Certification
2. NPDES Regulations (40 CFR Part 122)
3. PRWQS (April 2016)
4. Technology-based limits are included based upon 40 CFR §122.45(h),
5. Effluent Limitation Guidelines (ELG) for the Steam Electric Generating Point Source Category at 40 CFR §423.12, and §423.13
6. Clean Water Act §316(b) Existing Facilities Final Rulemaking signed May 19, 2014, and implementing regulations at 40 CFR §125.94.

PART I. RATIONALE FOR EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

CWA section 301(b) and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable technology-based requirements where necessary to achieve applicable water quality standards. In addition, 40 CFR 122.44(d)(1)(i) requires that permits include effluent limitations for all pollutants that are or may be discharged at levels that cause, have the reasonable potential to cause, or contribute to an exceedance of a water quality criterion, including a narrative criterion. The process for determining reasonable potential and calculating water quality-based effluent limits (WQBELs) is intended to protect the designated uses of the receiving water, and achieve applicable water quality criteria. Where reasonable potential has been established for a pollutant, but there is no numeric criterion for the pollutant, WQBELs must be established using (1) EPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

The effluent limitations and permit conditions in the permit have been developed to ensure compliance with all federal and state regulations, including PRWQS. The basis for each limitation or condition is discussed below.

A. Effluent Limitations

The permit establishes both Technology-based Effluent Limitations (TBELs) and WQBELs for several pollutants and the basis for these limitations are discussed below**.**

1. **Flow:** An effluent limitation for flow has been established in the permit. Monitoring conditions are applied pursuant to 40 CFR 122.21(j)(4)(ii) and the WQC.
2. **Dissolved Oxygen.** The effluent limitation is based on the water quality criterion for Class **SC** waters as specified in Rule **1303.2** of PRWQS, and the WQC.
3. **Flow:** An effluent limitation for flow has been established in the permit. Monitoring conditions are applied pursuant to 40 CFR 122.21(j)(4)(ii) and the WQC.

4. **Narrative Effluent Limitations.**

    a. **Color.** A narrative effluent limitation for color has been established based on Rule 1303.2 of the PRWQS and the WQC. As required by the WQC, monitoring for color shall occur at the effluent and the receiving water body.

    b. **Oil and Grease.** A narrative condition for oil and grease has been established based on Rule 1303.1 of the PRWQS and the WQC.

    c. **Solids and Other Matter**: A narrative condition for solids and other matter has been established based on Rule 1303.1 of the PRWQS and the WQC.

    d. **Suspended, Colloidal or Settleable Solids.** A narrative condition for suspended, colloidal or settleable solids has been established based on Rule 1303.1 of the PRWQS and the WQC.

    e. **Taste and Odor Producing Substances.** A narrative effluent limitation for taste and odor producing substances has been established based on Rule 1303.2 of the PRWQS and the WQC.

5. **pH.** The effluent limitation for pH is on the water quality criterion for Class SC based on Rule 1303.2 of the PRWQS and the WQC.

6. **Turbidity.** The effluent limitation for turbidity is based on Rule 1303.2 of the PRWQS.

7. **Whole Effluent Toxicity (WET):** CWA section 101(a) establishes a national policy of restoring and maintaining the chemical, physical and biological integrity of the nation's waters. Specifically, CWQ section 101(a)(3) and PRWQS Rule 1303(l) prohibit the discharge of toxic pollutants in toxic amounts. Federal regulations at 40 CFR 122.44(d) also require that where the permitting authority determines, through the analysis of site-specific WET data, that a discharge causes, shows a reasonable potential to cause, or contributes to an excursion above a water quality standard, including a narrative water quality criterion, the permitting authority must establish effluent limits for WET. To satisfy requirements of the CWA, its implementing regulations, and the PRWQS, a reasonable potential analysis for WET was conducted for this discharge.

    PRWQS do not provide a numeric criterion for toxicity. Therefore, consistent with the recommendations of section 2.3.3 of EPA's *Technical Support Document* (TSD) *for Water Quality-Based Toxics Control* (EPA-505-2-90-001), values of 0.3 acute toxic unit (TUa) and 1.0 chronic toxic unit (TUc) were used to interpret the narrative water quality criteria for WET established in PRWQS Rule 1303(i). The toxicity data collected in quarterly in 2008 indicates the test results as "passing" for both discharges. As such, no WET testing limitation have been established in the permit. However, as the existing WET data is over 10 years old, the permit does establish monitoring requirements and an action level for acute WET to determine unacceptable toxicity.

8. **Toxic Metals and Organic Compounds:** In accordance with 40 CFR 122.44(d), a WQBEL must be established if the discharge of a pollutant demonstrates that it is or might be discharged at a level that will cause, have the reasonable potential to cause, or contributes to an excursion above any state water quality standard. The need for WQBELs is based on the procedures specified in section 5 of EPA's TSD and by comparing effluent data and water quality criteria established in PRWQS Rule 1303 and the National Toxics Rule at 40 CFR 131.36(d)(4).

9. **Color, Oil & Grease, Solids & Other Matter, Suspended, Colloidal, or Settleable Solids, Taste & Odor Producing Substances:**

    a. **Color.** A narrative effluent limitation for color has been established based on Rule 1303.2 of the PRWQS and the WQC. As required by the WQC, monitoring for color shall occur at the effluent and the receiving water body.

    b. **Oil and Grease.** A narrative condition for oil and grease has been established based on Rule 1303.1 of the PRWQS and the WQC.

    c. **Solids and Other Matter:** A narrative condition for solids and other matter has been established based on Rule 1303.1 of the PRWQS and the WQC.

    d. **Suspended, Colloidal or Settleable Solids**. A narrative condition for suspended, colloidal or settleable solids has been established based on Rule 1303.1 of the PRWQS and the WQC.

e. **Taste and Odor Producing Substances.** A narrative effluent limitation for taste and odor producing substances has been established based on Rule 1303.2 of the PRWQS and the WQC.

10. **Whole Effluent Toxicity (WET):** CWA section 101(a) establishes a national policy of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Specifically, CWA section 101(a)(3) and PRWQS Rule 1303(I) prohibit the discharge of toxic pollutants in toxic amounts. Federal regulations at 40 CFR 122.44(d) also require that where the permitting authority determines, through the analysis of site-specific WET data, that a discharge causes, shows a reasonable potential to cause, or contributes to an excursion above a water quality standard, including a narrative water quality criterion, the permitting authority must establish effluent limits for WET. To satisfy the requirements of the CWA, its implementing regulations, and the PRWQS, a reasonable potential analysis for WET was conducted for this discharge.

    PRWQS do not provide a numeric criterion for toxicity. Therefore, consistent with the recommendations of section 2.3.3 of EPA's *Technical Support Document* (TSD) *for Water Quality-Based Toxics Control* (EPA-505-2-90-001), values of 0.3 acute toxic unit (TU_a) and 1.0 chronic toxic unit (TU_c) were used to interpret the narrative water quality criteria for WET established in PRWQS Rule 1303(I). In addition, the permit establishes a requirement for the Permittee to conduct accelerated testing and develop a Toxicity Reduction Evaluation (TRE) Workplan as Special Conditions. These requirements are necessary to ensure that the Permittee has a process for addressing effluent toxicity if toxicity is observed.

11. **Free Available Chlorine, Total Residual Chlorine, Chromium, Iron, Zinc, Polychlorinated Biphenyls (PCBs), Total Suspended Solids, and monitoring requirements for 126 Priority Pollutants** are based on Steam Electric Power Generating Point Source Category cooling tower blowdown waste sources effluent guideline, representing the degree of effluent reduction attainable by the application of BAT (40 CFR 423.13(d)(1)). This guideline also includes a requirement that no detectable amount of the 126 Priority Pollutants be discharged, and a prohibition on the discharge of PCBs.

12. **Temperature**

    The March 10, 1992 permit for this facility required development of a work plan and subsequent field work to supplement a Clean Water Act §316(a) variance request for discharge Outfall 001, and included a limit of 107° Fahrenheit (F) for Outfall 001 which discharges to a cove with limited mixing. The §316(a) variance from temperature standards allows for cooling water discharges to cause exceedances of a State's water quality standard for temperature, provided that a biologically indigenous population of aquatic life can be supported. A 316(a) draft Plan of Study (POS) for the facility was submitted to EPA in 1995. After the submittal of substantial documentation by PREPA, EPA Region 2 recommended a denial of the variance request for the thermal component of the 001 discharge based on existing information. EPA determined that the 107° F discharge could not support a finding of a biologically indigenous population in the receiving waters, and therefore EPA could not grant a variance from the water quality standards for temperature under Clean Water Act §316(a). The denial of the 316(a) variance was included in a draft permit proposed on January 21, 2005.

    After the 2005 draft permit was issued, EPA and PREPA agreed, in consultation with the Guayanilla community, that PREPA would prepare an evaluation of alternatives to bring the discharge into compliance with the water quality standard for temperature. This resulted in a Detailed Engineering While many alternatives for this discharge have been considered, few of the alternatives would accomplish the goal of compliance with Puerto Rico Water Quality Standards and the Clean Water Act. The alternatives were also analyzed by PREPA for feasibility and cost. This process resulted in a preliminary selected alternative, to relocate the thermal discharge to deeper, cooler waters, where the discharge could comply with the temperature standard of 90° F after mixing. Routes for the proposed pipeline were considered along the northern portion of Guayanilla Bay and the southern portion. The impacts of these alternatives, as well as other possible alternatives, were considered during the environmental review process for this project. A compliance schedule to conduct the environmental review and obtain environmental permits for this alternative was included in the 2009 existing NPDES permit.

Since the 2009 issuance of that permit, PREPA has converted the Costa Sur facility to using natural gas and adjusted the use of the generating units at the plant. As a result, the temperature of the discharge has been significantly reduced from the former high temperatures of as much as 107° F.

PREPA has also pursued the permitting and environmental review process that would be required for relocating the discharge. The scoping process for environmental review lead to comments from neighboring facilities and community members regarding impacts of construction of a new outfall pipe, that would potentially harm fishing habitats and require right of way through other properties. The Environmental Review process required to obtain permits for the relocation of the discharge lead to a decision that the alternative with the most environmentally beneficial impact would be to leave the discharge in the cove at its existing location, and reduce the temperature of the dishcharge to between 96° F and 98° F through equipment upgrades and modified plant operations.

PREPA submitted a request for an alternative temperature limit to the EQB on Marc 1, 2017. The EQB included an alternative temperature limit based on this history, improvements in the temperature of the discharge, and consistent with their water qualtiy standards provisions the final WQC issued on November 1, 2017. EPA has included the temperature limit based on the WQC.

13. **Total Suspended Solids, and Oil and Grease on oil water separators and storm water monitoring stations** have been retained from the previous permit, and were origirnally based on *EPA Region II Revised Guidance for Cooling Water and Storm Water Runoff (September 5, 1991),* which established effluent limitations based on best professional judgement (BPJ) for discharges of storm water and non-contact cooling water from industrial facilities in Puerto Rico. These limitations were also included in the previous permit. The limitation for Chemical Oxygen Demand has been removed from Outfall 001h based on our best professional judgement that the Oil and Grease and Total Suspended Solids limits are representative and protective for the pollutants in this waste stream.

B. Effluent Limitations Summary Table

Outfall Number 001

Effluent Limitations Table A-1 – Outfall 001 **(**Condenser cooling water, cooling towers blowdown, condensate from fuel heater system, miscellaneous water use, wastewater treatment plant effluent, storm water runoff, fire protection system test and hyydrostatic test waters**)**

Parameter	Units	Averaging period	Existing limits	Proposed limits	Basis
Effluent Flow	mgd	Maximum Daily	1,156	751.5	WQBEL
Color	Pt-Co Units	Maximum Daily	Shall not be altered by other than natural phenomena.		WQBEL
Copper	ug/L	Maximum Daily	--	Monitor	WQBEL
Dissolved Oxygen	mg/L	Maximum Daily	Shall not contain less than 4.0 mg/l.	Shall not contain less than 4.0 mg/l.	WQBEL
Oil & Grease	mg/L	Maximum Daily	The waters of Puerto Rico shall be substantially free from floating non-petroleum oils and greases as well as petroleum derived oils and greases.		WQBEL
pH	S.U.	Maximum Daily	Minimum 7.3 Maximum 8.5	Minimum 7.3 Maximum 8.5	
Polychlorinated Biphenyls (PCBs)	ug/L	Maximum Daily	There shall be no discharge of Polychlorinated Biphenyl compounds such as those commonly used for transformer fluids.		TBEL 423.13(a)
Solids and Other Matter		Maximum Daily	The waters of Puerto Rico shall not contain floating debris, scum, or other floating materials attributable to the discharge in amounts sufficient to be unsightly or deleterious to the existing or designated uses of the waterbody.		WQBEL

Effluent Limitations Table A-1 – Outfall 001 (Condenser cooling water, cooling towers blowdown, condensate from fuel heater system, miscellaneous water use, wastewater treatment plant effluent, storm water runoff, fire protection system test and hyydrostatic test waters)					
Parameter	**Units**	**Averaging period**	**Existing limits**	**Proposed limits**	**Basis**
Suspended, Colloidal or Settleable Solids	mL/L	Maximum Daily	Solids from wastewater source shall not cause deposition in or be deleterious to the existing or designated uses of the waterbody.		WQBEL
Taste and Odor Producing Substances		Maximum Daily	--	Shall not be present in amounts that will render any undesireable taste or odor to edible aquatic life.	WQBEL
Temperature	℉ (℃)	Maximum Daily	Except by natural causes, no heat may be added to the waters of Puerto Rico, which would cause the temperature of any site to exceed 90℉ (32.2 ℃) Compliance Level: The permittee shall adhere to the terms of the Schedule of Compliance outlined in Part I, Section D, which requires the relocation of Outfall 001. During the period of the Schedule of Compliance, the permittee shall comply with an interim limitation of 107℉ (41.7℃).	No more than four (4) days per year the discharge temperature will exceed 106℉ (41.1℃). In such four events the difference between intake water temperature and the Discharge temperature shall not exceed 18℉ (10℃).	WQBEL
Turbidity	NTU		10		WQBEL
Total Suspended Solids	mg/l	Average Monthly Maximum Daily	30.0 100.0	---	
Whole Effluent Toxicity	TU_a			Monitor Only	WQBEL

Outfalls 002 & 003

Effluent Limitations Table A-2 – Outfall 002 & Outfall 003 (Storm Water)					
Parameter	**Units**	**Averaging period**	**Existing limits**	**Final limits**	**Basis**
Effluent Flow	m^3/day (mgd)	Maximum Daily		Monitor	WQBEL
Color	Pt-Co Units	Maximum Daily	Shall not be altered by other than natural phenomena.		WQBEL
Copper	ug/L	Maximum Daily	3.1	3.73	WQBEL
Dissolved Oxygen	mg/L	Maximum Daily	Shall not contain less than 4.0 mg/l.		WQBEL
Oil & Grease		Maximum Daily	The waters of Puerto Rico shall be substantially free from floating non-petroleum oils and greases as well as petroleum derived oils and greases.		WQBEL
pH	standard units	Maximum Daily	Minimum 7.3 Maximum 8.5		WQBEL

Effluent Limitations Table A-2 – Outfall 002 & Outfall 003 (Storm Water)					
Parameter	**Units**	**Averaging period**	**Existing limits**	**Final limits**	**Basis**
Polychlorinated Biphenyls (PCBs) (ug/L)	ug/L	Maximum Daily	There shall be no discharge of Polychlorinated Biphenyl compounds such as those commonly used for transformer fluids.		TBEL
Suspended, Colloidal or Settleable Solids	mL/L	Maximum Daily	Solids from wastewater source shall not cause deposition in or be deleterious to the existing or designated uses of the waterbody.		WQBEL
Taste and Odor Producing Substances		Maximum Daily	Shall not be present in amounts that render any undesirable taste or odor to edible aquatic life.		WQBEL
Temperature	℉ (℃)	Maximum Daily	Except by natural causes, no heat may be added to the waters of Puerto Rico, which would cause the temperature of any site to exceed 90℉ (32.2 ℃)		WQBEL
Turbidity	NTU	Maximum Daily	**10**	10	WQBEL

Outfalls 001b, 001e, & 001g

Effluent Limitations Table A-3 – Outfall 001b, 001e, & 001g (Internal Wastreams, Cooling Tower Blowdown)					
Parameter	**Units**	**Averaging period**	**Existing limits**	**Final limits**	**Basis**
Flow	Mgd	Maximum Daily	Monitor	Monitor	TBEL
Total Suspended Solids	mg/l	Average Daily Maximum Daily	30.0 100.0	30.0 100.0	TBEL
Free Available Chlorine	mg/l	Average Daily Maximum Daily	0.2 0.5	0.2 0.5	TBEL
Total Residual Chlorine	mg/l	Maximum Daily	0.2	0.2	TBEL
Total Chromium	mg/l	Average Daily Maximum Daily	0.2 0.2	0.2 0.2	TBEL
Total Zinc	mg/l	Average Daily Maximum Daily	1.0 1.0	1.0 1.0	TBEL
126 Priority Pollutants	ug/l	Average Daily Maximum Daily	No detectable amount allowed.		TBEL
Polychlorinated Biphenyls (PCBs) (ug/L)	ug/L	Maximum Daily	There shall be no discharge of Polychlorinated Biphenyl compounds such as those commonly used for transformer fluids.		**TBEL**
pH	S.U.	Average Daily Maximum Daily	Shall always lie between 6.0 – 9.0		TBEL

Outfall 001c

Effluent Limitations Table A-4 – Outfall 001c (Equipment Cooling, Condensate from Fuel Oil Heater System, Miscellaneous Water Use and Storm Water)					
Parameter	**Units**	**Averaging period**	**Existing limits**	**Final limits**	**Basis**
Flow	MGD	Maximum Daily	Monitor	Monitor	TBEL
Total Suspended Solids#	mg/l	Average Daily Maximum Daily	30.0 100.0	30.0 100.0	TBEL
pH	S.U.	Average Daily Maximum Daily	Shall always lie between 6.0 and 9.0		TBEL
Oil and Grease*	mg/l	Average Daily Maximum Daily	15.0 20.0	15.0 20.0	TBEL

Outfall 001f

Effluent Limitations Table A-5 – Outfall 001f (Wastewater Treatment Plant)					
Parameter	**Units**	**Averaging period**	**Existing limits**	**Final limits**	**Basis**
Flow	Mgd	Maximum Daily	Monitor	Monitor	TBEL
Total Suspended Solids	mg/l	Average Daily Maximum Daily	30.0 100.0	30.0 100.0	TBEL
Oil and Grease*	mg/l	Average Daily Maximum Daily	15.0 20.0	15.0 20.0	TBEL
pH	S.U.	Average Daily Maximum Daily	Shall always lie between 6.0 – 9.0		TBEL
Polychlorinated Biphenyls (PCBs) (ug/L)	ug/L	Maximum Daily	There shall be no discharge of Polychlorinated Biphenyl compounds such as those commonly used for transformer fluids.		TBEL
Copper	mg/l	Average Daily Maximum Daily	1.0 1.0	1.0 1.0	TBEL
Iron	mg/l	Average Daily Maximum Daily	1.0 1.0	1.0 1.0	TBEL

Outfall 001h

Effluent Limitations Table A-6 – Outfall 001h (Storm Water Runoff)					
Parameter	**Units**	**Averaging period**	**Existing limits**	**Final limits**	**Basis**
Flow	Mgd	Maximum Daily	Monitor	--	TBEL
Total Suspended Solids	mg/l	Maximum Daily	50.0	--	TBEL
Oil and Grease*	mg/l	Maximum Daily	15.0	--	TBEL
pH	S.U.	Average Daily Maximum Daily	Shall always lie between 6.0 – 9.0	---	TBEL
Chemical Oxygen Demand	mg/l	Maximum Daily	100	---	TBEL

The effluent limitations for Outfall 001h have been eliminated, as these limitations were previously established based on the *Region 2 Best Professional Judgement Policy for Storm Water and Cooling Water Discharges,* September 1991, which has been replaced by the industrial storm water requirement to develop and implement a storm water pollution prevention plan, comply with the storm water limits on Outfalls 002 and 003. Additionally, these parameters are limited at Outfall 001, to which Outfall 001h discharges.

C. Monitoring Requirements

NPDES regulations at 40 CFR 122.48 require that all permits specify requirements for recording and reporting monitoring results. The Part III of the Permit establishes monitoring and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements for this facility.

1. **Influent Monitoring Requirements**

   This facility is not subject to influent monitoring requirements.

2. **Effluent Monitoring Requirements**

   Effluent monitoring frequency and sample type have been established in accordance with the requirements of 40 CFR 122.44(i) and recommendations in EPA's TSD. Consistent with 40 CFR Part 136 monitoring data for toxic metals must be expressed as total recoverable metal.

D. Compliance with Federal Anti-Backsliding Requirements and Puerto Rico's Anti-Degradation Policy

Federal regulations at 40 CFR 131.12 require that state water quality standards include an anti-degradation policy consistent with the federal policy. The discharge is consistent with the anti-degradation provision of 40 CFR 131.12, 72 Federal Register 238 (December 12, 2007, pages 70517-70526) and EQB's *Anti-Degradation Policy Implementation Procedure* in Attachment A of PRWQS. In addition, CWA sections 402(o)(2) and 303(d)(4) and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. Further, the Region 2 Antibacksliding Policy provides guidance regarding relaxation of effluent limitations based on water quality for Puerto Rico NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit with some exceptions where limitations may be relaxed. The effluent limitations in the permit are at least as stringent as the effluent limitations in the existing permit, with the exception of effluent limitations for Copper at Outfalls 002 and 003. The effluent limitations for these pollutants are less stringent that those in the existing permit. This relaxation of effluent limitations is consistent with the anti-backsliding requirements of CWA section 401(o), 40 CFR 122.44(l), EPA Region 2's Anti-backsliding Policy dated August 10, 1993, and Puerto Rico's Anti-Degradation Policy Implementation Procedure established in PRWQS, as the revision from 3.1 ug/L to 3.73 ug/L is the result of revisions to the Puerto Rico water quality criterion for Copper.

PART II. RATIONALE FOR STANDARD AND SPECIAL CONDITIONS

A. Standard Conditions

In accordance with 40 CFR 122.41, standard conditions that apply to all NPDES permits have been incorporated by reference in Part IV.A.1 of the permit and expressly in Attachment B of the permit. The Permittee must comply with all standard conditions and with those additional conditions that are applicable to specified categories of permits under 40 CFR 122.42 and specified in Part IV.A.2 of the Permit.

B. Special Conditions

In accordance with 40 CFR 122.42 and other regulations cited below, special conditions have been incorporated into the permit. This section addresses the justification for special studies, additional monitoring requirements, Best Management Practices, Compliance Schedules, and/or special provisions for POTWs as needed. The special conditions for this facility are as follows:

1. **Special Conditions from the Water Quality Certificate**

   In accordance with 40 CFR 124.55, the EPA has established Special Conditions from the WQC in the permit that EQB determined were necessary to meet PRWQS. The Special Conditions established in this section are only those conditions from the WQC that have not been established in other parts of the permit.

2. **Storm Water Pollution Prevention Plan (SWPPP) / Best Management Practices (BMP) Plan**

   In accordance with 40 CFR 122.2 and 122.44(k), a SWPPP is a plan that includes BMPs, which are schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution to waters of the United States. The Permittee is required to develop a SWPPP in Part IV.B.4 of the permit to control or abate the discharge of pollutants.

3. **Clean Water Act §316(b) Reports**

   The permit includes a schedule of submittals in compliance with the Clean Water Act §316(b) Existing Facilities Final Rulemaking, 40 CFR 125.94. The Decision Document that represents the EPA determination of Best Technology Available for this permit renewal for this facility is included as Attachment C.

4. Chemical Usage

The permittee is permitted to use chemicals to control biofouling in the service cooling towers, or for fire protection foam, provided that they meet the following conditions:

a. The discharge shall not cause a violation of any permit limit or cause or contribute to an exceedance of any applicable water quality standard for the receiving water.

b. Notification to the EPA of the optimum product dosage necessary to ensure no deleterious effects to the effluent aquatic toxicity. PREPA shall also document that adequate process controls are in place to ensure that excessive levels of the chemical products are not subsequently discharged.

c. The EPA may request that PREPA perform toxicity testing of the outfall discharges, or pilot test waste streams, to ensure that the use of chemicals does not contribute to effluent toxicity.

d. The EPA has prohibited the discharge of plastic pellets or rockets utilized in Condenser Cleaning Systems.

e. The EPA has included a requirement that PREPA use best management practices to prevent and minimize any discharges of fire protection foam.

f. The EPA has included a procedure for pilot testing of materials and chemicals to ensure that permit limitations are met at all times.

The EPA recommends the following pollution prevention practices during future chemical useage pilot tests:

- Utilize alternative firefighting foam products that exhibit high biodegradability, and that do not contain flourosurfactants;
- Conduct pilot tests in bermed areas away from storm drain inlets, drainage facilities or water bodies;
- Configure the discharge area with a sump to allow collection and disposal of foam to the sanitary sewer system; and
- Discharge foam waste to a sanitary sewer to the maximum extent practicable.

PART III. COMPLIANCE WITH APPLICABLE PROVISIONS OF OTHER FEDERAL LAWS OR EXECUTIVE ORDERS

A. Coastal Zone Management Act

Under 40 CFR 122.49(d), and in accordance with the Coastal Zone Management Act of 1972, as amended, 16 *United States Code* (U.S.C.) 1451 *et seq*. section 307(c) of the act and its implementing regulations (15 CFR Part 930), EPA may not issue an NPDES permit that affects land or water use in the coastal zone until the Permittee certifies that the proposed activity complies with the Coastal Zone Management Program in Puerto Rico, and that the discharge is certified by the Commonwealth of Puerto Rico to be consistent with the Commonwealth's Coastal Zone Management Program. The Permittee has indicated that the outfall is in a coastal area managed by the Commonwealth's Coastal Zone Management Program. On March 2, 2001, the Puerto Rico Planning Board issued a consistency certification for the discharge that provides that the discharge complies with its Coastal Zone Management Plan.

B. Endangered Species Act

Under 40 CFR 122.49(c), EPA is required pursuant to section 7 of the Endangered Species Act (ESA), 16 U.S.C. 1531 *et seq*. and its implementing regulations (50 CFR Part 402) to ensure, in consultation with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) that the discharge authorized by the permit is not likely to jeopardize the continued existence of any endangered or threatened species or adversely affect its critical habitat. EPA has determined that endangered or threatened species might occur in the vicinity of the discharge, and will commence consultation with NMFS and USFWS to identify whether impacts to threatened or endangered species might occer as a result of the intake or discharge from this facility.

The ESA requires the Regional Administrator to ensure, in consultation with the Secretary of the Interior or Commerce, that any action authorized by EPA is not likely to jeopardize the continued existence of any endangered or threatened species or adversely affect its critical habitat.

In a May 2000 memo to the Regions, EPA Headquarters provided guidance to the Regions in making a determination as to whether a final permit may be issued while waiting for consultation to be concluded. As part of this permit action, if consultation has not been completed by final permit issuance and EPA has concluded that permit issuance is consistent with section 7 prior to the conclusion of consultation, EPA will re-issue the final permit before consultation is concluded and will document this decision in the Administrative Record. At the time consultation is completed, EPA may decide that changes to the permit are warranted after permit issuance based on the results of the consultation. Therefore, a reopener provision to this effect has been included in the Permit Part IV.A.1.b.

C. Environmental Justice

EPA has performed an Environmental Justice (EJ) Analysis for the discharge in accordance with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations*, and EPA's Plan EJ 2014. EJ is the right to a safe, healthy, productive and sustainable environment for all, where "environment" is considered in its totality to include the ecological, physical, social, political, aesthetic and economic environments. The NPDES permitting provides opportunities to address EJ concerns through appropriate avenues for public participation, seeking out and facilitating involvement of those potentially affected,

and, when relevant, including public notices in more than one language where appropriate. EPA **did** conduct EJ screening as this permit **is** a Regional priority permit action. Based on the EPA Region 2 Environmental Justice Assessment Tool, the facility is in an area characterized as overburdened and therefore subject to the *EPA Region 2 Regional Implementation Plan to Promote Meaningful Engagement of Overburdened Communities in Permitting Activities*. As a result, the EPA has taken steps to minimize the impacts on the Community of Concern affected by the discharge. These steps include:

1) providing public notice in both English and Spanish of the availability of the draft permit for public comment,
2) ensuring that all supporting documents will be available in a repository at the EPA Caribbean Environmental Protection Division in San Juan, Puerto Rico,
3) If a public hearing is held, bi-lingual EPA staff will be made available to meet with the community before and after the public meeting,

If determined necessary, EPA will have simultaneous translation at the public hearing and public availability session to facility the participation of both English and Spanish speaking participants.

D. National Historic Preservation Act

Under 40 CFR 122.49(b), EPA is required to assess the impact of the discharge authorized by the permit on any properties listed or eligible for listing in the National Register of Historic Places (NRHP) and mitigate any adverse effects when necessary in accordance with the National Historic Preservation Act, 16 U.S.C. 470 et seq. EPA's analysis indicates that no soil disturbing or construction-related activities are being authorized by approval of this permit; accordingly, adverse effects to resources on or eligible for inclusion in the NHRP are not anticipated as part of this permitted action.

E. Magnuson-Stevens Fishery Conservation and Management Act

Under 40 CFR 122.49, EPA is required to ensure that the discharge authorized by the permit will not adversely affect Essential Fish Habitat (EFH) as specified in section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), 16 U.S.C. 1801 *et seq*. EPA has included a reopener provision to the permit for the purpose of establishing permit conditions should the facility adversely affect EFH.

F. Clean Water Act, Section 403 Ocean Discharge

CWA Section 403 requires EPA to consider guidelines for determining potential degradation of the marine environment when issuing NPDES permits. These Ocean Discharge Criteria (40 CFR 125, Subpart M) are intended to "prevent unreasonable degradation of the marine environment and to authorize imposition of effluent limitations, including a prohibition on discharge, if necessary, to ensure this goal". Based on the available information, EPA has determined that the discharge will not cause unreasonable degradation of the marine environment. A reopener provision has been included in the permit Part IV.B.5 that provides EPA the right to modify or revoke the permit based on any new data.

PART IV. PUBLIC PARTICIPATION

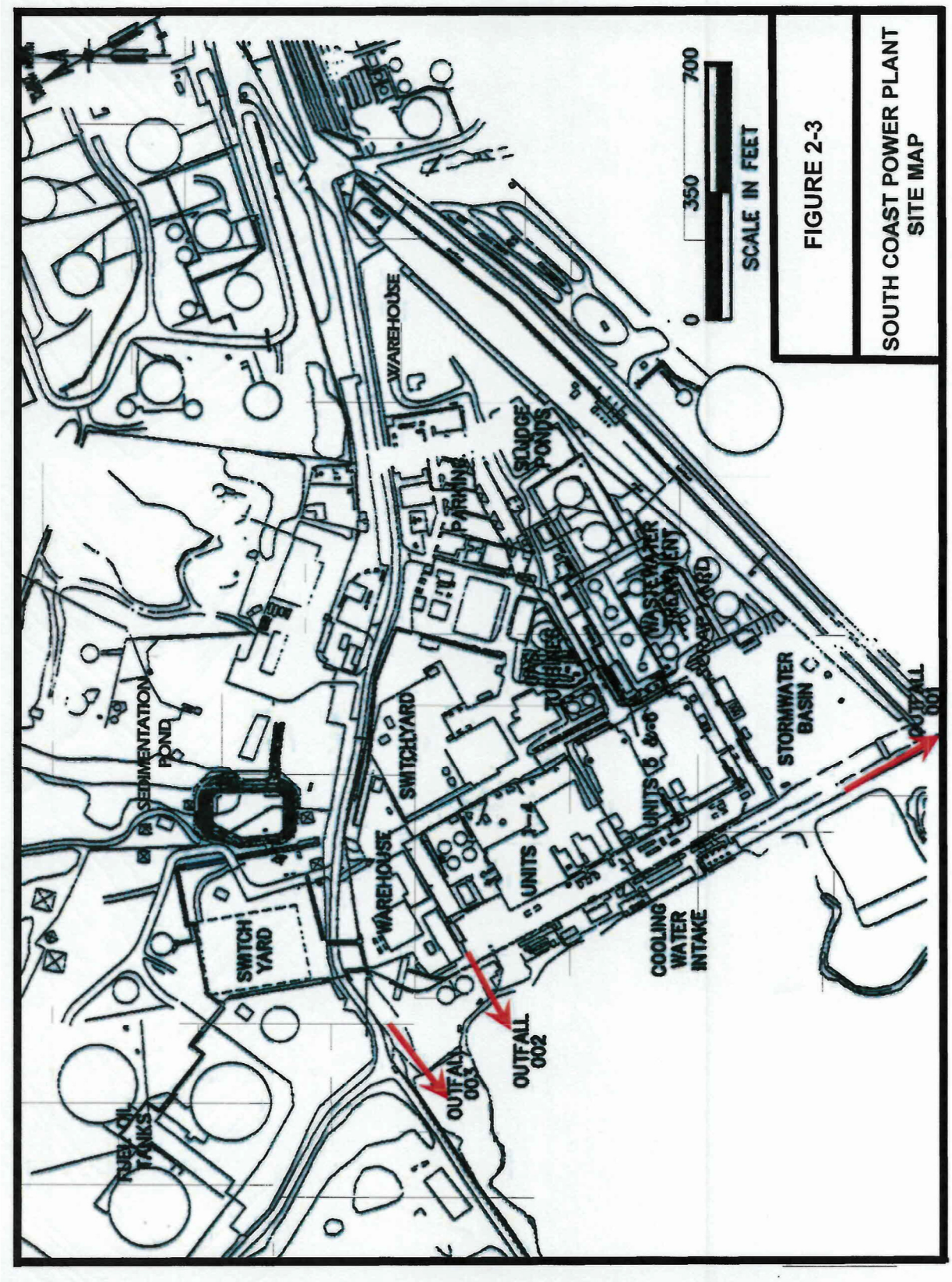
The procedures for reaching a final decision on the draft permit are set forth in 40 CFR Part 124 and are described in the public notice for the draft permit, which is published in ***El Vocero.*** Included in the public notice are requirements for the submission of comments by a specified date, procedures for requesting a hearing and the nature of the hearing, and other procedures for participation in the final agency decision. EPA will consider and respond in writing to all significant comments received during the public comment period in reaching a final decision on the draft permit. Requests for information or questions regarding the draft permit should be directed to

Karen O'Brien
EPA Region 2, Clean Water Division
Permit Writer Phone: 212-637-3717
Permit Writer Email: obrien.karen@epa.gov

A copy of the draft permit is also available on EPA's website at www.epa.gov/region02/water/permits.html.

ATTACHMENT A — FACILITY MAP AND FLOW SCHEMATIC

The facility map and flow schematic are attached as provided by the discharger in the application.



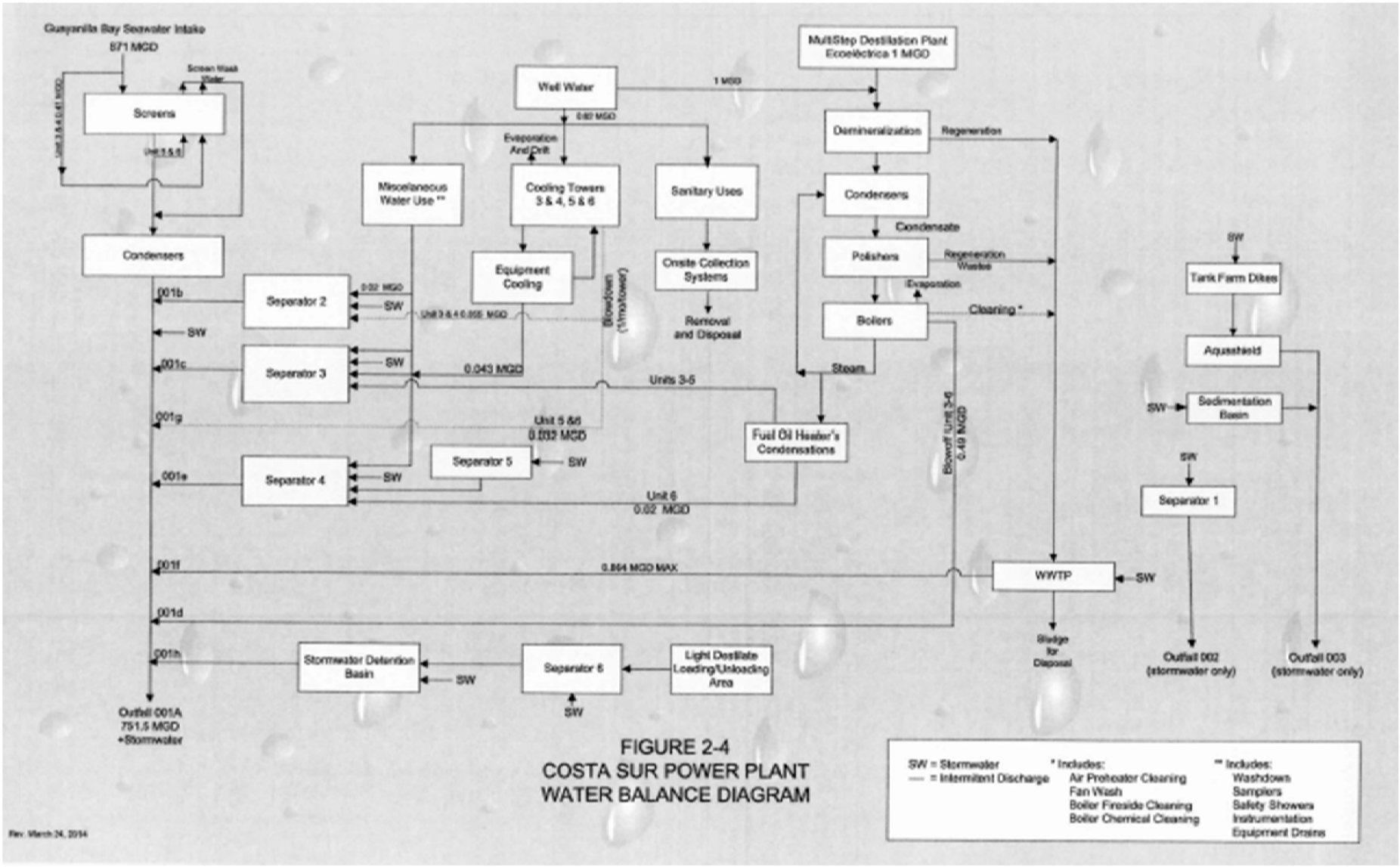


FIGURE 2-4
COSTA SUR POWER PLANT
WATER BALANCE DIAGRAM

Puerto Rico Electric Power Authority
Costa Sur Power Plant
316(b) Decision Document

March 2018

1 INTRODUCTION

The proposed National Pollutant Discharge Elimination System (NPDES) permit regulates the discharge of treated effluent from the Puerto Rico Electric Power Authority (PREPA) Costa Sur Power Plant to a cove within Guayanilla Bay. This renewal permit also includes condition to ensure that the best technology available to minimize adverse impacts to aquatic life are included at the cooling water intake structure, as required by Section 316(b) of the Clean Water Act. The previous permit was becamse effective on October 1, 2009 and expired on September 30, 2014. PREPA submitted a timely renewal application on March 28, 2014, which included information on improvements to the technology used at the cooling water intake structure in response to the conditions included in that 2009 permit. The previous permit remains adminstratively continued, fully effective and enforceable under 40 CFR Part 122.6 until this renewal action is finalized.

1.1 Summary of Decision

As currently configured and operated, the existing intake technology is not considered as Best Technology Available (BTA) for impingement reduction. Specifically, the current traveling screen debris return system is not designed or operated in a manner that minimizes injury and promotes the survival of impinged fish consistent with applicable regulations. With respect to entrainment, the existing sampling data is insufficient to fully characterize the scope of entrainment and definitively conclude whether a measurable impact is occurring. Additional entrainment monitoring is recommended to inform such an analysis.

1.2 Section 316(b) Requirements

Under CWA section 316(b), NPDES permits must regulate cooling water intake structures at facilities that also have permitted discharges. Section 316(b) requires that "the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact" to protect aquatic organisms from being killed or injured by impingement (being pinned against screens or other parts of a cooling water intake structure) or entrainment (being drawn into cooling water systems and subjected to thermal, physical or chemical stresses).

USEPA promulgated national BTA requirements for all existing facilities on May 19, 2014. The Existing Facilities Rule applies to existing power generating facilities and existing manufacturing and industrial facilities that are point sources and that use one or more cooling water intake structures (CWIS) to withdraw more than 2 million gallons per day (MGD) of water from waters of the U.S. and use at least twenty-five (25) percent of the water they withdraw exclusively for cooling purposes. As an existing electric generating facility with a design intake flow of close to 1,156 million gallons per day (MGD), and a proposed permitted flow of 751.5 MGD, these requirements apply to the Costa Sur Power Plant. The Existing Facility Rule establishes a framework for developing BTA requirements for both impingement mortality and entrainment, as described below. The Existing Facility Rule also establishes a process for facilities to collect and submit information to their permitting authority to support development of appropriate NPDES permit requirements.

1.2.1 Impingement Mortality

The Existing Facility Rule provides seven compliance alternatives for reducing impingement mortality. These requirements are fully described at 40 CFR 125.94(c). In general, they are:

- Operate a closed-cycle recirculating cooling system, as defined at 40 CFR 125.92;
- Operate a cooling water intake structure with a design intake velocity of less than 0.5 feet per second through-screen velocity;
- Operate a cooling water intake structure with an actual intake velocity of less than 0.5 feet per second through-screen velocity;
- Operate an existing offshore velocity cap, as defined at 40 CFR 125.92;
- Operate modified traveling screens, as defined at 40 CFR 125.92;
- Operate a system of technologies, management practices and operational measures that optimizes impingement mortality; or
- Achieve an impingement mortality annual performance standard.

Each facility subject to the Existing Facility Rule must select one of the above compliance alternatives.

1.2.2 Entrainment

Under the Existing Facility Rule, a determination of BTA for entrainment is developed on a site-specific, best professional judgment (BPJ) basis by the permitting authority. The rule requires that facilities achieve the maximum reduction in entrainment warranted after consideration of several relevant factors specified in the rule. Facilities with an actual intake flow greater than 125 million gallons per day (MGD) must collect and submit certain information to the permitting authority to inform the BTA determination. These submittals are described in more detail below.

1.2.3 Application Requirements

Section 316(b) is implemented through NPDES permits. The Existing Facility Rule establishes requirements for a facility to submit materials as part of its NPDES permit renewal application. The permitting authority then reviews these materials and develops appropriate permit conditions for impingement mortality and entrainment. The specific permit application materials are described below.

All existing facilities are required to complete and submit the following application studies:

- Description of the source water body (§ 122.21(r)(2));
- Description of the cooling water intake structures (§ 122.21(r)(3));
- Characterization of the biological community in the vicinity of the cooling water intake structure (§ 122.21(r)(4));
- Description of the cooling water system (§ 122.21(r)(5));
- Identification of the facility's chosen compliance method for impingement mortality (§ 122.21(r)(6));
- Description of any previously conducted entrainment performance studies (§ 122.21(r)(7)); and
- Description of the facility's operational status (§ 122.21(r)(8)).

Facilities that have an actual intake flow greater than 125 MGD must also submit the following studies:

- Entrainment characterization study (§ 122.21(r)(9));
- Comprehensive technical feasibility and cost evaluation study (§ 122.21(r)(10));
- Benefits valuation study (§ 122.21(r)(11));
- Non-water quality environmental and other impacts assessment (§ 122.21(r)(12)); and
- Description of the peer review process for studies submitted under § 122.21(r)(10)-(12) ((§ 122.21(r)(13)).

1.2.4 Threatened and Endangered Species

The Clean Water Act and any requirements established pursuant to section 316(b) and the Existing Facility Rule are intended to supplement efforts to protect threatened and endangered species. Nothing in the Existing Facility Rule authorizes the take of a species protected by the Endangered Species Act. The facility and permitting authority are required to coordinate with the National Marine Fisheries Service and/or United States Fish and Wildlife Service to determine if any impact to threatened and endangered species may be occurring and, if so, how to address the operation of the cooling water intake structure. The permitting authority may develop additional requirements including (but not limited to) additional or more specific biological monitoring or additional technology requirements.
A discussion of BTA and Existing Facility Rule implementation issues for the Costa Sur Power Plant are discussed later in this report.

2 BACKGROUND

This section includes a description of the facility, intake and receiving water, and intake structures.

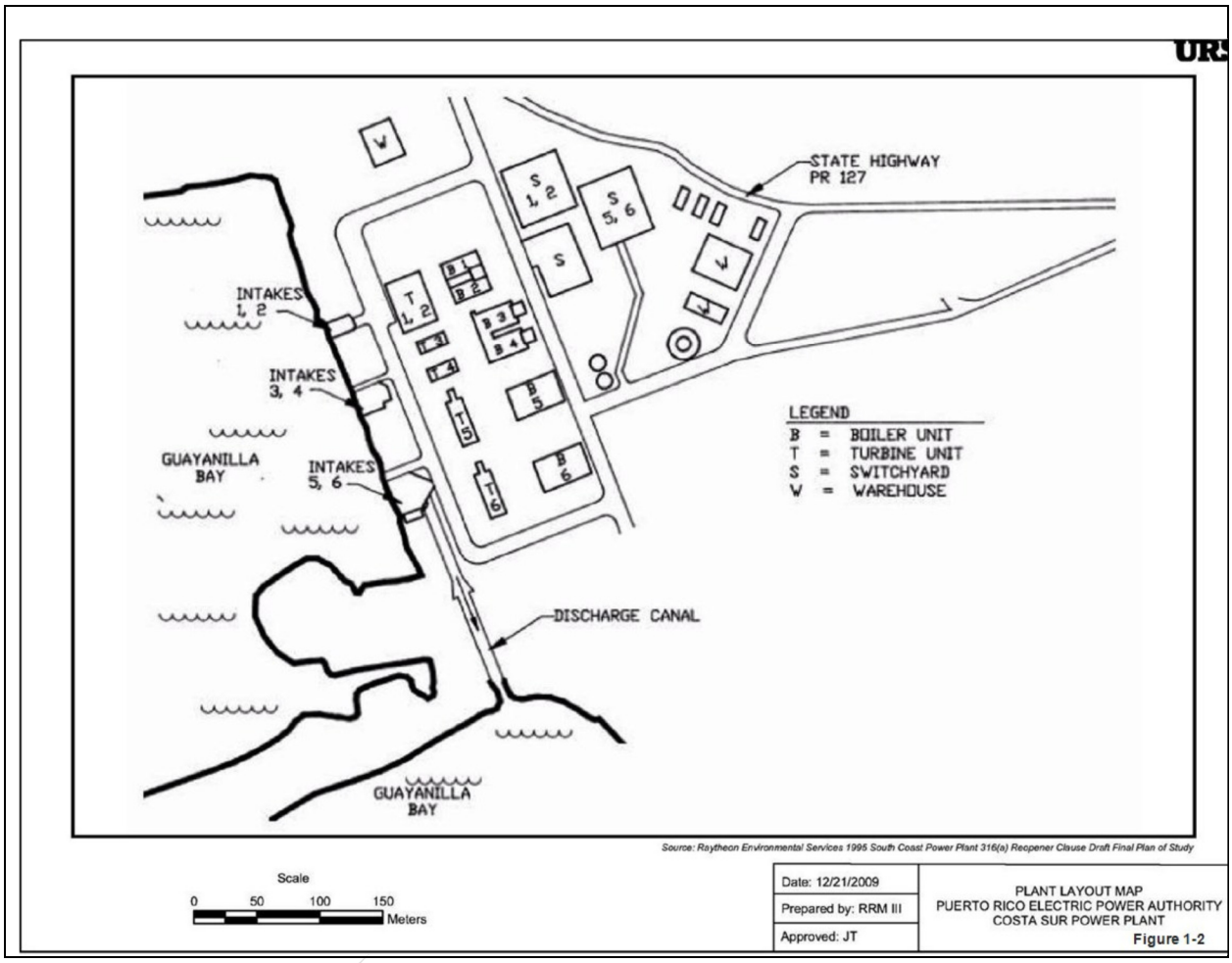
2.1 Facility Description

The Applicant has provided the following facility description in their March 2014 NPDES Renewal Application:

> PREPA's [Costa Sur Power Plant] is an onshore steam electric power generation facility located at the south coast of Puerto Rico in Guayanilla Municipality. The facility consistens of different steam electric generating units, two 410 megawatt (MW) dual fuel oil/natural gas units for a total of 820 MW, two 85 MW oil-fired units (170 MW total) and two 22 MW gas turbine generator power units (44 MW total). The total electric generating capacity of the complex is 1034 MW. The facility had a permitted flow of 1,156 million gallons per day in their existing permit. They have reduced flow through operational measures and closure of units, and will receive a maximum permitted flow of 751.5 MGD in this permit renewal action.
>
> The Costa Sur Power Plant uses seawater from Guayanilla Bay for cooling purposes. ECO Ecoeléctrica Multistep Distilled Seawater and/or well water from nearby groundwater wells is used to produce demineralized water needed for the electric generation process. Once-through Cooling water, treated process wastewater, and stormwater is discharged through Outfall 001 to a small cove located at the south part of the facility, and then into the Guayanilla Bay. Stormwater only is discharged through Outfalls 002 and 003 into Guayanilla Bay.
>
> The main uses of water incluyde once-through cooling, seawater screen washing, recirculating cooling, boiler makeup, and equipment cleaning and maintenance. Minor uses of water include boiler drainage, hydrostatic testing, sanitary uses, and miscellaneous in-plant operations. Wastewaters are also generated as cooling tower blowdown and condensate discharges. Stormwater is discharged through each of the outfalls.

2.2 Location/Waterbody Description

Exhibit 1. Costa Sur Power Plant intake and discharge locations



The Costa Sur Power Plant is located within the municipalities of Guayanilla and Peñuelas, between the villages of Playa de Guayanilla and Tallaboa (Exhibit 1). The Power Plant is located along the shoreline of Guayanilla Bay, south of State Highway 2 on the southwest coast of Puerto Rico.

Guayanilla Bay is a well-protected bay located on the south coast of Puerto Rico measuring approximately four miles long by two miles wide. Water depths average 19 feet and range from one to 16 feet near the shore and 19 to 60 feet in the middle of the Bay (Raytheon 1995). A large reef area, called Arrecife Guayanilla and Arrecife Unitas, is located to the south of Guayanilla Bay and a deep natural channel extends into the bay between the reef area and Cayo Maria Langa (Raytheon 1995).

Costa Sur cooling water is discharged into the Costa Sur Cove, which is a small, shallow (3 feet to 13 feet depth) largely enclosed cove in the northeast portion of Guayanilla Bay (USEPA

2004). The Costa Sur Cove measures approximately 2,600 feet long by 1,200 feet wide and is 150 feet wide at its mouth (USEPA 2004).

Three rivers empty into Guayanilla Bay. The Guayanilla and Macana Rivers flows through residential areas, emptying into the Bay at Playa de Guayanilla and the Yauco River empties into Puerto de Guayanilla near Punta Verraco. Mangroves are found along the shoreline of Guayanilla Bay wherever development is not occurring. (URS, December 2012)

2.3 Cooling Water Intake Structure Description

Costa Sur currently withdraws water for its cooling and process needs from Guayanilla Bay through two shoreline intake structures. These structures supply water for once-through cooling of the main condensers and for plant services, including boiler make-up, screen wash, and fire protection. No cooling water usage is associated with the gas turbine units. Heated water is discharged from Outfall 001 into the northern end of Costa Sur Cove within northeastern Guayanilla Bay. Figure 1-2 depicts the intake and discharge structures.

Since retirement of Units 1 and 2, two circulating water pumps are used to supply cooling water for Units 3 and 4 (i.e., one pump for each unit); Units 5 and 6 each have two circulating water pumps (i.e., four pumps), for a total of six circulating water pumps operating at Costa Sur. A 100 percent spare pump is shared by Units 3 and 4 and one additional (50 percent) spare pump is shared by Units 5 and 6.

Both of the two operating intake chambers are equipped with a system of bar racks and traveling screens to remove debris from the incoming water. Units 3 and 4 have screens with ⅜-inch mesh and Units 5 and 6 have been retrofitted with 3/8-inch dual-flow screens. The traveling screens are cleaned with a spraywash system with a pressure of 100 pounds per square inch. The wash water with any impinged materials is sluiced into the discharge canal through a recent first stage modification to the fish return. This recent alteration repositioned the outlet the fish return approximately 140 meters downstream of its original position into the discharge canal. This reduced the amount of time impinged organisms are exposed to the elevated temperature within the discharge canal. (URS, December 2012)

3 EXISTING INTAKE STRUCTURE

The 2009 NPDES Permit for the PREPA Costa Sur facility included a determination of BTA, based on best professional judgement in light of the remand of the Phase 2 316(b) Rule. This determination required that

> The permittee must install intake control technology and implement operational measures to achieve the following performance standards:
>
> i. Impingement Mortality Performance Standard - Reduce fish and shellfish impingement mortality by a minimum of 80% from the calculation baseline.
>
> ii. Entrainment Performance Standard - Reduce entrainment of fish and shellfish impingement mortality by a minimum of 60% from the calculation baseline.
>
> iii. The calculation baseline shall be the level of entrainment or impingement mortality that would occur in a 1130 MW, 871 MGD facility with once through

cooling water system, with the cooling water intake structure (CWIS) located at the shoreline, equipped with standard 3/8 inch mesh traveling screens oriented parallel with the shoreline.

In order to achieve these performance standards, the NPDES permit required PREPA to make "first stage" improvements, which included the reduction of the water pressure of the screen washes, an increase in traveling screen rotation frequency, relocation of the fish return system, and covering a portion of the water column in front of the intake structures. Additionally, the permit required PREPA to evaluate other control measures to further reduce impingement mortality and entrainment (IM&E). To this end, PREPA prepared and submitted a Plan of Action (POA) in June 2012 and a POA Addendum in November 2012 that evaluated technologies and operational measures to reduce IM&E at CSPP. The POA Addendum concluded that the installation of a floating debris barrier with skimmer panels may reduce entrainment by approximately 20 to 30 percent.

Additionally, PREPA has reduced the intake flow at this facility by 37% from the permitted maximum flow at it's previous operational status.

PREPA provided EPA with a March 7, 2018 letter authorizing work to proceed at the Costa Sur facility, which included the following description from their contractor, Tetratech:

In response to the above permit requirements, PREPA conducted a pilot study that involved the installation of an aquatic permeable curtain to act as a physical barrier in front of the plant intake. The barrier was to act as a semi-permeable barrier to limit the introduction of ichthyoplankton into the intake of the Costa Sur cooling water intake system (CWIS). A work plan (URS, April 2016) was developed and implemented to tentatively evaluate the potential effectiveness of this barrier to reduce the entrainment and impingement of organisms by the CWIS.

This pilot study was implemented and the results summarized in URS (2016a). Sampling occurred over a short duration window (June – August 2016) and with limited frequency between sampling intervals. Impingement results were favorable for the Hydrolox screen which showed lower numbers of impinged fish and more favorable survival of impinged fish versus the existing traveling screens. Results of the aquatic barrier study were less conclusive and indicated little difference between organism densities within and outside the existing barrier.

It was not clear if the existing aquatic barrier design considered the diel vertical migration of ichthyoplankton and zooplankton in terms of spatial distribution patterns within the water column in vicinity of the intake and the adjoining waters. The diel vertical migration patterns of ichthyoplankton (primarily fish and invertebrate larvae) and zooplankton is to swim to deeper depths of the water column by day to avoid predation and at the same time reduce the metabolic (respiration) costs associated with lower water temperatures with increasing depth. This pattern is reversed at night when these organisms rise in the water column to feed. However, in general, the shallow waters of the Caribbean Sea are well mixed (surface mixed layer is up to 45 m deep during the year) suggesting that the shallower waters of the intake area are like-wise well mixed as well and may afford little spatial sorting outside of this diel migration pattern. Other factors that can influence spatial distributions of ichtyoplankton in the water column include phototactic attraction by facility lighting and habitat structure acting as aggregation influences for specific species to incur greater entrainment numbers. These contributing factors can significantly affect susceptibility of ichthyoplankton to entrainment by an operating CWIS.

The comparability of densities of ichthyoplankton in-front of and behind the aquatic barrier in the current study suggests that the main sources of variability in ichthyoplankton may be unrelated to the planktonic populations of Guayanilla Bay as a whole. Due to safety considerations, intake structures are usually artificially illuminated at night, and the phototactic nature of many planktonic taxa, including fish larvae, drives them to concentrate in illuminated areas. This difference is apparent for several taxa sampled in the initial pilot study. Another major factor to consider is the selective influences for intake structures to act as species specific aggregators in and around intake structures. Fish larvae belonging to gobiiformes, damselfish (Pomacentridae), and many other highly abundant and numerically dominant tropical coastal fishes reproduce by demersal eggs attached to floating or stable structures such as dock pilings, piers, or any submerged infrastructure including those associated with water intake infrastructures. Therefore, the presence of such structures in the vicinity of the sampling points need to be considered as a source of variability, one that may contribute to the observed lack of differences between the in-front and behind abundances observed in the current study. The entrainment mortality of such locally abundant and numerically dominant species can give the impression of significant effect given the biases discussed above. Therefore any sampling design will require consideration of these influences. All of the above influences will need to be considered in future monitoring programs or evaluations.

Since the current barrier does not extend to the bottom and the water column has the potential to be well mixed, the distribution of ichthyoplankton appears to limit the potential effectiveness of the aquatic barrier. For example, because many species of fish have buoyant eggs that tend to remain suspended in the water column and thus would float for some time, would have a good chance of them being retained or deflected by the barrier, however, densities of fish eggs were very similar inside and outside the barrier further suggesting localized abundances around the structure and a well-mixed environment potentially contributing to this observed effect.

(March 6, 2018 Proposal for Services from Tetratech to PREPA)

PREPA is currently proceeding with evaluation of effectiveness of both the floating barrier and traveling screens for further reductions in impingement and entrainment mortality. As part of their March 2014 application, PREPA provided EPA Region 2 with a report of the cumulative reductions in Impingement Mortality and Entrainment in compliance with the 2009 NPDES permit requirements. This report is included as an Attachment to this document.

4 BTA REQUIREMENTS

To meet section 316(b) requirements, a facility must employ CWISs that "reflect the BTA for minimizing adverse environmental impact." As discussed above, the Costa Sur Power Plant is subject to the Existing Facility Rule, which establishes BTA requirements that the facility must achieve. For impingement mortality, PREPA will continue to make improvements to meet the technical alternatives for BTA. For entrainment, the facility must submit several studies that will enable EPA Region 2 to make a BTA determination using BPJ. These requirements will be implemented through PREPA's NPDES permit via a compliance schedule. Below is a discussion of the technical basis for these requirements.

4.1 Additional Data Collection Under the Compliance Schedule

Under the compliance schedule set forth in this permit, PREPA will develop and submit the appropriate information related to compliance with impingement mortality and entrainment requirements. Included in these submittals is a document in which PREPA will select its preferred approach for achieving compliance with the impingement mortality requirements. These requirements could include the installation of new technologies, adjustments to existing technologies, or other activities. Consistent with the Existing Facility Rule, the compliance deadlines for impingement mortality and entrainment have been synchronized; requirements for both will go into effect once EPA Region 2 has reached a Final BTA determination for entrainment.

4.2 Impingement Mortality

To achieve 316(b) compliance with impingement mortality requirements, PREPA must select and implement one of seven compliance alternatives. As noted above, the current configuration does not meet any of these seven alternatives. As part of the permit application process, PREPA is required to evaluate these options and select one for compliance.

4.2.1 Compliance Alternatives for Impingement Mortality in the Existing Facility Rule

Each intake at the facility, or both intakes combined, must comply with the impingement standard through one of seven alternative compliance methods.

1) *Operate a closed-cycle recirculating system as defined at § 125.92* – Closed-cycle recirculating cooling systems can reduce a facility's intake flow by over 90%, reducing both the impingement and entrainment at a facility by an equivalent amount. Closed-cycle systems have been identified by EPA as a best-performing technology for reducing impingement and entrainment. However, these cooling systems can also be challenging to install and may not be appropriate at all facilities.

2) O*perate a cooling water intake structure that has a maximum through-screen design intake velocity of 0.5 fps* – Reducing the intake velocity can be a highly effective method for reducing impingement, and by extension, impingement mortality.

3) *Operate a cooling water intake structure that has a maximum through-screen intake velocity of 0.5 fps* – As noted above, reducing the intake velocity (here calculated using the actual intake flow as the basis) can provide significant reductions in impingement.

4) *Operate an offshore velocity cap as defined at § 125.92 that is installed before effective date of the rule* – The combination of using a control technology with an intake located

far offshore can produce reductions in organisms densities (and therefore impingement mortality) that are approximately equivalent to the impingement mortality performance standard.

5) *Operate a modified traveling screen that the Director determines meets the definition at* § 125.92 and that the Director determines is the best technology available for impingement reduction – Numerous studies have shown that modified traveling screens can achieve high rates of impingement survival. This technology was the basis for the impingement mortality performance standard in the Existing Facility Rule.

6) Operate any other combination of technologies, management practices and operational measures that the Director determines is the best technology available for impingement reduction – This alternative may include any combination of technologies where the combined effect of estimated impingement mortality reductions from more than one component is determined to be equal to or greater than the impingement mortality performance standard. Technologies can include flow reduction, fish avoidance technologies, scheduling of maintenance downtime to coincide with increased biological activity, wedgewire screens, etc.

7) *Achieve the specified impingement mortality performance standard* – In the Existing Facility Rule, EPA calculated a numeric performance standard for impingement mortality and established a process for long-term compliance monitoring. A similar arrangement could be developed for the Costa Sur Power Plant.

4.2.2 Upgraded Fish Return

To be most effective, a fish return should be designed to minimize injury to the fish, return fish to the source waterbody, and discharge at a location that minimizes predation and recirculation back into the intake, exposing the fish to significantly increased temperatures and other pollutants for a prolonged period. EPA Region 2 expects that PREPA's selected compliance alternative will address this concern.

4.3 Entrainment Reduction

Entrainment requirements will be developed on a BPJ basis, using information submitted by PREPA under the terms of the compliance schedule. A variety of technologies and operational measures exist and should be examined for their feasibility to be implemented at the Costa Sur Power Plant.

5 TENTATIVE DETERMINATION OF BEST TECHNOLOGY AVAILABLE

PREPA is currently not compliant with current Section 316(b) requirements. Under the 2014 Existing Facility Rule, PREPA must submit several documents to 1) select a compliance path for impingement mortality and 2) provide information to allow the permitting authority to make an appropriate BTA determination for entrainment.

The permitee has requested an Alternative Schedule for completion of these information submittals. A compliance schedule is provided in the permit, which considers the materials that have already been developed by PREPA and how they might be used to fulfill the information submittal requirements.

6 REFERENCES

URS Consultants, Costa *Sur Power Plant Impingement Mortality & Entrainment Cumulative Reduction Report,* March 2014

URS Consultants, *Costa Sur Power Plant Entrainment Mortality Data Collection Plan,* December 2012

PREPA Letter from Efran Paredas Maisonet, Director, Planning and Protection, PREPA to Eng. Fernando L. Pagés Rangel, Tetratech, Inc., March 7, 2018