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DIVISION OF AIR
RESOURCE MANAGEMENT

June 3, 2013

Jeffrey F. Koerner, Program Administrator
Florida Department of Environmental Protection
Division of Air Resource Management
Office of Air Permitting and Compliance
2600 Blair Stone Road, M.S. 5505
Tallahassee, Florida 32399-2400

Via FedEx
Airbill No. 7998-8990-0587

**Re: Tampa Electric Company - Big Bend Station
Title V Permit Number 0570039-061-AV
Unit 4 Cooling Tower Replacement Courtesy Notification**

Dear Mr. Koerner:

Pursuant the request on August 22, 2011, Tampa Electric is submitting a courtesy notification to replace the existing Unit No. 4 mechanical drift cooling tower at Big Bend Station during the spring outage in 2014.

The proposed cooling tower will be constructed of fiberglass material to minimize corrosion and designed to the meet the current wind loading requirements set forth in the Florida Building Code. The design will also consist of an integrated fill/drift eliminator combination instead of the standard segregated fill and drift eliminator configuration. The integration combination provides the synergies of the increasing air to gas ratio while minimizing mist entrainment. The cooling tower will be designed for a water recirculation rate of 6,500 gallon/minute and a drift rate of 0.005%.

The proposed cooling tower will use the makeup supply water from the Sun City reclaimed water system. The results show the TDS in the reclaimed water ranged from 615 mg/L. Based on the analytical data and 3.5 cycles of concentration, the TDS concentration in the cooling tower will operate at approximately 2,150 mg/L.

The particulate emissions from the proposed cooling tower were calculated using AP-42 procedure (Chapter 13.4 Wet Cooling Towers, latest Ed.) and revised procedure by Reisman and Frisbie (2001)¹. This procedure is a widely accepted methodology to calculate PM/PM₁₀/PM_{2.5} emissions. The Department has accepted this procedure on several air permit applications including, but not limited to the following projects:

¹ Reisman, J. and Frisbie, G. , *Calculating Realistic PM₁₀ Emissions from Cooling Towers*, Technical Proceedings, Air Waste Management Association, June 2001.

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Big Bend Carbon Capture Project	0570039-047-AC
Treasure Coast Energy Center	1110121-001-AC
Hillsborough Resource Recovery Facility Expansion	0570261-008-AC
Crystal River Unit 3	0170004-018-AC
Crystal River Cooling Towers	0170004-010-AC
Levy Nuclear Plant Permit, Unit 1 and 2 Cooling Tower Project	0750088-001-AC
Taylor Energy Center	1230052-001-AC
Cane Island Power Park	0970043-014-AC

Table 1 shows a summary of the PM/PM₁₀/PM_{2.5} emission calculations. The calculations show the PM emissions are less than the 5.0 tons per year threshold. Consequently, the proposed cooling tower is considered an insignificant source of emissions and exempt from air permitting requirements pursuant to Rule 62-210.300(3)(b)1., F.A.C., *Generic Emission Unit or Activity Exemption*. A copy of the emission calculations is shown attached.

Table 1 –Proposed Unit 4 Cooling Tower Emission Summary.

Location	Drift Rate	Flow (gpm)	TDS (mg/L)	Emission Rate (tons/year)		
				PM	PM ₁₀	PM _{2.5}
Unit 4 Cooling Tower	0.005%	6,500	2,150	1.5	0.93	0.0067

TEC believes the aforementioned calculations demonstrate reasonable assurance of meeting the requirements to Rule 62-210.300(3)(b)1., F.A.C., *Generic Emission Unit or Activity Exemption*. TEC also requests that these changes be included in the Title V air permit at the next available opportunity.

Please contact me at (813) 228-4232, if you have any questions or comments.

Sincerely,



Robert A. Velasco, P.E., BCEE, QEP
 Air Programs
 Environmental, Health & Safety

EHS/iyim/RAV203 BB4 Cooling Tower Courtesy Notification


Enclosure

c/enc: Kelley Boatwright, DEP SW District
 Diana Lee, EPCHC

**Tampa Electric Company
Big Bend Power Station
Facility ID No. 0570039
Unit 4 Cooling Tower Emission Calculations**

Professional Engineer Certification

1. Professional Engineer Name: Robert A. Velasco, P.E. Registration Number: 57190
2. Professional Engineer Address... Organization/Firm: Tampa Electric Company Street Address: P.O. Box 111 City: Tampa State: FL Zip Code: 33601
3. Professional Engineer Telephone Numbers... Telephone: (813) 228 - 4232 Fax: (813) 228 - 1308
4. Professional Engineer E-mail Address: ravelasco@tecoenergy.com
5. Professional Engineer Statement: <i>(1) Engineering opinions and information included herein provides reasonable assurance of meeting the requirements of Chapter 62-210.300 F.A.C.;</i> <i>(2) Engineering information included herein is believed to be correct to the best of the Engineer's knowledge;</i> <i>(3) Emission information is based on acceptable techniques available for calculating emissions or estimating emissions of insignificant emission units from materials, information and calculations contained in this certification;</i> <i>(4) Seal does not certify or attest to the accuracy of work or information prepared by others who are qualified to perform such services. This includes, but not limited to drawings, specifications, vendor information, engineering test data, laboratory data, correspondences, personnel communication.; and</i> <i>(5) The Engineer is not responsible for subsequent modifications made by others without the Engineer's written consent.</i>



Signature/Date
(seal)



Emission Inventory Work Sheet

PM EMISSIONS - WET COOLING TOWERS

Big Bend Power Station

Tampa Electric Company

Facility ID No. 0570039

INPUT DATA AND EMISSION CALCULATIONS

Emission Source Description:

Proposed Unit 4 cooling tower replacement

Emission Control Methods:

Drift eliminators

Emission Points:

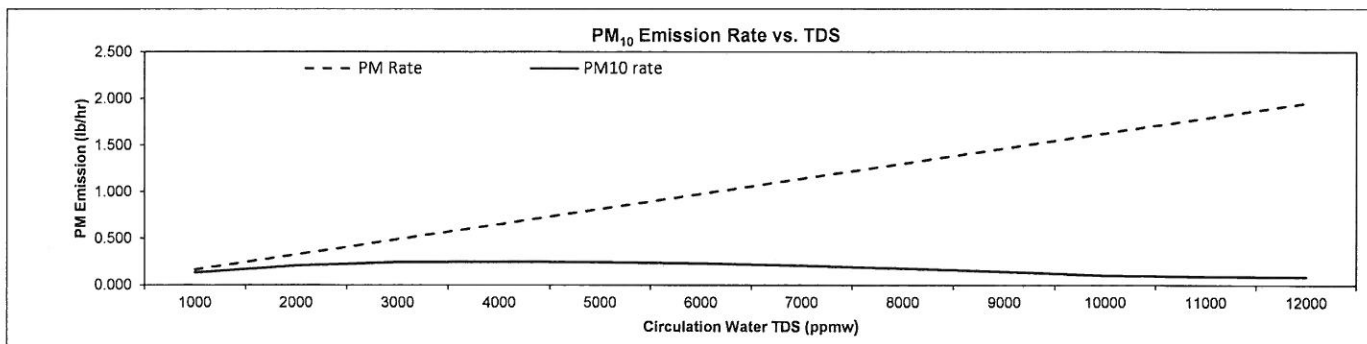
Cooling drift

INPUT DATA AND EMISSION CALCULATIONS

Water droplet density	1	g/cm ³
Solid particle density	2.2	g/cm ³
TDS	2,150	ppmw
Drift rate	0.005	%
Water circulation rate	6,500	gpm
PM emission rate	0.35	lb/hr
	1.5	ton/yr
PM ₁₀ emission rate	0.21	lb/hr
	0.93	ton/yr
PM _{2.5} emission rate	0.0015	lb/hr
	0.0067	ton/yr

Solids Particle Size Distribution

EPRI Droplet Diameter (μm)	Droplet Volume (μm ³) [2]	Droplet Mass (μg) [3]	Particle Mass Solids (μg) [4]	Solid Particle Volume (μm ³)	Solid Particle Diameter (μm) [7]	EPRI % Mass Smaller
10	524	5.24E-04	1.13E-06	0.51	0.992	0.000
20	4189	4.19E-03	9.01E-06	4.09	1.985	0.196
30	14137	1.41E-02	3.04E-05	13.82	2.977	0.226
40	33510	3.35E-02	7.20E-05	32.75	3.969	0.514
50	65450	6.54E-02	1.41E-04	63.96	4.962	1.816
60	113097	1.13E-01	2.43E-04	110.53	5.954	5.702
70	179594	1.80E-01	3.86E-04	175.51	6.947	21.348
90	381704	3.82E-01	8.21E-04	373.03	8.931	49.812
110	696910	6.97E-01	1.50E-03	681.07	10.916	70.509
130	1150347	1.15E+00	2.47E-03	1124.20	12.901	82.023
150	1767146	1.77E+00	3.80E-03	1726.98	14.885	88.012
180	3053628	3.05E+00	6.57E-03	2984.23	17.863	91.032
210	4849048	4.85E+00	1.04E-02	4738.84	20.840	92.468
240	7238229	7.24E+00	1.56E-02	7073.72	23.817	94.091
270	10305995	1.03E+01	2.22E-02	10071.77	26.794	94.689
300	14137167	1.41E+01	3.04E-02	13815.87	29.771	96.288
350	22449298	2.24E+01	4.83E-02	21939.09	34.733	97.011
400	33510322	3.35E+01	7.20E-02	32748.72	39.695	98.340
450	47712938	4.77E+01	1.03E-01	46628.55	44.656	99.071
500	65449847	6.54E+01	1.41E-01	63962.35	49.618	99.071
600	113097336	1.13E+02	2.43E-01	110526.94	59.542	100.000



EMISSION EQUATIONS

[2] Volume of drift droplet

$$V = 4/3 \pi (D_p/2)^3$$

[3] Mass of solids in drift droplet

$$TDS \times \rho_w \times V$$

[4] Mass of solids

$$\rho_{TDS} \times V$$

[7] Diameter of drift droplet

$$D_d [(TDS)(\rho_w/\rho_{TDS})]^{1/3}$$

SOURCES OF INPUT DATA

Circulation Rate

Design Specifications

Drift Rate

Design Specifications

PM Calculation

EPA AP 42 Chapter 13.4 Wet Cooling Towers (latest Ed.)

PM₁₀ Calculation

Reisman, J. and Frisbie, G., Calculating Realistic PM₁₀ Emissions from Cooling Towers, Technical Proceedings Air Waste Management Association, June 2001.

NOTES AND OBSERVATIONS

PM₁₀/PM ratio based on a conservative 0.0006% drift rate

Velasco, Robert A.

From: Holtom, Jonathan <Jonathan.Holtom@dep.state.fl.us>
Sent: Monday, August 22, 2011 4:51 PM
To: Velasco, Robert A.
Subject: RE: Request for Confirmation of Cooling Tower Exemption

Hi Rob,

The information you submitted related to your existing small cooling towers indicated that the potential emissions from each of them is less than 5 tons per year of particulate matter. Assuming your information and calculations are correct, these existing emissions units qualify as insignificant units pursuant to Rule 62-213.430(6), F.A.C. As such, no permitting revisions are needed at this time. The insignificant units can be rolled into the Title V permit the next time it is open for some other reason. Just be sure to include a request with the next application that they be added to the list of insignificant sources. If you would like for us to revise the insignificant list to include these existing cooling towers during the processing of the application that was submitted by EPSAP today, please send me a letter certifying their potential emissions, a description as you would like to have them listed in the insignificant list and a request that we include them as part of this revision.

For the new cooling towers, based on your information regarding potential emissions, the construction activity should qualify for an exemption from the requirement to obtain a construction permit under the provisions of Rule 62-210.300(3)(b), F.A.C. Please provide a letter to us each time you add/replace one of these exempt/insignificant units along with a request to revise the insignificant list the next time the Title V permit is opened.

Please do not hesitate to contact me if you have additional questions regarding the incorporation of these units into the Title V permit. Thanks!

Jon Holtom, P.E., CPM
Power Plant Permitting Group Administrator
Florida Department of Environmental Protection
Division of Air Resource Management
Office of Air Permitting and Compliance
(850) 717-9079
FAX: (850) 717-9097
Email: jon.holtom@dep.state.fl.us

The Department of Environmental Protection values its customers opinions and feedback. Please take a few minutes to share your comments on the service you received from the department by clicking on this link. [DEP Customer Survey](#).

From: Velasco, Robert A. [mailto:RAVelasco@tecoenergy.com]
Sent: Tuesday, August 16, 2011 10:06 AM
To: Holtom, Jonathan
Subject: Request for Confirmation of Cooling Tower Exemption

Jon:

As discussed yesterday, I would like a correspondence or email from the FDEP documenting the cooling towers are an insignificant source of emissions and request to update the permit when each upgraded tower is brought online.

Best Regards,

(Rob) Robert Velasco, P.E., BCEE, QEP
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