

Golder Associates Inc.

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March 18, 2009

Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

0938-7554
RECEIVED
MAR 19 2009
BUREAU OF AIR REGULATION

Attention: Mr. Jeffery F. Koerner, Administrator

**RE: REQUEST FOR ADDITIONAL INFORMATION
PROJECT NO. 0990045-007-AC
TOM G. SMITH POWER PLANT
AUTHORIZATION TO RE-TUBE FOSSIL FUEL STEAM GENERATOR UNIT 3**

Dear Mr. Koerner:

City of Lake Worth Utilities, Inc. (CLWU) has received a request for additional information (RAI) from the Florida Department of Environmental Protection (FDEP) dated February 16, 2009, regarding the construction permit application for replacement of water-wall tubes of the fossil fuel-fired steam generator Unit 3 at the Tom G. Smith Power Plant. Each of FDEP's requests is answered below, in the same order as they appear in the RAI letter.

Comment 1. Provide an analysis of the baseline actual pollutant emissions with the projected actual or potential pollutant emissions.

Response: An analysis to compare baseline actual versus future projected actual emissions has been prepared and presented in attached Tables 1 through 6. The actual annual emissions for the 5 years prior to the unit failure are calculated in Tables 1 and 2 for natural gas- and fuel oil-firing, respectively. The period chosen is May to April of each year because the unit failed in May of 2008. Table 3 presents the 2-year average actual emissions. Future projected actual emissions are presented in Tables 4 and 5 for natural gas- and fuel oil-firing, respectively. A Prevention of Significant Deterioration (PSD) applicability analysis is presented in Table 6.

Based on the difference of the projected actual and baseline actual emissions, the net changes in emissions are less than the PSD significant emission rates; therefore, the Unit 3 re-tubing project is not subject to PSD review.

Comment 2. When was the last compliance test conducted between 90 to 100 percent (%) of the permitted capacity of 325.1 million British thermal units (MMBtu) per hour? What were the results of the compliance test? Please provide a synopsis of the test results and include the heat input during each test performed. The Air Resource Management System (ARMS) data system shows the last compliance test to have been conducted on June 9, 2003, for nitrogen oxides (NOx) and the heat input was 131 MMBtu, which is only 40.3% of the permitted capacity of Unit 3.

Response: The last compliance test conducted between 90- and 100-percent of the permitted heat input rate of 325.1 MMBtu/hr was in November 2001. The testing was for particulate matter (PM) with a measured value of 0.025 pound per MMBtu of PM emissions. Based on available data, power output during the test was approximately 25 megawatts, which is equivalent to 312.5 MMBtu/hr of heat input

(96 percent of permitted capacity) using a heat rate of 12,500 British thermal units per kilowatt-hour. Please note that compliance testing is only required for PM and visible (VE) emissions from Unit 3 and only if oil-firing is for 400 hours or more per year (Sections C.10., E.6., and E.7. of Title V Permit No. 0990045-005-AV).

The test conducted on June 9, 2003, was a reasonable accuracy test audit for the NO_x continuous emission monitoring system of Unit 3. Note that the Relative Accuracy Test Audit (RATA) for NO_x is conducted annually at power output rating between 24 and 26 megawatts.

Comment 3. Provide a synopsis of the pollutant compliance tests conducted on Unit 3 for the last ten years and include the heat input during each test performed.

Response: Unit 3 is required to perform compliance testing for PM and VE emissions if fuel oil-firing hours are 400 or more per year. During the last 10 years, the only compliance test conducted on Unit 3 was for PM and VE on October 2, 2001.

Comment 4. Provide a detailed description of the actual work that will be performed on Unit 3. When is the work planned to be conducted?

Response: The following work has been planned for Unit 3:

- Remove all remaining insulation and lagging from the outside of boiler water walls and steam drum.
- Remove the water wall tubes on the sides of the boiler.
- Flush bottom headers with de-mineralized water.
- Remove the water wall roof panels from the steam drum to just below the ceiling in the wind box. This includes removing refractory and steel from around the super heater tube penetrations. Remove steam drum internals to allow access for rolling water wall tubes into the drum and replacing the drum internals when tube installation is completed.
- Remove the rear water wall tubes from the steam drum down to the mud drum, including the refractory above the mud drum so the new tubes can be rolled in the mud drum.
- Fabricate water wall roof panels. The panels will be fabricated using 3¼-inch outside diameter (OD) x .180 minimum wall (MW) thickness, SA178A material. The panels will be built on 4-inch centers with ¾-inch fin membrane from steam drum to the cut line just below the wind box ceiling where the old tubes were removed.
- Replace the refractory around the super heater tube penetrations on the roof panels and cover with steel plate.
- Fabricate and install left-hand and right-hand side water wall panels with upper headers attached. These panels will be fabricated using 3¼-inch OD x .180 MW thickness, SA178A material. The panels will be built on 4-inch centers with ¾-inch fin membrane. The upper headers will be fabricated from 8 5/8-inch OD x .812 wall with SA106 Gr. B pipe.
- Fabricate rear wall panels from the steam drum to the mud drum. The panels will be fabricated using 3¼-inch OD x .180 MW, SA178A material. The panel will be built on 4-inch centers with a ¾-inch fin membrane. The tubes will be rolled into the drums.

- Install the refractory around the rear water wall tubes between the mud drum.
- Fabricate 22 upper header feeder tubes. The tubes will be supplied from the upper header to the steam drum. These tubes will be fabricated using 4-inch OD x .220 MW, SA210A1 material.
- Replace missing baffle brick supports between tubes 6 and 7 of the superheat section EL. 38-feet.
- Repair cracked firebrick found on the furnace floor.
- Replace damaged baffle bricks in the superheat section at EL. 36-feet.
- Replace the refractory along the rear wall of the furnace where the super heater come up through the furnace.
- Re-insulate the boiler using the existing lagging.
- Cover the top of the boiler with expanded metal so all insulation will remain off the top of the water wall tubes.

Comment 5. Will the proposed re-tubing allow Unit 3 to regain lost capacity?

Response: Unit 3 experienced tube failure in May 2008 and is currently inoperable. The boiler is in immediate need of having its water walls replaced so that it can be safely operated again. Note that the unit is required by the CLWU to maintain system security during peak load conditions due to transmission and distribution infrastructure constraints.

Comment 6. Provide any current operational data showing operation at permitted capacity.

Response: Current operational data for the last 5 years prior to the tube failure are presented below:

	Gross Generation (kWh)	Natural Gas Used (10 ³ ft ³)	Hours on Natural Gas	Fuel Oil Used (10 ³ gal)	Hours on Fuel Oil
May 03 – May 04	4,321,278	32,009	226	87.5	48
May 04 – May 05	707,519	4,924	61	0	0
May 05 – May 06	6,454,716	89,848	386	88.3	52
May 06 – May 07	5,926,836	99,336	262	0	0
May 07 – May 08	5,996,675	98,741	142	0	0

Thank you for consideration of this information. If you have any questions, please do not hesitate to call me at (352) 336-5600.

Sincerely,

GOLDER ASSOCIATES INC.



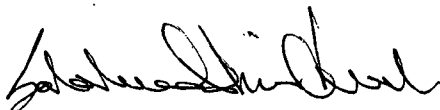
Kennard K. Kosky, P.E.
Principal Engineer

SKM/tlc

Enclosures

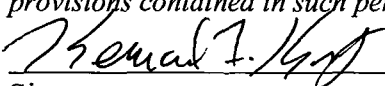
cc: M. Ridge, CLWU

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Salahuddin Mohammad
Senior Project Engineer

Professional Engineer Certification

1. Professional Engineer Name: Kennard F. Kosky Registration Number: 14996
2. Professional Engineer Mailing Address... Organization/Firm: Golder Associates Inc.** Street Address: 6241 NW 23rd Street, Suite 500 City: Gainesville State: FL Zip Code: 32653
3. Professional Engineer Telephone Numbers... Telephone: (352) 336-5600 ext. Fax: (352) 336-6603
4. Professional Engineer E-mail Address:
5. Professional Engineer Statement: <i>I, the undersigned, hereby certify, except as particularly noted herein*, that:</i> <i>(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and</i> <i>(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.</i> <i>(3) If the purpose of this application is to obtain a Title V air operation permit (check here <input type="checkbox"/> , if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.</i> <i>(4) If the purpose of this application is to obtain an air construction permit (check here <input checked="" type="checkbox"/> , if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here <input type="checkbox"/> , if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.</i> <i>(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here <input type="checkbox"/> , if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.</i>  Signature _____ Date <u>3/18/09</u> (seal)

* Attach any exception to certification statement.

**Board of Professional Engineers Certificate of Authorization #00001670.

**TABLE 1
ESTIMATED ACTUAL ANNUAL EMISSIONS FOR UNIT 3 DUE TO NATURAL GAS-FIRING**

Pollutant	Natural Gas Consumption (10 ⁶ scf/yr) ^a					Emissions Factor ^b (lb/10 ⁶ scf)	Annual Emissions (TPY)				
	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008		2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
NO _x	32.0	4.9	89.8	99.3	98.7	280	4.5	0.7	12.6	13.9	13.8
CO	32.0	4.9	89.8	99.3	98.7	84	1.3	0.2	3.8	4.2	4.1
SO ₂	32.0	4.9	89.8	99.3	98.7	0.6	0.01	0.001	0.027	0.030	0.030
VOC	32.0	4.9	89.8	99.3	98.7	5.5	0.09	0.01	0.25	0.27	0.27
PM ^c	32.0	4.9	89.8	99.3	98.7	7.6	0.12	0.02	0.34	0.38	0.38
PM ₁₀ ^c	32.0	4.9	89.8	99.3	98.7	7.6	0.12	0.02	0.34	0.38	0.38

^a Provided by City of Lake Worth Utilities. Time range is from May to April.

^b Tables 1.4-1 and 1.4-2, Section 1.4, AP-42.

^c Total particulate matter (filterable + condensable).

**TABLE 2
ESTIMATED ACTUAL ANNUAL EMISSIONS FOR UNIT 3 DUE TO FUEL OIL-FIRING**

Pollutant	Fuel Oil Consumption (10 ³ gal/yr) ^a					Emissions Factor ^b (lb/10 ³ gal)	Annual Emissions (TPY)				
	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008		2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
NO _x	87.5	0.0	88.3	0.0	0.0	47	2.1	0.0	2.1	0.0	0.0
CO	87.5	0.0	88.3	0.0	0.0	5	0.2	0.0	0.2	0.0	0.0
SO ₂	87.5	0.0	88.3	0.0	0.0	157 *S	15.46	0.00	15.60	0.00	0.00
VOC	87.5	0.0	88.3	0.0	0.0	0.76	0.03	0.00	0.03	0.00	0.00
PM ^c	87.5	0.0	88.3	0.0	0.0	1.5+3.22+9.19 *S	1.11	0.00	1.12	0.00	0.00
PM ₁₀ ^c	87.5	0.0	88.3	0.0	0.0	1.5+3.22+9.19 *S	1.11	0.00	1.12	0.00	0.00

^a Provided by City of Lake Worth Utilities. Time range is from May to April.

^b Tables 1.3-1, 1.3-2, and 1.3-3, Section 1.3, AP-42. Fuel sulfur content (S) is limited to 2.25%.

^c Total particulate matter (filterable + condensable).

**TABLE 3
UNIT 3 ANNUAL AVERAGE EMISSIONS (NATURAL GAS- AND FUEL OIL-FIRING)
FOR EACH CONSECUTIVE TWO-YEAR PERIOD, 2002-2006**

Pollutant	Total Annual Emissions (May to April) ^a					Two-Year Average Annual Emissions (May to April)			
	2003-2004 (TPY)	2004-2005 (TPY)	2005-2006 (TPY)	2006-2007 (TPY)	2007-2008 (TPY)	2003-2005 (TPY)	2004-2006 (TPY)	2005-2007 (TPY)	2006-2008 (TPY)
NO _x	6.5	0.7	14.7	13.9	13.8	3.6	7.7	14.3	13.9
CO	1.6	0.2	4.0	4.2	4.1	0.9	2.1	4.1	4.2
SO ₂	15.5	0.0	15.6	0.0	0.0	7.7	7.8	7.8	0.0
VOC	0.1	0.0	0.3	0.3	0.3	0.1	0.1	0.3	0.3
PM	1.2	0.0	1.5	0.4	0.4	0.6	0.7	0.9	0.4
PM ₁₀	1.2	0.0	1.5	0.4	0.4	0.6	0.7	0.9	0.4

^a Sum of natural gas-firing and fuel oil-firing emissions. See Table 1 for natural gas-firing emissions and Table 2 for fuel oil-firing emissions.

**TABLE 4
FUTURE PROJECTED ACTUAL EMISSIONS FOR UNIT 3 DUE TO NATURAL GAS-FIRING**

Pollutant	Potential Hourly Heat Input ^a (MMBtu/hr)	Annual Operation ^b (hrs/yr)	Natural Gas Heat Content ^c (MMBtu/10⁶ scf)	Hourly Natural Gas Consumption (10⁶ scf/hr)	Emissions Factor ^d (lb/10⁶ scf)	Hourly Emissions (lb/hr)	Annual Emissions (TPY)
NO _x	325.1	386	1,040	0.31	280	87.5	16.9
CO	325.1	386	1,040	0.31	84	26.3	5.1
SO ₂	325.1	386	1,040	0.31	0.6	0.2	0.0
VOC	325.1	386	1,040	0.31	5.5	1.7	0.3
PM ^e	325.1	386	1,040	0.31	7.6	2.4	0.5
PM ₁₀ ^e	325.1	386	1,040	0.31	7.6	2.4	0.5

^a Maximum hourly heat input rate, Permit No. 0990045-005-AV.

^b Annual operating hours based on maximum natural gas-firing operating hours during the period May 2003 to April 2008.

^c Provided by City of Lake Worth Utilities.

^d Tables 1.4-1 and 1.4-2, Section 1.4, AP-42.

^e Total particulate matter (filterable + condensable).

**TABLE 5
FUTURE PROJECTED ACTUAL EMISSIONS FOR UNIT 3 DUE TO FUEL OIL-FIRING**

Pollutant	Potential Hourly Heat Input^a (MMBtu/hr)	Annual Operation^b (hrs/yr)	Fuel Oil Heat Content^c (Btu/gal)	Hourly Fuel Oil Consumption (10³ gal/hr)	Emissions Factor^d (lb/10³ gal)	Hourly Emissions (lb/hr)	Annual Emissions (TPY)
NO _x	325.1	52	145,000	2.24	47	105.4	2.7
CO	325.1	52	145,000	2.24	5	11.2	0.3
SO ₂	325.1	52	145,000	2.24	157 *S	792.0	20.6
VOC	325.1	52	145,000	2.24	0.8	1.7	0.04
PM ^e	325.1	52	145,000	2.24	1.5+3.22+9.19 *S	56.9	1.5
PM ₁₀ ^e	325.1	52	145,000	2.24	1.5+3.22+9.19 *S	56.9	1.5

^a Maximum hourly heat input rate, Permit No. 0990045-005-AV.

^b Annual operating hours based on maximum fuel oil-firing operating hours during the period May 2003 to April 2008.

^c Provided by City of Lake Worth Utilities.

^d Tables 1.3-1, 1.3-2 and 1.3-3, Section 1.3, AP-42. Fuel sulfur content (S) is limited to 2.25%.

^e Total particulate matter (filterable + condensable).

**TABLE 6
PSD APPLICABILITY - UNIT 3 RE-TUBING PROJECT
(FUTURE PROJECTED ACTUAL - 2-YEAR AVERAGE BASELINE ACTUAL)**

Pollutant	Maximum 2-Year Average Baseline Actual Emissions^a (TPY)	Projected Actual Emissions^b (TPY)	Increase/Decrease in Emissions (TPY)	PSD Significant Emission Rate (TPY)
NO _x	14.3	19.6	5.4	40
CO	4.2	5.4	1.2	100
SO ₂	7.8	20.6	12.8	40
VOC	0.3	0.4	0.1	40
PM	0.9	1.9	1.0	25
PM ₁₀	0.9	1.9	1.0	15

^a Maximum 2-year average emission rate from Table 3.

^b Sum of projected actual natural gas-firing emissions and projected actual oil-firing emissions, see Tables 4 and 5.