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- file -

1030011-009-AV

August 3, 2007

Mr. Al Linero  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

**Subject: Best Operating Practices during utility boiler start-up**

Mr. Linero:

**BACKGROUND**

Based on citizen complaints received on January 25, 2007, reporting dense visible emissions coming from the Progress Energy Bartow plant [Air Permit 1030011-009-AV], the Air Quality Division [AQD] requested information of Bartow personnel regarding operations at the plant on that date. Bartow Plant personnel were quick to acknowledge they had operational problems with Emission Unit 002 on January 25<sup>th</sup> when attempting a cold-start of the unit, after a prolonged shutdown for maintenance. In an effort to fully understand the precise cause of the excess emissions, letters and telephone conversations with the AQD were exchanged over the course of the next few months.

**FINDINGS**

- Attempted light-off began at 15:58 on January 25<sup>th</sup>.
- No. 6 fuel flow readings, in barrels/hour, taken every five minutes:
 

16:00.....	-1.2	16:05.....	-1.48	16:10.....	214.87
16:15.....	86.27	16:20.....	-1.41	16:25.....	80.96
16:30.....	-1.39				

Starting at ~16:35 PM until ~18:20 PM, fuel flow held steady between 15.87 to 20.28 BPH. From ~18:25 PM until ~19:30 PM fuel flows ranged from 5.23 to 6.55 BPH. These are the only fuel flow readings currently known [copy attached].

- ~ 16:32 PM a continuous flame was achieved in the boiler
- Opacity readings from 16:00 until 16:30 ranged from 0.8 to 54%.
- From 16:36 on January 25<sup>th</sup> until 06:42 on January 26<sup>th</sup> [~14 hour span] opacity readings ranged from 30 to 86%, with the overwhelming majority of the 6 minute readings being in the 60-80% range, as compared to a steady state opacity standard of 40%.
- At ~ 06:47 on January 26<sup>th</sup>, power was placed on the grid
- At ~ 09:05 on January 26<sup>th</sup>, due to undisclosed problems, the unit was disconnected from the grid and shutdown

PLEASE ADDRESS REPLY TO:

300 S. Garden Avenue  
Clearwater, Florida 33756  
Phone: (727) 464-4422  
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As the picture of Bartow's operational practices unfolded, Wayne Martin of the AQD staff, spoke with you and Scott Sheplack via phone, during the month of May. As part of that conversation you expressed your understanding of Best Operational Practices for utility boiler start-up. That is, when informed EU002 had been primed with No. 6 fuel oil, you indicated that would not be considered BOP as an industry wide standard, but priming with No. 2 fuel oil would be. In the same context, Scott suggested Wayne research the matter further by reviewing the language in the TV permit application regarding BOP during start-up operations.

The language contained in the portion of the permit application titled, **PROCEDURES FOR STARTUP AND SHUTDOWNS MINIMIZING EXCESS EMISSIONS**, reads as follows: Startup of the fossil-fuel boilers begins when fuel (No. 2 or No. 6 fuel oil) is introduced into one of more burners within the boiler and lighted (commencement of combustion) ...

### **UNRESOLVED ISSUES**

1. At this time, Bartow personnel do not have an explanation for the recorded 215 BPH flow reading recorded at 16:10; other than stating the reading was a perturbation; an "erroneous data point." Bartow personnel also indicated, "The system is physically unable to handle such a high flow rate." However, as a point of interest, the permit indicates the unit is capable of a fuel firing rate of 209 BPH.

Based on the data provided by the Bartow Plant, the AQD is concerned that BOP was not followed if the boiler was overloaded with fuel between 16:00 and 16:30, the result of which was out-of-control combustion.

#### **Do you have any thoughts on the 215 BPH reading, or even the 81 and 86 BPH fuel flow readings, and the potential impact on the start-up in question?**

2. Your input regarding the undesirable use of No. 6 fuel oil during boiler start-up, also raises the question as to whether Bartow was following BOP. It appears the Bartow Plant was in compliance with start-up procedures as expressed in the permit application language cited above.

#### **If your belief is correct regarding the use of No. 2 as the proper fuel for utility boiler start-up; should this BOP issue be revisited regarding this facility?**

3. Bartow personnel believe startup ends when the generating unit is at 15 MW or greater, and stated the unit never exceeded 15 MW during this 14 hour period, and therefore never exited the startup mode. As a point of interest, the permit indicates the unit is rated at 120 MW. Rule 62-210.700 indicates startup ends when the process rate exceeds 10% of its rated capacity [other than startup or shutdown]. Ten percent of 120 MW is 12 MW, not 15 MW. Language contained in the same section of the permit application cited above, reads: "Startup is complete and steady-state operation begins when the combustion process has stabilized and the megawatt load on the unit is stable and above 10 percent load."

#### **If the unit under discussion was operating between 13-15 MW [assumed to be a stable load], and the combustion process was stable [assumed based on the unit being placed on the grid], would you consider this unit to have exited the start-up mode, and began operating in a "steady state" mode?**

Your input regarding the three unresolved issues cited above would greatly be appreciated. Contact Wayne Martin at (727) 464-4422 if you have any questions regarding this inquiry.

Sincerely,



Gary Robbins  
Environmental Program Coordinator

cc: PF- (0011 002), RF  
Craig DeAngelo, FDEP-DARM

Attachments: Table 1, Continuous Opacity Monitor (COM) data  
Table 2, Process Rate Data  
Progress Energy - letter dated 03/19/07

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Table 1: Continuous Opacity Monitor (COM) Data  
 Florida Power Corporation dba Progress Energy Florida, Inc.  
 P.L. Bartow Plant  
 Fossil Fuel Fired Steam Generator No. 2 (EU -002)

Bartow Unit 2 - COM Readings 1/25/07 16:00 - 1/26/2007 08:54									
Time	OPACITY	Time	OPACITY	Time	OPACITY	Time	OPACITY	Time	OPACITY
16:00	0.8	19:24	61.5	22:48	70.8	2:12	76.3	5:36	58.3
16:06	13.6	19:30	60.7	22:54	71.5	2:18	76.3	5:42	55.4
16:12	16.9	19:36	59.6	23:00	71.2	2:24	77.7	5:48	54.2
16:18	1.3	19:42	58.8	23:06	70.9	2:30	75.8	5:54	57.2
16:24	16.5	19:48	58.8	23:12	70.9	2:36	63.2	6:00	43.6
16:30	54.4	19:54	58.7	23:18	72.1	2:42	61.4	6:06	42.7
16:36	85.7	20:00	55	23:24	71.9	2:48	60.8	6:12	39.4
16:42	85.7	20:06	45.4	23:30	72.1	2:54	61.6	6:18	39.4
16:48	85.8	20:12	22.1	23:36	73.3	3:00	63	6:24	39.3
16:54	85.8	20:18	32.7	23:42	73.8	3:06	61.7	6:30	41.8
17:00	85.8	20:24	78.9	23:48	72.3	3:12	63.6	6:36	36.2
17:06	85.7	20:30	67.3	23:54	72.3	3:18	65.8	6:42	29.7
17:12	85.7	20:36	60.6	0:00	72.1	3:24	66.6	6:48	25.5
17:18	85.7	20:42	55.8	0:06	72.6	3:30	64.6	6:54	21.4
17:24	83.9	20:48	55.2	0:12	73.2	3:36	65.2	7:00	0
17:30	75.3	20:54	60.5	0:18	73	3:42	65.9	7:06	20.9
17:36	67.9	21:00	62.8	0:24	71	3:48	65.6	7:12	22.7
17:42	65.8	21:06	64.9	0:30	71.5	3:54	76.2	7:18	23.8
17:48	62.6	21:12	70.9	0:36	68.8	4:00	74.5	7:24	23.3
17:54	58.6	21:18	70.1	0:42	77.3	4:06	55.2	7:30	25.4
18:00	56.8	21:24	67.7	0:48	77.7	4:12	52.6	7:36	25.7
18:06	52.2	21:30	68.7	0:54	81	4:18	60.3	7:42	25
18:12	51.9	21:36	69.2	1:00	80.8	4:24	59.2	7:48	52
18:18	59.8	21:42	69.4	1:06	81.1	4:30	53.7	7:54	62.1
18:24	79.2	21:48	69.3	1:12	79.9	4:36	53.8	8:00	39.3
18:30	76.9	21:54	70.8	1:18	79.8	4:42	49	8:06	7.8
18:36	72.3	22:00	71.9	1:24	77.5	4:48	50.7	8:12	8.2
18:42	70.6	22:06	71.5	1:30	78.7	4:54	51.7	8:18	8.9
18:48	70.8	22:12	70.9	1:36	80.3	5:00	48.8	8:24	8.6
18:54	69.2	22:18	69.3	1:42	82	5:06	52.8	8:30	8.8
19:00	64.7	22:24	69.9	1:48	81.2	5:12	56.6	8:36	8.7
19:06	71.5	22:30	71.9	1:54	71.5	5:18	56.7	8:42	8.7
19:12	58.2	22:36	70.3	2:00	71.9	5:24	56.7	8:48	8.5
19:18	59.3	22:42	70.8	2:06	73.7	5:30	55.4	8:54	8.4

Note: Unit 2 was shutdown at 0905 1/26/2007.

**Table 2: Process Rate Data**  
**Florida Power Corporation dba Progress Energy Florida, Inc.**  
**P.L. Bartow Plant**  
**Fossil Fuel Fired Steam Generator No. 2 (EU -002)**  
**January 25, 2007; 4:00 pm – 7:30 pm**

	No. 6 Fuel Flow (BBH)
25-Jan-07 16:00:00	-1.20
25-Jan-07 16:05:00	-1.48
25-Jan-07 16:10:00	214.87
25-Jan-07 16:15:00	86.27
25-Jan-07 16:20:00	1.41
25-Jan-07 16:25:00	80.96
25-Jan-07 16:30:00	-1.39
25-Jan-07 16:35:00	15.87
25-Jan-07 16:40:00	15.89
25-Jan-07 16:45:00	16.25
25-Jan-07 16:50:00	15.17
25-Jan-07 16:55:00	13.34
25-Jan-07 17:00:00	15.52
25-Jan-07 17:05:00	16.32
25-Jan-07 17:10:00	16.28
25-Jan-07 17:15:00	16.33
25-Jan-07 17:20:00	16.11
25-Jan-07 17:25:00	17.90
25-Jan-07 17:30:00	19.79
25-Jan-07 17:35:00	19.77
25-Jan-07 17:40:00	19.61
25-Jan-07 17:45:00	19.71
25-Jan-07 17:50:00	19.64
25-Jan-07 17:55:00	19.49
25-Jan-07 18:00:00	19.92
25-Jan-07 18:05:00	20.09
25-Jan-07 18:10:00	20.03
25-Jan-07 18:15:00	20.28
25-Jan-07 18:20:00	18.09
25-Jan-07 18:25:00	5.84
25-Jan-07 18:30:00	5.68
25-Jan-07 18:35:00	6.22
25-Jan-07 18:40:00	6.29
25-Jan-07 18:45:00	6.22
25-Jan-07 18:50:00	6.51
25-Jan-07 18:55:00	6.41
25-Jan-07 19:00:00	6.55
25-Jan-07 19:05:00	6.35
25-Jan-07 19:10:00	6.31
25-Jan-07 19:15:00	6.30
25-Jan-07 19:20:00	6.17
25-Jan-07 19:25:00	5.98
25-Jan-07 19:30:00	5.23