



March 3, 1995

Mr. John C. Brown, Jr. P.E.
Air Permitting and Standards
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

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Bureau of
Air Regulation

Dear Mr. Brown:

Subject: **Key West, City Electric System
Proposed Relocation of 23-MW Combustion Turbine
Permit File No. AC44-245399, PSD-FL-210**

On behalf of City Electric System (CES) we are responding to your letter dated July 28, 1994. Our previous correspondence on this matter in response to your letter dated March 10, 1994 was dated June 10, June 24 and July 15 and provided responses to various technical questions, air quality modeling results, and hard copy and computer disk of those modeling results, respectively. In order to complete the application, your letter of July 28 has questions in the areas of historic operation of NO_x control and air quality modeling with consideration of downwash. Our analysis has been completed as follows:

Comments 1 and 2

Please provide 30-day rolling averages of the water to fuel ratio at different loads for a period of one year since the last compliance test was conducted, and compare it to the ratio of water to fuel for that load utilized during the March 1993 compliance test. Please note that the Department is also interested in looking at the water to fuel ratios when the turbine was operating within 10% of its rated capacity, even though the March 1993 compliance test did not achieve that rate. Please provide the excess emissions data as required by 40CFR60.334(c)(1) for the same time period.

Response

Emissions testing was conducted in 1983, December 1987, and March 1993 with the following results:

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Year	Load (MW)	Water/Fuel	Fuel (gpm)	NO _x (ppm, dry 15% O ₂)
1993	5	0.24	18	49
1983	7	0.25	20	51
1987	7	0.20	21	60
1993	10	0.28	24	61
1983	11	0.28	24	62
1987	11	0.24	25	60
1993	15	0.33	30	64
1983	16	0.33	31	66
1987	16	0.29	31	67
1983	21	0.34	38	69
1987	21	0.33	38	64

*The PLC equation was set based on these data at water/fuel = 0.45-3.8/fuel(gpm)

The historic run times of the combustion turbine were 751 hours in 1992 (high due to Hurricane Andrew), 413 hours in 1993 and 189 hours in 1994. The annotated strip chart records of MW, water and fuel for 1994 were submitted to DEP with the annual report. R. W. Beck analyzed the 1994 strip chart starting with March 10 (when CES indicates the correct scale was applied to the MW reading) and summarized the data as follows:

Date	Start Time	Duration (hours)	Average Power(MW)	Average Water/Fuel	Average Fuel (gpm)
March 10	1500	7	6.0	0.30	15
March 28	1500	5	12.0	0.34	31
June 22	900	53	6.5	0.35	17
July 28	900	4	5.0	0.35	13
Aug 14	800	3	8.5	0.29	21
Aug 17	1400	8	13.0	0.29	33
Aug 19	1500	7	8.0	0.33	20
Aug 29	1100	7	6.0	0.37	15





Oct 13	900	7	10.5	0.31	26
Oct 14	1300	3	6.5	0.34	16
Dec 13	2200	9	8.0	0.34	19
Dec 14	2200	2	11.0	0.31	27
Dec 15	1600	15	7.5	0.32	19
Dec 21	1900	10	8.0	0.33	20
Dec 22	1000	2	4.0	0.33	12

Due to the relatively few hours of operation in 1994, 30-day rolling averages are not meaningful. Operation during 1994 was typically at 8 MW with average water/fuel of 0.33, which is higher than the value expected from the PLC equation and fuel use of 19 gpm. There is no data near rated capacity. There are no excess emissions when the water skid is in operation and a total of approximately 6 hours when the water skid was out of service.

Comment 3

Building downwash effects should be included in all ISC2 modeling runs. The Department ran ISC2 for five years, with building downwash effects included, using the 59 F, 50% load condition for emission and stack parameters. Highest predicted short-term impacts for SO₂ and PM/PM₁₀ were well above significant impact levels. Please do a full impact analysis, which includes building downwash effects and all sources within the significant impact area, for comparison with all applicable standards, PSD Class II increments and de minimus levels.

Response

Rather than piecemeal air quality modeling procedures and results, the entire Chapter 5 of the PSD application has been rewritten and is attached hereto. Since DEP has previously requested both hardcopy and computer disks of ISC2 input/output, these will be forwarded separately to Cleve Holladay. Among the results of particular note are the following:

- CES will use 0.05% sulfur fuel oil in the combustion turbine, medium-speed diesels and high-speed diesels since it is now available.
- SO₂, PM₁₀, and NO_x impacts from the combustion turbine and medium-speed diesels meet the Class II increment standards.
- SO₂ and CO impacts from the Stock Island sources (combustion turbine, medium-speed diesels, high-speed diesels and steam unit) meet NAAQS standards.



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- Annual NO_x impacts from the Stock Island sources exceed NAAQS standards until the actual operating factor for the high speed diesels (.066) is taken into account.
- Maximum 24-hr PM_{10} impacts from the Stock Island sources exceed NAAQS standards until the daily operating hours limit is taken into account. The high speed diesels have been limited to operation between the hours of 0900 and 1700 due to SO_2 downwash concerns. Correspondence to this effect was submitted to DEP by CES on May 6, 1993, and by R. W. Beck on July 20, 1993, and is also attached hereto.
- The changes in SO_2 , PM_{10} , and NO_x impacts at the Everglades Class I area are insignificant due to the relocation of the combustion turbine from Key West to Stock Island.
- PM_{10} impact at the site boundary due to downwash exceeds monitoring significance levels for 8 days in 5 years. We understand that FDEP is collecting data in Monroe County which is representative of background and more useful than attempting to quantify source-specific impact from a source not permitted to operate routinely. Modeling results indicate that increasing the combustion turbine stack height from 35 feet to 42 feet reduce the impact below the monitoring significance level.

We believe this response should provide adequate information on which FDEP can base the permit review. We would appreciate a completeness letter in due course. Should you have any questions or comments, please call me at (303) 299-5234.

Sincerely,

R. W. BECK

A handwritten signature in black ink that reads "Michael D. Henderson" with a stylized flourish at the end.

Michael D. Henderson
Associate

MDH:ws

Attachments

- c: Jim Greenshields, CES (w/attach)
Skip Jansen, CES (w/o attach)
Nick Guarriello (w/o attach)
George Wu (w/attach)

cc: S. Arief
C. Holladay
D. Knoules, SF Dist.
J. Harper, EPA
J. Bunyah, NPS

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