TECO

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March 4, 1999

Mr. A.A. Linero, P.E.
Florida Department of Environmental Protection
Division of Air Resources Management
New Source Review Section
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Via FedEx
Airbill No. 809689266124

Re: Tampa Electric Company (TEC) -
F.J. Gannon Station Units 5 and 6
Stack Height Increase Construction Permit Application
FDEP File No. 0570040-009-AC
Request for Additional Information

Dear Mr. Linero:

This correspondence provides responses to the issues raised in the department's letters dated November 25, 1998 and December 11, 1998. The Department's December 11, 1998 letter requested that TEC respond to comments contained in a letter to Mr. Cleve Holladay from EPA Region 4 dated December 8, 1998.

November 25, 1998 Letter

FDEP Comment No. 1:

The proposed 24-hour maximum plant emission limit of 267 tons provides an average hourly emission rate of 11.5 tons for use in the assessment of compliance with the 24-hour ambient air quality standard. Based on your submittal the appropriate emission rate for assessing the 3-hour ambient air quality standard is the presently allowable 2.4 lb/MMBtu for each unit. Please provide assurance through air quality impact modeling results that this limit will meet the 3-hour standard.

TEC Response 1:

Because Emission Set G premises a constant emission rate of 1.9 lb SO2/MMBtu for each unit, the dispersion model results for this emission rate scenario shown on Table 1-6 of the October 1998 modeling report were multiplied by a factor of 1.26 (i.e., 2.4 divided by 1.9) to obtain 3-hour average SO2 model results for an emission rate of 2.4 lb SO2/MMBtu. Model impacts based on this calculation are provided in Table 1 attached. As shown in Table 1, the highest, second highest (HSH) 3-hour average SO2 impacts are all well below the AAQS of 1,300 (g/m3. Table 1 also provides 3-hour average SO2 impacts for the 75 and 50 load cases based on an emission rate of 2.4 lb SO2/MMBtu.

FDEP Comment No. 2:
If the exit stack temperatures and velocities vary with load, the air quality impact modeling should address the worst impact considering various combinations of loads (e.g., 100, 75, and 50 percent loads) for the six boilers. You have provided the information for the 100 percent load case. Please provide similar information for the 75 and 50 percent load cases.

TEC Response No. 2:
Tables 2-5 attached provided the requested partial load impact assessments for the four emission rate scenarios evaluated. All modeled SO2 impacts are projected to be below the applicable National and Florida AAQS.

FDEP Comment No. 3:
The comments above address similar comments contained in the enclosed correspondence from EPA Region 4 dated November 24, 1998.

TEC Response No. 3:
No response required. See responses to Items 1 and 2 above.

FDEP Comment No. 4:
Although the cover letter stated that a request to burn used oil and oil-contaminated solids was included as part of the application, we did not see any information regarding this in the application. Our preference would be to process such a request separately from the stack height issue.

TEC Response No. 4:
TEC will prepare and submit a separate request addressing the issue of the burning of used oil and oil-contaminated solids.

December 11, 1998 Letter
FDEP/EPA Comment No. 1:
The October 15, 1998, cover letter form Theresa J.L. Watley to you states that the TECO dispersion modeling assumes that the Unit 5 and 6 stacks will be raised to 110 meters. According to the good engineering practice (GEP) stack height regulations, there is no restriction or prohibition against, or demonstration required for raising an existing (or replacing) a stack up to 65 meters, provided prohibited dispersion techniques are not employed. If a stack is raised above the 65 meter *de minimis* height to the calculated GEP formula height, then the source must (1) demonstrate by fluid modeling or a field study that both excessive concentration criteria are met, using existing stack quality, or (2) show by site-specific information, that the stack is causing a local nuisance. Otherwise, the actual stack height must be used to set the emission limitations. The excessive concentration criteria include both an exceedance of a NAAQS or available Prevention of Significant Deterioration (PSD) increment and 40% excess concentration. Please refer to the EPA document, **Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations)** (EPA-450/4-80-023R), for more detailed discussions. Also, the June

29, 1992, EPA memorandum, **Credit for Stack Height Increases Due to the Siting of New, Nearby Structures**, from John Calcagni provides further interpretation of the stack height regulations to allow credit for additional stack height by recalculating the GEP formula hieght to account for those situations in which an exisitng source is impacted by the siting of a new, nearby structure. A copy of this memo is enclosed for your reference. Unless TECO can comply with the above guidance and provide sufficient documentation, the actual stack height must be used in the permit modeling to set emission limitations.

TEC Response No. 1:
The October 1998 modeling study was based on increasing the stack heights of F.J. Gannon Station Units 5 and 6 from their current height of 96 m to 110 m. Based on existing F.J. Gannon Station building dimensions, the formula GEP stack height for Units 5 and 6 is 133 m as determined by EPA's BPIP program. Accordingly, TEC is not requesting that Units 5 and 6 stacks be raised to their full GEP formula height but rather to approximately 82 percent of the formula height.

TEC also notes that the GEP requirements specified in Rule 62-210.550(3), F.A.C. (Good Engineering Practice) does not mandate a fluid model or field study for stacks using the GEP formula height but rather provides that "EPA, Department, or local air program may require the use of a field study or fluid model to verify GEP stack height for the emissions unit."

To address agency concerns regarding GEP stack heights, additional dispersion modeling was conducted for Units 5 & 6 based on the current allowable SO2 emission rate of 2.4 lb SO2/MMBtu and current stack heights of 96 m. Modeling was conducted using the same meteorology and receptor grids as were employed in the October 1998 air dispersion modeling study with and without consideration of building downwash. The results of this modeling analysis are presented in Table 6 attached. As shown in Table 6, there is a substantial increase in maximum 24-hour average SO2 impacts when downwash is considered in comparison to impacts predicted without downwash. These differences are well above the 40 percent excessive concentration criterion contained in the GEP rule. TEC is proposing to raise the stack heights of Units 5 & 6 at the F.J. Gannon Station in response to FDEP concerns that the Station was contributing to a potential exceedance of the SO2 AAQS. Accordingly, the second criterion of the GEP excessive concentration test is met; i.e., the units contribute to a total concentration due to emissions from all emission units that is greater than an ambient air quality standard.

TEC believes that the substantial increase in maximum modeled impacts due to downwash effects and use of stack heights for Units 5 and 6 less than formula GEP stack height demonstrate compliance with the GEP rule and justify the requested 15 percent increase in Units 5 & 6 stack height to 110 m.

FDEP/EPA Comment No. 2:
There was no mention of a background concentration in the submittal. Sections 8.2.1 and 9.2.1 of **Appendix W to Part 51: Guideline on Air Quality Models (Modeling Guideline)** require the addition of a background concentration to the modeled concentration before determining compliance

with the SO2 NAAQS. The submittal must identify the background concentrations that are applicable to each SO2 averaging period and discuss how those concentrations were determined.

FDEP/EPA Comment No. 3:
Only the TECO SO2 emission points were modeled. There was no discussion concerning the nearby SO2 sources that should be modeled for NAAQS compliance. The **Modeling Guideline** recommends that such sources be modeled to estimate the impact on the NAAQS. Unless the TECO power plant is isolated, compliance with the NAAQS cannot be appropriately determined without the consideration of the nearby sources and the background. The TECO emission points modeled concentrations are but one part of the concentrations impacting the NAAQS.

TEC Response Nos. 2 and 3:
As communicated to TEC by Mr. Cleve Holladay and Mr. Scott Sheplak at a meeting with FDEP staff in Tallahassee on October 15, 1998, the FDEP policy for the purposes of Title V permitting is to require Title V applicants to model only their individual emission sources for verification of compliance with NAAQS. Regional, multi-source modeling which may be performed for the purpose of SIP revisions will be conducted by FDEP.

FDEP/EPA Comment No. 4:
The scenarios modeled to determine the load or operating condition that causes maximum ground-level concentrations should consider applicable combinations of boilers and operational loads. The submitted demonstration included modeling each boiler at maximum load and variations of the lb/MMBtu emissions rates. The exit temperature and velocities did not change with the different variations. Loads of 100, 75 and 50 percent are normally considered in air quality assessments. The combinations of boiler/loads modeled should be based on past and expected operations of the station.

TEC Response No. 4:
See TEC Response No. 2 of the FDEP November 25, 1998 letter.

FDEP/EPA Comment No. 5:
The modeling should also address compliance with the three-hour NAAQS for the different load scenarios mentioned above and should use the maximum allowed hourly emission rate (i.e., 2.4 lb/MMBtu) that is identified in the Title V Air Operating Permit.

TEC Response No. 5:
See TEC Response No. 3 of the FDEP November 25, 1998 letter.

FDEP/EPA Comment No. 6:
The exit temperatures used in the modeling and Table 1-2 do not agree with the values measured by the Continuous Emissions Monitors (CEMs) and reported in Table 1-3. Please explain why the CEM exit temperatures were not used in the modeling.

TEC Response No. 6:
CEM exit temperatures were used in the modeling analysis; these temperatures were shown in Table 1-3 of the October 1998 study. Table 7 attached provides a summary of modeled stack parameters for 100, 75, and 50 percent load cases.

FDEP/EPA Comment No. 7:
Table 1-2 should include the CT1 stack parameters since they were included as TECO modeling inputs.

TEC Response No. 7:
Table 7 attached provides modeled stack parameters for CT1. Because CT1 SO2 emission rates are low compared to the main F.J. Gannon Station units and data on partial loads unavailable, only the 100% load case was evaluated for CT1.

FDEP/EPA Comment No. 8:
A copy of the aerial photograph describing the receptor network (i.e., Figure 1.2) was not included in the submittal. Please include this figure in your response to this letter.

TEC Response No. 8:
Figure 1.2 was included in the October 1998 permit application package submitted to FDEP. Since FDEP voluntarily forwarded a copy of this permit package to EPA, TEC believes that this comment refers to an oversight by FDEP.

Your continued and expeditious review of TEC's October 1998 construction permit application is appreciated. Please contact me at (813) 641-5034 if there are any further questions.

Sincerely,

Theresa J.L. Watley
Consulting Engineer
Environmental Planning Department

EP\bj\tjlw632

c: Mr. Clair Fancy - FDEP
Mr. Cleve Holladay - FDEP (w/enc.)
Mr. Jerry Kissel - FDEP SW (w/enc.)
Mr. Rick Sterlin, EPCHC (w/enc.)

CC: EPA

Tables

Table 1. F.J. Gannon Station SO_2 Dispersion Modeling Results - 2.4 lb SO_2/MMBtu, 96 m Stack Height

A. 100% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Highest 3-Hr	1,071.7	964.3	803.5	809.4	1,052.2	None	None
Highest 2nd-Highest 3-Hr	884.5	829.9	727.1	733.9	877.1	1,300	1,300

B. 75% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Highest 3-Hr	949.5	902.3	891.7	924.3	1,058.5	None	None
Highest 2nd-Highest 3-Hr	812.5	774.8	721.3	744.3	833.7	1,300	1,300

C. 50% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Highest 3-Hr	808.7	754.2	814.4	815.6	926.8	None	None
Highest 2nd-Highest 3-Hr	715.3	676.9	636.8	664.3	724.0	1,300	1,300

Table 2. F.J. Gannon Station SO_2 Dispersion Modeling Results - Emission Set G

A. 75% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Annual	19.4	19.7	15.8	16.8	17.8	80	60
Highest 24-Hr	281.5	332.9	331.7	262.4	351.0	None	None
Highest 2nd-Highest 24-Hr	235.8	247.9	234.9	248.7	245.7	365	260
Highest 3-Hr	751.7	714.3	705.9	731.7	838.0	None	None
Highest 2nd-Highest 3-Hr	643.2	613.4	571.0	589.2	660.0	1,300	1,300

B. 50% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Annual	18.9	19.0	15.2	16.9	17.4	80	60
Highest 24-Hr	237.1	278.9	292.7	242.0	306.7	None	None
Highest 2nd-Highest 24-Hr	207.9	201.5	217.4	221.5	256.9	365	260
Highest 3-Hr	640.2	597.1	644.7	645.7	733.7	None	None
Highest 2nd-Highest 3-Hr	566.3	535.9	504.1	525.9	573.2	1,300	1,300

Table 3. F.J. Gannon Station SO_2 Dispersion Modeling Results - Emission Set F

A. 75% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Annual	15.3	15.5	14.3	16.8	15.7	80	60
Highest 24-Hr	220.2	286.1	268.0	224.4	288.1	None	None
Highest 2nd-Highest 24-Hr	190.0	210.3	203.9	218.0	212.2	365	260
Highest 3-Hr	668.3	649.2	582.5	656.6	675.4	None	None
Highest 2nd-Highest 3-Hr	538.3	535.9	483.4	512.2	546.5	1,300	1,300

B. 50% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Annual	15.4	15.3	14.4	16.9	15.8	80	60
Highest 24-Hr	195.5	233.9	246.0	212.1	260.2	None	None
Highest 2nd-Highest 24-Hr	176.5	174.4	182.5	198.1	212.4	365	260
Highest 3-Hr	574.1	532.1	538.4	591.2	614.3	None	None
Highest 2nd-Highest 3-Hr	486.8	474.2	417.2	463.9	498.7	1,300	1,300

Table 4. F.J. Gannon Station SO_2 Dispersion Modeling Results - Emission Set D

A. 75% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Annual	15.3	14.7	14.3	16.8	15.7	80	60
Highest 24-Hr	211.8	269.8	264.2	217.9	277.9	None	None
Highest 2nd-Highest 24-Hr	184.6	199.2	193.8	212.5	207.3	365	260
Highest 3-Hr	676.0	658.9	590.5	659.3	665.7	None	None
Highest 2nd-Highest 3-Hr	542.8	522.7	485.1	502.4	522.1	1,300	1,300

B. 50% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Annual	15.4	15.0	14.4	16.9	15.8	80	60
Highest 24-Hr	191.0	234.9	246.7	217.7	256.3	None	None
Highest 2nd-Highest 24-Hr	173.5	164.8	177.9	195.5	214.9	365	260
Highest 3-Hr	581.7	540.4	585.9	600.4	616.7	None	None
Highest 2nd-Highest 3-Hr	473.2	464.2	425.3	465.4	486.7	1,300	1,300

Table 5. F.J. Gannon Station SO_2 Dispersion Modeling Results - Emission Set J

A. 75% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Annual	17.5	17.7	14.4	16.8	16.3	80	60
Highest 24-Hr	254.4	307.6	305.0	244.9	321.7	None	None
Highest 2nd-Highest 24-Hr	214.6	227.8	217.7	234.2	227.4	365	260
Highest 3-Hr	714.6	689.5	638.2	701.2	770.2	None	None
Highest 2nd-Highest 3-Hr	590.1	577.6	519.0	555.5	609.4	1,300	1,300

B. 50% Load

Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data					Ambient Air Quality Standard ($\mu g/m^3$)	
	1992	1993	1994	1995	1996	National	Florida
Annual	17.4	17.5	14.4	16.9	16.0	80	60
Highest 24-Hr	218.3	261.6	274.7	228.6	286.7	None	None
Highest 2nd-Highest 24-Hr	192.2	186.7	201.5	211.2	240.6	365	260
Highest 3-Hr	615.0	570.5	620.5	626.5	688.0	None	None
Highest 2nd-Highest 3-Hr	529.0	508.2	471.4	499.4	543.1	1,300	1,300

Table 6. F.J. Gannon Station SO_2 Dispersion Modeling Results - Units 5 & 6, 2.4 lb SO_2/MMBtu, 96 m Stack Height

Downwash (Y/N)	Averaging Period	Modeled Ambient Impact ($\mu g/m^3$) - St. Petersburg International Airport Met Data				
		1992	1993	1994	1995	1996
Y	Highest 2nd-Highest 24-Hr	135.4	187.4	166.5	113.5	185.0
N	Highest 2nd-Highest 24-Hr	63.1	68.1	53.5	50.4	47.2
Percent in Excess		114.6	175.2	211.2	125.2	291.9

Table 7. F.J. Gannon Station Stack Parameters for ISCST3 Dispersion Modeling - 100% Load

A. 100% Load

Emissions Unit	Stack Height		Stack Gas Temperature		Stack Gas Velocity		Stack Diameter	
	(ft)	(m)	(°F)	(K)	(ft/min)	(m/sec)	(ft)	(m)
Boiler 1	315	96.0	276.6	409.0	7,467	37.93	9.92	3.02
Boiler 2	315	96.0	313.0	429.3	7,579	38.50	9.92	3.02
Boiler 3	315	96.0	271.4	406.2	6,812	34.60	10.50	3.20
Boiler 4, Stack 4E	315	96.0	288.6	415.7	5,825	29.59	9.45	2.88
Boiler 4, Stack 4W	315	96.0	337.6	442.9	5,936	30.15	9.45	2.88
Boiler 5	361	110.0	293.4	418.4	9,988	50.74	10.33	3.15
Boiler 6	361	110.0	260.0	399.8	6,551	33.28	17.46	5.32
CT1	35	10.7	1,009.1	816.0	5,557	28.23	11.15	3.40

B. 75% Load

Emissions Unit	Stack Height		Stack Gas Temperature		Stack Gas Velocity		Stack Diameter	
	(ft)	(m)	(°F)	(K)	(ft/min)	(m/sec)	(ft)	(m)
Boiler 1	315	96.0	234.7	385.8	5,650	28.70	9.92	3.02
Boiler 2	315	96.0	281.1	411.5	6,067	30.82	9.92	3.02
Boiler 3	315	96.0	264.7	402.4	5,501	27.95	10.50	3.20
Boiler 4, Stack 4E	315	96.0	282.1	412.1	4,691	23.83	9.45	2.88
Boiler 4, Stack 4W	315	96.0	307.0	425.9	5,176	26.29	9.45	2.88
Boiler 5	361	110.0	240.0	388.7	7,669	38.96	10.33	3.15
Boiler 6	361	110.0	236.3	386.7	4,415	22.43	17.46	5.32

C. 50% Load

Emissions Unit	Stack Height		Stack Gas Temperature		Stack Gas Velocity		Stack Diameter	
	(ft)	(m)	(°F)	(K)	(ft/min)	(m/sec)	(ft)	(m)
Boiler 1	315	96.0	257.7	398.5	4,895	24.87	9.92	3.02
Boiler 2	315	96.0	252.6	395.7	4,827	24.52	9.92	3.02
Boiler 3	315	96.0	239.3	388.3	4,671	23.73	10.50	3.20
Boiler 4, Stack 4E	315	96.0	289.1	416.0	3,926	19.95	9.45	2.88
Boiler 4, Stack 4W	315	96.0	299.8	421.9	3,794	19.27	9.45	2.88
Boiler 5	361	110.0	241.4	389.5	5,909	30.02	10.33	3.15
Boiler 6	361	110.0	203.9	368.7	3,315	16.84	17.46	5.32

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

4APT-APB

OCT - 5 1999

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

Dear Mr. Holladay:

Thank you for the opportunity to review the August 20, 1999, *Wind Tunnel Good Engineering Stack Height Study of the Francis J. Gannon Generating Station* protocol prepared by David E. Neff from Colorado State University. Our comments are as follows:

1. There are two stacks for boiler units five and six, each stack being 96 meters tall. The purpose of this fluid modeling exercise is to determine the most restrictive stack height, using the existing emission rates and background air quality such that both "excessive concentration" criteria are met. When determining a good engineering practice (GEP) stack height greater than the formula height, the New Source Performance Standard (NSPS) emission rate for that source (i.e., 1.2 lb. SO_2/MMBTU) must be used in the wind tunnel demonstration. The excessive concentration is defined as a maximum ground-level concentration due to emissions from a stack due in whole or in part to downwash produced by nearby structures or nearby terrain features which individually is a least 40 percent in excess of the maximum concentration experienced in the absence of such downwash, wakes and eddy effects and which contributes to a total concentration due to emissions or an exceedance of a National Ambient Air Quality Standard (NAAQS) or available Prevention of Significant (PSD) increment. The request is to raise the stack height to 110 meters. However, it is our understanding that excessive concentrations continue to occur at 110 meters. If this is true, then some greater stack height would be needed for the new GEP height. The new GEP height must be the lowest height at which the 40% criterion is met in order to get credit for the new stack height in air quality dispersion modeling (see item 3 below for more discussion). The purpose of the fluid modeling should be to determine the new GEP height for units five and six based on the nearby structures. Otherwise, the current stack height (i.e., 96 meters) must be used in any modeling to set emission limitations.

2. It is Region 4's understanding that the Tampa Electric Company (TECO) wants to determine if a stack height of 110 m is the new GEP height to use in air quality dispersion modeling. The last sentence at the bottom of page 1, states that the stack heights for the units five and six stacks as determined by 40 *Code of Federal Regulations (CFR)* §51.100(ii)92)(ii) are 110 meters. Past correspondence from TECO indicates that the

GEP formula height is 133 m. The correct GEP formula height must be stated in the protocol.

3. In contrast to the statement in the second paragraph of the Background section, Region 4 requested a fluid modeling demonstration to justify raising the TECO stack above 96 m such that credit for this new stack height could be used in air dispersion modeling, and not to support the GEP formula height. Any new height above the 65 m *de minimis* height which complies with the stack height regulations would be the new GEP height, and may not necessarily be the formula height. This new height would be demonstrated through fluid modeling (see *Raising stacks Below Formula Height to Formula Height* in 50 *Federal Register (FR) 27899*, July 8, 1985). A company may increase a stack or build a stack to any height. The stack height regulation requires the Environmental Protection Agency (EPA) to ensure that the degree of emission limitation required for control of any air pollutant under an applicable State implementation plan (SIP) is not affected by that portion of any stack height which exceeds GEP or any other dispersion technique (see 50 *FR 27892*). That is, EPA regulates the stack height credits rather than the actual stack height. Air quality dispersion modeling for regulatory purposes requires that the GEP stack height be used as input to the model assessment (see item 20 and 21 in the October 10, 1985, enclosed memo, *Questions and Answers on Implementing the Revised Stack Height Regulation*, and the January 2, 1990, enclosed memo, *Effect of changing Stack Height on Prevention of Significant Deterioration (PSD) Modeling and Monitoring*). The GEP stack height is defined as "the height necessary to insure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies or wakes which may be created by structures or nearby terrain obstacles" (see section 123(c) of the Clean Air Act).

4. The size of all building structures and the general topography in the vicinity of the source should be examined to determine the structures to include in the modeling. The criteria in the protocol does not appear to meet the guidance for including or excluding tall structures when defining the modeling area.

5. A site roughness length of 0.2 meters is proposed. Using table 1 in the *Guideline for Use of Fluid Modeling to Determine Good Engineering Practice Stack Height* document, a 0.2 meter surface roughness length corresponds to surfaces located in the outskirts of towns and suburbs. However, approximately one-fourth of the topography within 3 kilometers of the sources is water (i.e., bays in the area). Also, the land south of Hookers Point appears to be undeveloped. An explanation should be provided as to why these surfaces would not require a modification of the surface length chosen. A discussion of the topography around the stacks would help to justify the surface roughness choice.

6. Depending on the choice of the surface roughness length, the site power law index could change. It is unclear how the power law index and exponent were developed.

7. A 100% operating load condition for the stacks must be used in the fluid modeling, unless a compelling argument otherwise is made. Other operating loads could be modeled in a sensitivity simulation, if they are frequently used. There is no clear demonstration to support the use of the 50% load that was proposed in lieu of the 100% load. Fluid modeling parameters associated with the operating load conditions will need to be revised per the 100% load conditions. Please see item 12 in the October 10, 1985, memo enclosed entitled, *Questions and Answers on Implementing the Revised Stack Height Regulation* for a reference on this issue.

8. The excessive concentration criterion must be determined for all applicable averaging periods for the affected pollutant.

9. Background sources must be included in the modeling by adding their air pollutant contribution to that of the source in question for assessing the GEP height. The air pollutant concentration used for the applicable averaging periods should be addressed in the protocol. Please refer to page 49 of the *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) Revised* (EPA-450/4/80/023R) for this discussion.

10. The protocol states that four unidentified wind directions will be selected for determining the excessive concentration(s). It is unclear how these wind directions will be determined. The directions used in the fluid modeling should be those directions producing the largest building downwash as determined during the visualization phase of the study.

If questions arise, please do not hesitate to contact Brenda Johnson of the EPA Region 4 staff at (404) 562-9037.

Sincerely,

Linda Anderson-Carnahan
Chief
Air Planning Branch

Enclosures

UNITED STATES ENVIRONMENTAL PROTECTION AGENC
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

JAN 0 2 1990

MEMORANDUM

SUBJECT: Effect of Changing Stack Heights on Prevention of Significant Deterioration (PSD) Modeling and Monitoring

FROM: John Calcagni, Director
Air Quality Management Division (MD 15)

TO: Bruce P. Miller, Chief
Air Programs Branch, Region IV

This is in response to your October 20, 1989 memorandum concerning whether and when the beneficial air quality impacts that result from raising an existing stack height at a source can be considered as part of a proposed PSD modification. You asked for our comments on your draft response to Mr. Richard Grusnick's (Alabama Department of Environmental Management) September 11, 1989 letter on this issue. I have reviewed your draft response concerning the following specific examples provided by Mr. Grusnick.

Example 1. A baseline (non-increment consuming) unit raising its stack (from 100 feet to 250 feet) at the time of a mill expansion. The reason for raising the stack is:

(a) to produce enough air quality credit to reduce the ambient impact caused by the expansion; and

(b) to prevent a nuisance to workers in a new 200-foot building.

Example 2. An existing PSD increment-consuming unit raising its stack (from 100 feet to 250 feet) in conjunction with a mill expansion to avoid worker exposure inside a new 200-foot building.

Example 3. An existing PSD increment-consuming unit (with a wet scrubber and a 100-foot stack) whose emissions would be merged with new emissions from a proposed new adjacent unit (with an ESP) with a 300-foot stack.

I agree with your position that the reason why a source raises a stack is not relevant in deciding whether the air quality benefit to be derived from the stack increase can be considered in the PSD analysis. However, the maximum height creditable as the good engineering practice (GEP) stack height without providing a demonstration is 65 meters (approximately 213 feet). For a height greater than 65 meters to be fully creditable as the GEP stack height, it must be established in a manner consistent with the stack height rules.

In response to the question of when the increase in a stack height can be considered as part of a proposed modification, I believe that the increase must be proposed in conjunction with the overall modification, but need not be directly related to other physical changes or changes in the method of operation being proposed by the source. That is, the stack being raised need not be physically tied to the emissions unit(s) being constructed or modified. Thus, when a stack height increase is proposed in a PSD (modification) application, any creditable air quality improvements resulting from the higher stack (whether or not any increase in emissions resulting from the proposed modification are to be released through such stack) should be considered in the preliminary modeling analysis to determine whether further modeling or preconstruction monitoring would be required.

In each of the examples provided by Mr. Grusnick, I would consider the proposed stack height increase to be part of the proposed modification, and such increase, in general, should therefore be used in the determination of whether PSD modeling or preconstruction monitoring would be required. However, before any new stack exceeding 65 meters (approximately 213 feet) could be fully creditable, it would have to be verified as the GEP height in accordance with approved stack height rules. There are additional requirements with regard to the merging of exhaust gas streams that should be carefully evaluated to determine the creditable stack parameters in the third example.

If you have any questions concerning this response, please contact Dan deRoeck at 629-5593.

cc: J. Calcagni
E. Lillis
G. McCutchen
E. Ginsberg
Air Branch Chief, Regions I-III, V-X
NSR Contacts

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

OCT 10 1965

MEMORANDUM

SUBJECT: Questions and Answers on Implementing the Revised Stack Height Regulation

FROM: G. T. Helms, Chief G. T. Helms
Control Programs Operations Branch (MD-15)

TO: Chief, Air Branch, Regions I-X

A number of questions have arisen in several areas of the revised stack height regulation since its promulgation on July 8. The following answers have been developed in response. The questions and answers are arranged under the general topic headings of interpretation of the regulation, State implementation plan (SIP) requirements, and modeling analyses. Please continue to call Sharon Reinders at 629-5526 if you have further comments or additional questions.

Interpretation of the Regulation "in existence" before Dec. 31, 1970.

1. Q: What criteria should be used to determine when a stack was "in existence" with respect to the various grandfathering dates in the regulation?

A: The recent promulgation of revisions to the stack height regulation did not change the definition of "in existence." The definition is provided in 40 CFR 51.1(gg) and includes either the commencement of continuous construction on the stack or entering into a binding contract for stack construction, the cancellation of which would result in "substantial loss" to the source owner or operator. The definition of what constitutes a "substantial loss" will be the subject of future guidance.

2. Q: What "source" definition should be used in determining whether tie-ins to grandfathered stacks should be permitted or prohibited?

A: The term "source" in this instance means a single emitting unit. Thus, credit for tying a single post-1970 unit(s) into a grandfathered stack serving a number of old units is prohibited under the regulation.

3. Q: What is meant in the regulation by "facility"?

A: For purposes of this regulation, the definition contained in 40 CFR 51.301(d) should be used. That definition essentially defines the term as the entire complex of emitting activities on one property or contiguous properties controlled by a single owner or designee.

4. Q: Must good engineering practice (GEP) stack height be established separately for each pollutant? If not, how should it be determined?

A: It is not necessary to calculate a separate GEP stack height for each pollutant. Since "GEP" is defined by Section 123 of the Clean Air Act as the height necessary to ensure against excessive concentrations of any air pollutant, it follows that GEP should be established for each source based on the pollutant requiring the greatest height to avoid excessive concentrations.

5. Q: How should "reliance" on the 2.5H formula be determined?

A: First, "reliance" on the 2.5H formula applies only to stacks in existence before January 12, 1979. Credit for "reliance" on the 2.5H formula can be granted under the following cases: (a) Where the stack was actually built to a height less than or equal to 2.5H; (b) Where the stack was built taller than 2.5H and the emission limitation reflects the use of 2.5H in the SIP modeling analysis; or (c) Where evidence is provided to show "reliance" as discussed in the following paragraph. If no modeling was used to set the emission limitation for the source, then it cannot be argued that there was "reliance" on the formula, since EPA's guidance was specifically aimed at using stack height credit in establishing emission limitations. Once it is determined that the emission limitation was in fact based on estimates of dispersion from the stack, then the source can be said to have properly "relied" on the 2.5H formula. In the event that it cannot be determined that the emission limit is based on "reliance" on the 2.5H formula, then the refined H + 1.5L formula must be used.

Where a clear relationship between a 2.5H stack height and the emission limitation cannot be shown, where the emission limitation was not calculated based precisely on the 2.5H height, or where the stack height used in modeling cannot be verified, then additional evidence will be needed. Preferred would be written documentation, such as copies of the original engineering calculations or correspondence between the State or the emission source owner and EPA indicating that the 2.5H formula should be used to derive the emission limitation. However, recognizing that such evidence is often not retained for more than a few years, "reconstructed" documentation may be considered, but should only be used as a last resort. This evidence should include explanations by those individuals who were involved in designing the facility, calculating emission rates, and who represented the facility in dealings with the

State and EPA on how the emission limit was derived, including a discussion of how the formula was originally used in deriving the source emission limitation, a discussion of the analytical method applied, and a listing of any contacts or discussions with EPA during that period. This listing will aid EPA in searching its own files to find any records of communication or correspondence that may bear on the issue.

In no case should a source be allowed after January 12, 1979, to obtain a relaxation in the emission limitation by arguing that it "relied" on past EPA guidance endorsing the 2.5H formula. In cases where a relaxation based on GEP formula height is sought in the future, the refined H + 1.5L formula must be used.

6. Q: The preamble specifically discusses cooling towers as structures to which the formula should not be applied. Will the Office of Air Quality Planning and Standards be specifying other structures that are not well represented by the formula?

A: The discussion in the preamble and GEP guideline is not intended to be all-inclusive; judgment should be used in determining when fluid modeling should be used to estimate the effects of structures with rounded, domed, or tapered shapes. Water towers and storage tanks are additional examples of such structures. As additional information becomes available on the aerodynamic effects of specific building shapes and configurations, we will evaluate the need to revise the GEP guidance. However, at present, there are no plans to issue a "laundry list" of structures to which the formulas do not apply.

SIP Requirements

7. Q: Should a compliance averaging time be explicitly stated in a SIP revision for sulfur dioxide (SO_2) emission limits that are revised to meet the stack height regulation?

A: A compliance averaging time need not be specified as an enforceable SIP provision as long as a stack test compliance method is in place in the underlying federally approved SIP. EPA's current national policy requires that SIP's and permits contain enforceable "short-term" emission limits set to limit maximum emissions to a level which ensures protection of the short-term national ambient air quality standards (NAAQS) and prevention of significant deterioration (PSD) increments. EPA relies upon a short-term stack test provision in the SIP as the method of determining compliance with the emission limits. In lieu of a stack test, EPA has accepted fuel sampling and analysis and continuous emission in-stack monitors (CEM's). When compliance is to be determined from information obtained by fuel sampling and analysis and CEM's, short-term averaging times should be specified.

8. Q: Are all States required to have "stack height regulations"?

A: Limitations on creditable stack height and dispersion techniques impact the SIP program in two areas--SIP emission limits for existing sources and SIP provisions covering new source review (NSR)/PSD permitting procedures. For existing sources, State regulations limiting credit for stack height and other dispersion techniques (stack height regulations) are not necessary as long as the SIP emission limits are not affected in any manner by so much of the stack height as exceeds GEP, or any other dispersion technique. Where a State has stack height regulations, those regulations must be consistent with EPA's regulation. Where a SIP contains regulations that are inconsistent with EPA's regulation, the State must either adopt a stack height regulation that is consistent with EPA's or incorporate the EPA regulation by reference.

For the NSR/PSD programs, it is essential that the plan contain limitations on the amount of creditable stack height and other dispersion techniques. The following cases have been developed to illustrate what action(s) may be required of the State since promulgation of the stack height regulation.

CASE A(1): A fully or partially delegated PSD program that references but does not define GEP where the delegation agreement does not contain a date to define which version of the PSD rule is being delegated.

ACTION: Notify the State that all permits issued henceforth must be consistent with EPA's stack height regulation. All permits previously issued must be reviewed and revised as necessary within 9 months.

CASE A(2): A fully or partially delegated PSD program that references but does not define GEP where the delegation agreement does contain a date to define which version of the PSD rule is being delegated.

ACTION: Update the delegation agreement to reflect agreement with EPA's stack height regulation as of July 8, 1985. Notify the State that all permits issued henceforth must be consistent with EPA's stack height regulation. All permits previously issued must be reviewed and revised as necessary within 9 months.

CASE B: The current federally approved SIP for NSR/PSD does not contain a reference to GEP or dispersion techniques, i.e., provisions assuring that emission limitations will not be affected by stack height in excess of GEP or any prohibited dispersion techniques do not exist in the current SIP.

ACTION: Notify the State that such provisions must be adopted and submitted as a SIP revision within 9 months. This can be acccomplished by adopting stack height regulations at the State level or by adopting the appropriate reference and commitment to comply with EPA's stack height regulation as promulgated on July 8, 1985. Interim permitting should be consistent with EPA's stack height regulation.**

CASE C: The current federally approved SIP for NSR/PSD contains references to, but does not define, GEP or dispersion techniques.

ACTION: Notify the State that a commitment to comply with EPA's stack height regulation as promulgated on July 8, 1985, is required. If a State is unable to make such a commitment, State regulations must be revised to be consistent and submitted to EPA as a SIP revision within 9 months and interim permitting should be consistent with EPA's stack height regulation. No "grace period" will be allowed for sources receiving permits between July 1985 and April 1986.**

CASE D: The current federally approved SIP for NSR/PSD contains stack height regulations that are inconsistent with EPA's regulation.

ACTION: Notify the State that such regulations must be revised to be consistent and submitted as a SIP revision within 9 months and that interim permitting should be consistent with EPA's stack height regulation.**

CASE E(1): A SIP for NSR/PSD has been submitted to EPA, or will be submitted to EPA before the due date for stack height revisions. The submittal contains provisions that conflict with EPA's stack height regulation.

ACTION: Notify the State that EPA cannot approve the submittal until it is revised pursuant to EPA's July 8, 1985, regulation.

**In the event that a State does not have legal authority to comply with EPA's regulation in the interim (e.g., because it must enforce State rules that are inconsistent with EPA's regulation) and is compelled to issue a permit that does not meet the requirements of the EPA revised stack height regulation, then EPA should notify the State that such permits do not constitute authority under the Clean Air Act to commence construction.

CASE E(2): As in Case E(1), a SIP for NSR/PSD has been submitted to EPA or will be submitted to EPA before the due date for stack height revisions. The submittal is not inconsistent with EPA's stack height regulation, but portions of the existing approved SIP that relate to the submittal are inconsistent.

ACTION: Approve the SIP submittal based on a commitment by the State to correct the inconsistencies in its existing SIP to comport with EPA's July 8 regulation and submit the corrections as a SIP revision within 9 months. Interim permitting should be consistent with EPA's stack height regulation.** If the existing SIP is ambiguous, i.e., the SIP references but does not define terms relating to GEP or dispersion techniques, the action steps outlined in Case C above should be followed.

CASE F: In nonattainment areas, emission limits or permits do not always include modeling, but rather are based on lowest achievable emission rate (LAER) and offsets.

ACTION: If no modeling is used in the issuance of a permit, the emission requirements for the source are not "affected" by stack heights or dispersion techniques, and no action is needed. However, if modeling was used in the process of preparing and issuing a permit, such as cases where offsets were obtained offsite, that modeling must be reviewed for consistency with the stack height regulation.

9. Q: What must all States do now that EPA's stack height regulation is promulgated?

A: States must review and revise their SIP's as necessary to include or revise provisions to limit stack height credits and dispersion techniques to comport with the revised regulations, and, in addition, review and revise all emission limitations that are affected by stack height credit above GEP or any other dispersion techniques. In accordance with Section 406(d)(2) of the Clean Air Act, States have 9 months from promulgation to submit the revised SIP's and revised SIP emission limitations to EPA.

In an August 7, 1985, memo titled "Implementation of the Revised Stack Height Regulation--Request for Inventory and Action Plan to Revise SIP's," Regional Offices were requested to begin working with each of their States to develop States' Action Plans. Each Action Plan should include the following: (1) An inventory of (a) all stacks greater than 65 meters (m), (b) stacks at sources which exceed 5,000 tons per year total allowable SO_2 emissions; and (2) A reasonable schedule of dates for significant State actions to conform both State stack height rules and emission limitations to EPA's stack height regulation. Schedules should include increments of progress. Regional Offices should be satisfied that each of their States provide schedules for completion of the tasks

as outlined in the August memo and report the status of schedule commitments to them on a monthly basis. Regional Offices have been asked to forward monthly status reports to the Control Programs Development Division on the States' progress to meet scheduled commitments and also report the results of followup with the States on schedules that are not met. In order to facilitate tracking the States monthly progress, guidance on a standardized format will be issued shortly.

Modeling Analyses

10. Q: Is there any restriction or prohibition against, or demonstration required for, raising an existing (or replacing) stack up to 65 m?

A: No, as long as prohibited dispersion techniques are not employed.

11. Q: Are flares considered to be stacks?

A: No, flares are excluded from the regulation.

12. Q: What load should be used for a fluid modeling demonstration?

A: One hundred percent load should generally be used unless there is a compelling argument otherwise.

13. Q: Can new or modified sources who have agreed to a case-by-case best available control technology (BACT) emission rate be required to use this rate for fluid modeling rather than a less stringent new source performance standard (NSPS) emission rate?

A: As set forth in 40 CFR 51.1 (kk), the allowable emission rate to be used in making demonstrations under this part shall be prescribed by the NSPS that is applicable to the source category unless the owner or operator demonstrates that this emission rate is infeasible.

14. Q: Must the exceedance of NAAQS or PSD increment due to downwash, wakes, or eddies occur at a location meeting the definition of ambient air?

A: No, the exceedance may occur at any location, including that to which the general public does not have access.

15. Q: Is a source that meets NSPS or BACT emission limits subject to restrictions on plume merging?

A: Yes. However, in a majority of such cases, there will be no practical effect since BACT or NSPS limits will be sufficient to assure attainment without credit for plume rise enhancement.

Q: What stack parameters are to be used in modeling when the actual stack height is greater than GEP height?

A: Where it is necessary to reduce stack height credit below what is in existence, for modeling purposes, use existing stack gas exit parameters--temperature and flow rate--and existing stack top diameter and model at GEP height.

17. Q: How should a stack that is less than GEP height be modeled when dispersion techniques are employed?

A: In order to establish an appropriate emission limitation where a source desires to construct less than a GEP stack but use dispersion techniques to make up the difference in plume rise, two cases should be tested. First, conduct a modeling analysis inputting the GEP stack height without enhanced dispersion parameters, then conduct a second analysis inputting the less than GEP stack height with the increased plume rise. The more stringent emission limitation resulting from each of the two runs should be the one specified as the enforceable limitation.

18. Q: How are the effects of prohibited dispersion techniques to be excluded for modeling purposes?

A: Where prohibited dispersion techniques have been used, modeling to exclude their effects on the emission limitation will be accomplished by using the temperature and flow rates as the gas stream enters the stack, and recalculating stack parameters to exclude the prohibited techniques (e.g., calculate stack diameter without restrictions in place, determine exit gas temperatures before the use of prohibited reheaters, etc.).

19. Q: How are single flued merged stacks and multiflued stacks to be treated in a modeling analysis?

A: This is a multistep process. First, sources with allowable SO_2 emissions below 5,000 tons/year may be modeled accounting for any plume merging that has been employed. For larger sources, multiflued stacks are considered as prohibited dispersion techniques in the same way as single flued merged gas streams unless one of the three allowable conditions has been met; i.e., (1) the source owner or operator demonstrates that the facility was originally designed and constructed with such merged gas streams; (2) after date of promulgation, demonstrate that such merging is associated with a change in operation at the facility that includes the installation of pollution controls and results in a net reduction in the allowable emissions of the pollutant for which credit is sought; or (3) before date of promulgation, demonstrate that such merging did not result in any increase in the allowable emissions (or, in the event that no emission limit existed, actual emission level) and was associated with a change in operation at the facility that included the installation of

emissions control equipment or was carried out for sound economic or engineering reasons, as demonstrated to EPA. Guidelines on what constitutes sound economic or engineering justification will be issued shortly.

If plume merging from multiflued stacks is not allowable, then each flue/liner must be modeled as a separate source and the combined impact determined. For single flued merged stacks where credit is not allowed, each unit should be modeled as a separate stack located at the same point. The exit parameters, i.e. velocity and temperature, would be the same as for the existing merged stack conditions and the volume flow rate based on an apportionment of the flow from the individual units.

20. Q: What stack height for point sources should be input to air quality dispersion modeling for the purpose of demonstrating protection of the NAAQS and PSD increments?

A: A discussion of the maximum stack height credit to be used in modeling analyses is provided in the "Guideline for Determination of Good Engineering Practice Stack Height" and provides that the GEP stack height should be used as input to the model assessment. If a source is operating with a less than GEP stack height, then the actual stack height should be input to the model.

21. Q: What stack height should be used for background sources in modeling analyses?

A: The GEP stack height for each background source should be input to the model assessment. If a background source is operating with a less than GEP stack height, then the actual stack height should be input to the model.

22. Q: Can credit for plume merging due to installation of control equipment for total suspended particulate (TSP) matter be allowed when setting the SO_2 limit?

A: To state the question another way, the concern is what impact the merging and installation of control equipment have on the emission limit for another pollutant, and whether the merging occurred before or after July 8, 1985. After July 8, 1985, any exclusion from the definition of "dispersion techniques" applies only to the emission limitation for the pollutant affected by such change in operation and is accompanied by a net reduction in allowable emissions of the pollutant. For example, a source tears down two old stacks and builds one new GEP stack with an electrostatic precipitator (ESP). This results in a net reduction in TSP emissions. This source could model using stack gas characteristics resulting from merging the two gas streams in setting the TSP emission limit, but may not so model and receive the credit for stack merging when evaluating the SO_2 emission limit.

Before July 8, 1985, installation of TSP pollution control equipment generally justifies the merging of the stacks for TSP. However, if a source's emission limitation for SO_2 increased after the merging, then credit would generally not be allowed since it is presumed that the merging was to increase dispersion.

A source with no previous SO_2 emission limit that merges stacks and installs an ESP for TSP control may consider the effects of merging on compliance with the TSP NAAQS but may not use merging to justify setting an SO_2 emission limit less stringent than its actual emission rate before the merging.

23. Q: If, after determining GEP stack height by fluid modeling, dispersion modeling under other than "downwash" meteorological conditions shows that a lower emission limit than that from the fluid model GEP analysis is necessary to meet ambient air quality constraints, should a new stack height be defined for the source?

A: No. GEP stack height is set. Ambient air quality problems predicted by dispersion modeling at the fluid modeled height means that a more stringent emission limit is necessary.

24. Q: Does EPA intend to issue additional guidance on fluid modeling demonstrations?

A: See the attached memo from Joseph A. Tikvart, Chief, Source Receptor Analysis Branch, to David Stonefield, Chief, Policy Development Section, on guidance for a discussion of existing and additional guidance on fluid model demonstrations.

Attachment

cc: Stack Height Contacts
Gerald Emison
Ron Campbell
B. J. Steigerwald

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RECEIVED

OCT 30 1998

BUREAU OF
AIR REGULATION

October 29, 1998

Mr. A.A. Linero, P.E., Administrator
New Source Review Section
Florida Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Via FedEx
Airbill No. 808266927161

Re: Tampa Electric Company (TEC) - F. J. Gannon Station
Units 5 and 6 Stack Height Increase Construction Permit Application

Dear Mr. Linero:

Please find enclosed four (4) signed and sealed copies of TEC's subject Construction Permit Application. A fifith signed and sealed copy is being submitted to the Environmental Protection Commission of Hillsborough County (EPCHC)

As discussed during our October 15, 1998 meeting in Tallahassee, this permit application requests approval of F.J. Gannon Station's revised SO2 Compliance Plan which includes the stack height increase construction project for F.J. Gannon Station Units 5 and 6.

TEC's detailed SO2 modeling analysis for the F.J. Gannon Station (as submitted to the Department on October 15, 1998) reveals that no modeled exceedances of the Florida or National Ambient Air Quality Standards (AAQS) are recorded when station SO2 emissions are capped at 276 tons per day. As such, the enclosed SO2 Compliance Plan proposes that TEC maintain their current SO2 limitations (2.4 lb/MMBtu on a weekly average for individual coal burning units and 10.6 tons per hour on a weekly average for the entire station) and implement ***an additional limitation of 276 tons per day for the entire station***. It is TEC's belief that this proposal will address compliance with AAQS and will not compromise the current SO2 emission limitations pursuant to the State Implementation Plan (SIP).

Also included in this Construction Permit Application is TEC's request to burn used oil, inlcuding liquid oil and oil-contaminated solids, in F.J. Gannon Station Units 1 through 6. This request is made pursuant to guidance received from the Department at our May 28, 1998 meeting in Tallahassee, and is consistent with the information provided in the Title V Application.

We trust that the completeness of this submittal will enable your expedient review and permit issuance by early 1999. This timing is critical for TEC to maintain our construction schedule. Meanwhile, should you have any additional questions, please feel free to contact me at (813) 641-5034. Thanks again for your continued cooperation.

Sincerely,

Theresa J.L. Watley
Consulting Engineer
Environmental Planning

EP\TJLW620
Enclosure

c: Mr. Clair Fancy - FDEP
Mr. Jerry Kissel - FDEP SW(w/enc.)
Mr. Richard Kirby - EPCHC (w/enc.)
cc: C. Holladay, BAR

TAMPA ELECTRIC

November 8, 1999

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

Via FedEx
Airbill No.7918 0713 9757

Re: Tampa Electric Company - F.J. Gannon Station
Units 5&6 Stack Height Increase Construction Permit Application
DEP File No. 0570040-009-AC
Response to Comments on the Proposed Wind Tunnel Study Protocol

Dear Mr. Fancy,

The following is a review and explanation of Tampa Electric Company's (TEC) understanding of the Gannon 5 & 6 Stack Height Increase permitting issues. In addition, specific responses to EPA's comments on the fluid modeling protocol are addressed.

Background

As part of the Title V permitting process sulfur dioxide (SO_2) emissions from Gannon Station were modeled using existing conditions (stack height and emission rate) to determine current possible impact on ambient air quality standards (AAQS). The results of the air dispersion modeling predicted exceedances of the AAQS in the immediate vicinity of the Gannon Station under extreme meteorological conditions. Because the actual current stack height is less than the "Good Engineering Practice" (GEP) formula stack height of 133 meters (based on the 40 CFR 51.100 (ii)(2)(ii) formula height equation), TEC proposed to resolve this problem through an increase in the stack height of Gannon Units 5 & 6 to 110 meters accompanied by a corresponding reduction in the emission rate.

In reasonable permitting prudence, the FDEP requested evidence that the purpose of the stack extension was to reduce downwash effects and was therefore a credible dispersion technique. TEC provided substantial evidence through computer modeling that the SO_2 concentrations in vicinity of the source were due to cavity or wake effects (downwash) due to the Gannon boiler structures. The FDEP and EPA deemed this evidence insufficient and fluid modeling was requested.

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TEC agreed to undertake a fluid modeling demonstration, at substantial cost, to confirm that the exceedances of the ambient air quality standard shown in the air dispersion modeling referenced above were, in fact, due to downwash effects. To this end, TEC contracted with Dr. Neff at Colorado State University to conduct the necessary fluid modeling demonstration. The intent of the modeling demonstration is to establish that under the existing stack height conditions, that excessive concentrations occur due to downwash effects. A "Study Protocol" dated August 1999, was submitted to the FDEP and is the source of the comments addressed below.

TEC understands that the fluid modeling is being required to provide evidence of the presence of downwash or cavity effects on the ground level concentrations of pollutants. This evidence would provide the permitting agency assurance that TEC is not raising the stack to simply disperse the pollutants but to correct a localized effect of downwash and/or cavity effects. The presence of downwash and/or cavity effects would be evident in the fluid model by the presence of a greater than 40% increase in ground level concentrations due the presence of building structures as compared to the instance without building structures. A positive demonstration of the greater than 40% concentration test from the fluid modeling, along with the exceedance of the ambient air quality standard shown in the air dispersion modeling, provide the necessary confirmation required in the applicable stack height regulations to show that TEC is justified in raising the stacks to a new height, up to and including, the GEP formula height.

Response to Comments

1. **There are two stacks for the boiler units five and six, each stack being 96 meters tall. The purpose of this fluid modeling exercise is to determine the most restrictive stack height, using the existing emission rates and background air quality such that both "excessive concentration" criteria are met. When determining a good engineering practice (GEP) stack height greater than the formula height, the New Source Performance Standard (NSPS) emission rate for that source (i.e., 1.2 lb. SO2/MMBTU) must be used in the wind tunnel demonstration. The excessive concentration is defined as a maximum ground-level concentration due to emissions from a stack due in whole or in part to downwash produced by nearby structures or nearby terrain features which individually is a least 40 percent in excess of the maximum concentration experienced in the absence of such downwash, wakes and eddy effects and which contributes to a total concentration due to emissions or an exceedance of a National Ambient Air Quality Standard (NAAQS) or available Prevention of Significant (PSD) increment. The request is to raise the stack eight to 110 meters. However, it is our understanding that excessive concentrations continue to occur at 110 meters. If this was true, then some greater stack height would be needed for the new GEP height. The new GEP height must be the lowest height at which the 40% criterion is met in order to get credit for the new stack height in air quality dispersion modeling (see item 3 below for more discussion). The purpose of the fluid modeling should be to determine the new GEP height for units five and six based on the nearby structures. Otherwise, the current stack height (i.e., 96 meters) must be used in any modeling to set emission limitations.**

TEC Response

There are several issues in the above comment that need to be addressed. First, the purpose of this fluid modeling exercise is not to determine the most restrictive stack height such that both "excessive concentration" criteria are met. This reference would only apply in the case of requesting to raise the stacks to a height greater than the formula height. Since this is not the case here, the purpose of this fluid modeling exercise is to seek justification for raising the existing stacks for Units 5 & 6 above their current height to some new height, up to and including the formula height. The need to conduct fluid modeling is discusses on page 49 of the *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) Revised* (EPA-450/4-80-023R), which states the following:

> "Sources with stack height greater than 65 meters but less than the GEP height given by Equation 1, and wishing to raise the stack to that height given by Equation 1, must provide evidence that additional height is necessary to avoid downwash-related concentrations raising health and welfare concerns. This can be accomplished by either one of two methods: (1) demonstrate by fluid modeling or a comparable field study, using the existing stack and emission rate (before the stack is raised) and adding in the background air quality, that both "excessive concentration" criteria are met; or (2)..."

Therefore, the goal of the fluid modeling exercise in this case is only to support the demonstration that, at the existing stack height and emission rate, both "excessive concentration" criteria are met. Both "excessive concentration" criteria are defined in 40 CFR 51.1(kk) as

> "a maximum ground-level concentration due to emissions from a stack due in whole or part to downwash, wakes or eddy effects produced by nearby structures or nearby terrain features which individually is at least 40 percent in excess of the maximum concentration experienced in the absence of such downwash, wakes, or eddy effects and which contributes to a total concentration due to emissions from all sources that is greater than an ambient air quality standard."

As noted on page 51 of the above referenced document,

> "If a successful demonstration is made, the stack height can be increased up to Equation 1 height and the emission limitations established at this new height."

This process is further outlined in Section F of Table 3.1 of the referenced document. Subpart 2c of Section F states that after a successful fluid modeling demonstration that the applicant "may increase physical stack up to " the Equation 1 height. Note that words such as "can", "may" and "up to" clearly indicate that it is the applicants option to raise the existing stack up to and including the Equation 1 height, but it does not require the applicant to go *only* to the full Equation 1 height. (It is clear that if the applicant was requesting to go above the Equation 1 height that further demonstrations would be necessary, but this is not the case here.) Once the applicant has selected a new stack height in this range (between existing and formula height), the

provisions discussed in Chapter 4 of the above referenced document should be used to establish the proper emission limit at the new stack height to ensure protection of the ambient air quality standards.

Second, the statement: "When determining a good engineering practice (GEP) stack height greater than the formula height, the New Source Performance Standard (NSPS) emission rate for that source (i.e. 1.2 lb. SO2/MMBTU) must be used in the wind tunnel demonstration." does not apply to this study, since TEC is not attempting to determine a GEP stack height greater than the formula height. Rather, TEC is proposing to raise the stacks to 110 meters to avoid downwash related exceedances of the ambient air quality standards.

Third, the discussion regarding the definition of excessive concentration in EPA's comment above seems to be incomplete and unclear as stated. Please refer to the definition noted earlier in this response.

Fourth, the remaining discussion presented in EPA's comment above is incorrect for the reasons already addressed in this response. Since it is clearly TEC's intent to only raise the stacks to a height within the formula height, then the only demonstration required is that both excessive concentration criteria *at the existing conditions* be met.

2. **It is Region 4's understanding that the Tampa Electric Company (TECO) wants to determine if a stack height of 110 m is the new GEP height to use in air quality dispersion modeling. The last sentence at the bottom of page 1, states that the stack heights for the units five and six stacks as determined by *40 Code of Federal Regulations* (CFR) 51.100(ii)92)(ii) are 110 meters. Past correspondence from the Tampa Electric Company (TECO) indicates that the GEP formula height is 133 m. The correct GEP formula height must be stated in the protocol.**

TEC Response

TEC will change the GEP formula stack height in the protocol to 133 meters. However, TEC does not intend to determine if a stack height of 110 m is the new GEP height to use in air quality dispersion modeling, as Region 4 understands. In fact, rule 62-210.550 states that:

> *(3) "Good engineering practice" (GEP) stack height means the greater of:*
>
> *1. 65 meters, measured from the ground-level elevation at the base of the stack'*
> *2. The stack height as determined below:*
> *a. For stacks in existence on January 12, 1979, and for which the owner or operator had obtained all applicable permits or approvals required under 40 CFR Parts 51 and 52, Hg = 2.5H, provided the owner or operator produces evidence that this equation was actually relied on in establishing an emission limitation;*

b. For all other stacks, Hg = H + 1.5L , where
Hg = good engineering practice stack height, measured from the ground-level elevation at the base of the stack,
H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack,
L = lesser dimension, height or projected width, of nearby structure(s) provided that the EPA, Department, or local air program may require the use of a field study or fluid model to verify GEP stack height for the emissions unit; or

3. *The height demonstrated by a fluid model or a field study approved by the EPA, Department, or local air program which ensures that the emissions from a stack do not result in excessive concentrations of any air pollutant as a result of atmospheric downwash, wakes, or eddy effects created by the emissions unit itself, nearby structures, or nearby terrain features. If this height exceeds the height allowed by Rule 62-210.550(3)(a)1. or 2., FAC, the Department shall notify the public of the availability of the demonstration study and provide an opportunity for a public hearing on it.*

Since 133 meters is the formula height and GEP stack height is the greatest of the three options above, 110 meters cannot, by definition, be the GEP stack height. Therefore, TEC intends only to determine if credit for this new stack height of 110 m is justifiable to use in air quality dispersion modeling.

3. **In contrast to the statement in the second paragraph of the <u>Background</u> section, Region 4 requested a fluid modeling demonstration to justify raising the TECO stack above 96 m such that credit for this new stack height could be used in air dispersion modeling, and not to support the GEP formula height. Any new height that a stack is raised above the 65 m *de minimis* height which complies with the stack height regulations would be the new GEP height, and may not necessarily be the formula height. This new height would be demonstrated through fluid modeling (see *Raising stacks Below Formula Height to Formula Height* in 50 *Federal Register (FR) 27899*, July 8, 1985). A company may increase a stack or build a stack to any height. The stack height regulation requires Environmental Protection Agency (EPA) to ensure that the degree of emission limitation required for control of any air pollutant under an applicable State implementation plan (SIP) is not affected by that portion of any stack height which exceeds GEP or any other dispersion technique (see 50 *FR 27892*). That is, EPA regulates the stack height credits rather than the actual stack height. Air quality dispersion modeling for regulatory purposes requires that the GEP stack height be used as input to the model assessment (see item 20 and 21 in the October 10, 1985, enclosed memo, *Questions and Answers on Implementing the Revised Stack Height on Prevention of Significant Deterioration (PSD) Modeling and Monitoring*). The GEP stack height is defined as "the height necessary to insure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a**

result of atmospheric downwash, eddies or wakes which may be created by structures or nearby terrain obstacles" (see section 123(c) of the Clean Air Act).

TEC Response

TEC agrees with the first statement made above and will correct the Background section to clarify this issue. With regard to the remainder of the above comment, TEC provides the following response.

By definition, the statement "Any new height that a stack is raised above the 65 m de minimis height which complies with the stack height regulations would be the new GEP height" applies *only* to those stacks which exceed the GEP formula height. In addition, *FR 27899* states that:

> *"Raising a stack below formula height to formula height is not, in EPA's judgment, subject to the same statutory reservations as building stacks greater than formula height. However, as the court has cautioned, it may still be necessary for these sources to show that raising stacks is necessary to avoid "excessive concentrations" that raise health or welfare concerns.*
>
> *For these reasons, sources wishing to raise stacks subsequent to October 11, 1983, the date of the D.C. Circuit opinion, must provide evidence that additional height is necessary to avoid downwash-related concentrations raising health and welfare concerns. These rules allow sources to do this in two ways.*
>
> *The first way is to rebut the presumption that the short stack was built high enough to avoid downwash problems; i.e., to show, by site-specific information such as monitoring data or citizen complaints, that the short stack had in fact caused a local nuisance and must be raised for this reason. The EPA believes that both the historical experience of the industry and the data on short-term peaks discussed earlier show that short stacks can cause local nuisances due to downwash. However, where a source has built a short stack rather than one at formula height, it has created a presumption that this is not the case. General data on short-term peaks may not be strong enough to support, by themselves and in the abstract, a conclusion that the stack must be raised to avoid local adverse effects. Instead, that proposition must be demonstrated for each particular source involved.*
>
> *In the event that a source cannot make such a showing, the second way to justify raising a stack is to demonstrate by fluid*

> *modeling or field study an increase in concentrations due to downwash that is at least 40-percent in excess of concentrations in the absence of such downwash and in excess of the applicable NAAQS or PSD increments. In making this demonstration, the emission rate in existence before the stack is raised must be used." (50 FR 27899, EPA's response to comments on Raising Stacks Below Formula Height to Formula Height)*

Careful examination of this passage reveals that when raising a stack to some height below formula height, a company need only prove that it is raising the stack to avoid excessive concentrations due to downwash using the existing stack height and emission rate. Completing a fluid modeling study for the purpose of defining GEP is irrelevant in this case, since GEP cannot be any height below 133 meters. Tampa Electric will submit the required evidence of downwash effects as outlined in the referenced Federal Register passage above.

In addition, EPA's above statement "Air quality dispersion modeling for regulatory purposes requires that the GEP stack height be used as input to the model assessment (see item 20 and 21 in the October 10, 1985, enclosed memo, *Questions and Answers on Implementing the Revised Stack Height on Prevention of Significant Deterioration (PSD) Modeling and Monitoring*)" is incorrect and incomplete. The references given state that "GEP stack height should (*emphasis added*) be used as input to the model assessment. If a source is operating with a less than GEP stack height, then the actual stack height should be input to the model." The latter is clearly the case here. TEC is clearly aware that in order to receive credit for the 110m height to be used as the input for the regulatory modeling that the stack must be physically raised to this level. TEC also understands that the appropriate emission level at the new stack height must be determined through the procedures described Section 4 of the *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) Revised* (EPA-450/4-80-023R) in order to insure protection of the ambient air quality standards.

4. **The size of all building structures and the general topography in the vicinity of the source should be examined to determine the structures to include in the modeling. The criteria in the protocol does not appear to meet the guidance for including or excluding tall structures when defining the modeling area.**

TEC Response

The first item on page 3 of the testing protocol states that "All structures and terrain features with heights greater than 1/20th the distance to the plant stack should be included in the geometrically scaled model. This is in accordance of Section 4.1.1 of Guideline for Use of Fluid Modeling to Determine Good Engineering Practice Stack Height. With respect to tall, slender structures, page 23 of the Guideline states that "For tall obstructions (height greater than width), the width replaces the height scale in the above determination of the critical distances." In stating that "The less stringent requirement of width being 1/20th the distance should be used for tall slender

structures," the protocol makes the exact same assertion; it is simply worded differently than the text in the Guideline.

5. **A site roughness of length of 0.2 meters is proposed. Using table 1 in the Guideline for Use of Fluid Modeling to Determine Good Engineering Practice Stack Height document, a 0.2 meters surface roughness length corresponds to surfaces located in the outskirts of towns and suburbs. However, approximately one-fourth of the topography within 3 kilometers of the sources is water (i.e. bays in the area). Also, the land south of Hookers Point appears to be undeveloped. An explanation should be provided as to why these surfaces would not require a modification of the surface length chosen. A discussion of the topography around the stacks would help in justifying the surface roughness choice.**

TEC Response

Figure 2 of the study protocol identifies the model configuration and primary wind direction used in the study. Based on this primary wind direction and surrounding terrain features, a surface roughness length of 0.2 meters was chosen. Three kilometers prior to passing over Gannon Station, wind passes over an urban development, Hookers Point, and a short stretch of water. After passing over Gannon Station, the wind proceeds to pass over a fertilizer plant before moving on to a small residential town. Therefore, the experimenter felt that a surface roughness length of 0.2 meters best represented this topography.

6. **Depending on the choice of the surface roughness length, the site power law index could change. It is unclear how the power law index or exponent was developed.**

TEC Response

Please refer to the above chosen surface roughness length and Figure 1 on page 26 of Guideline for Use of Fluid Modeling to Determine Good Engineering Practice Stack Height (EPA-450/4-81-003, July, 1981).

7. **A 100% operating load condition for the stacks must be used in the fluid modeling, unless a compelling argument otherwise is made. Other operating loads could be modeled in a sensitivity simulation, if they are frequently used. There is no clear demonstration to support the use of the 50% load that was proposed in lieu of the 100% load. Fluid modeling parameters associated with the operating load conditions will need to be revised per the 100% load conditions. Please see item 12 in the October 10, 1985, memo enclosed entitled, *Questions and Answers on Implementing the Revised Stack Height Regulation* for a reference on this issue.**

TEC Response

TEC feels that a 50% load is justified based on a similar fluid modeling study performed by William H. Snyder and Robert E. Lawson, Jr. titled Fluid Modeling Demonstration of Good-

Engineering-Practice Stack Height in Complex Terrain. (EPA/600/3-85/022, April, 1985) Specifically, page iv states that "...a stack height of 326 m meets that current GEP criteria under 50% plant-load conditions, i.e., the nearby upwind terrain effected an increase of 40% in the maximum ground-level concentration."

8. **The excessive concentration criterion must be determined for all applicable averaging periods for the affected pollutant.**

TEC Response

Modeled ambient air quality exceedances are only seen for the 24-hour averaging period. As such, excessive concentration criteria will be presented for this averaging period.

9. **Background sources must be accounted for by adding their air pollutant contribution to that of the source in question for assessing the GEP height. The air pollutant concentration that would be used for the applicable averaging periods should be addressed in the protocol. Please refer to page 49 of the *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) Revised* (EPA-450/4/80/023R) for this discussion.**

TEC Response

Since the goal of this fluid modeling exercise is only to determine if there is an excessive (greater than 40%) concentration due to downwash effects, it is not necessary to consider background air quality. The air dispersion modeling performed already indicates an exceedance of the ambient air quality standards (at the existing conditions) without the addition of background air quality. Inclusion of background air quality in that modeling will only exacerbate the predicted exceedance, and therefore, is not necessary to demonstration that there are excessive concentrations at the existing conditions.

10. **The protocol states that four unidentified wind directions will be selected for determining the excessive concentration(s). It is unclear how these wind directions will be determined. The directions used in the fluid modeling should be those directions producing the largest building downwash as determined during the visualization phase of the study.**

TEC Response

The referenced four unidentified wind directions will be selected through visualization. Please see section 5.1 on page 8 of the protocol for further clarification.

Summary

The above responses clarify TEC's understanding of the need for, and purpose of, the fluid modeling demonstration. In summary, that understanding is that a positive showing of excessive ground level concentrations due to downwash effects (at the existing stack height) from the fluid modeling, along with the dispersion modeling already performed (showing a modeled exceedance of the ambient air quality standard), provides the assurance necessary that raising the existing stacks to a new height, up to and including the formula height, is clearly justified.

A revised version of the August 1999 "Study Protocol", which conforms to the issues addressed in this letter, is enclosed. If you have any questions, please do not hesitate to telephone me at (813) 641-5033.

Sincerely,

Jamie Hunter
Administrator-Air Programs
Tampa Electric Company

EP\gm\JJH906

Enclosure

c: Ms. Linda Anderson-Carnahan, EPA (enc)
Mr. Greg Worley, EPA
Mr Cleve Holiday, FDEP (enc)
Mr. Bill Thomas, FDEP-SWD
Mr. Jerry Campbell, EPCHC

Cleve

Department of Environmental Protection

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

December 11, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Gregory M. Nelson, P.E.
Manager - Environmental Planning
Tampa Electric Company
6944 US Highway 41 North
Apollo Beach, Florida 33572-9200

Re: Request for Additional Information Regarding Air Construction Permit Application
DEP File No. 0570040-009-AC
F.J. Gannon Station, Units 5 and 6 Stack Height Increase Request

Dear Mr. Nelson:

The Department is forwarding the following correspondence, which was received today, from the United States EPA Region 4 containing further comments on your application for the Unit 5 and 6 stack height increase construction. Comment No. 1 is especially critical to this project. Please address these comments.

The Department will resume processing your application after receipt of this requested information and the information requested on November 25, 1998. Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. As a result your response should be certified by a professional engineer registered in the State of Florida. Material changes to the application should also be accompanied by a new certification statement by the authorized representative or responsible official. Rule 62-4.055(1), F.A.C. requires that the applicant submit additional information requested by the Department, or request an extension of time to respond, within ninety days. A copy of your response should be sent to Mr. Bill Thomas, P.E., DEP Southwest District and Mr. Iwan Choronenko, Hillsborough County EPC.

If you should have any questions, please call Cleve Holladay (meteorologist) at 850/921-8986.

Sincerely,

C.H. Fancy, Chief
Bureau of Air Regulation

CHF/ch

Enclosure

cc: Mr. Greg Worley, EPA
Mr. Linda Anderson-Carnahan, EPA
Mr. Thomas Davis, P.E.
Mr. Bill Thomas, P.E., SWD
Mr. Iwan Choronenko, HCEPC

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

4APT-APB

DEC 0 8 1998

Mr. Cleve Holladay
Meteorologist - Bureau of Air Regulation
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

0570040-009-AC

Dear Mr. Holladay:

The October 15, 1998, modeling to address compliance with the sulfur dioxide (SO2) National Ambient Air Quality Standards (NAAQS) for the Tampa Electric Company's F. J. Gannon Station (TECO) has been reviewed by the Region 4 Office of the Environmental Protection Agency (EPA). The following comments include those of both the Air Planning Branch and the Air and Radiation Technology Branch.

1. The October 15, 1998, cover letter from Theresa J. L. Watley to you states that the TECO dispersion modeling assumes that the Unit 5 and 6 stacks will be raised to 110 meters. According to the good engineering practice (GEP) stack height regulations, there is no restriction or prohibition against, or demonstration required for raising an existing (or replacing) a stack up to 65 meters, provided prohibited dispersion techniques are not employed. If a stack is raised above the 65 meter *de minimis* height to the calculated GEP formula height, then the source must (1) demonstrate by fluid modeling or a field study that both excessive concentration criteria are met, using existing stack and existing emission rates, and adding in background air quality, or (2) show by site-specific information, that the stack is causing a local nuisance. Otherwise, the actual stack height must be used to set the emission limitations. The excessive concentration criteria include both an exceedance of a NAAQS or available Prevention of Significant Deterioration (PSD) increment and 40% excess concentration. Please refer to the EPA document, **Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations)** (EPA-450/4-80-023R), for more detailed discussions. Also, the June 29, 1992, EPA memorandum, **Credit for Stack Height Increases Due to the Siting of New, Nearby Structures**, from John Calcagni provides further interpretation of the stack height regulations to allow credit for additional stack height by recalculating the GEP formula height to account for those

situations in which an existing source is impacted by the siting of a new, nearby structure. A copy of this memo is enclosed for your reference. Unless TECO can comply with the above guidance and provide sufficient documentation, the actual stack height must be used in the permit modeling to set emission limitations.

2. There was no mention of a background concentration in the submittal. Sections 8.2.1 and 9.2.1 of **Appendix W to Part 51: Guideline on Air Quality Models (Modeling Guideline)** require the addition of a background concentration to the modeled concentration before determining compliance with the SO2 NAAQS. The submittal must identify the background concentrations that are applicable to each SO2 averaging period and discuss how those concentrations were determined.

3. Only the TECO SO2 emission points were modeled. There was no discussion concerning the nearby SO2 sources that should be modeled for NAAQS compliance. The **Modeling Guideline** recommends that such sources be modeled to estimate the impact on the NAAQS. Unless the TECO power plant is isolated, compliance with the NAAQS cannot be appropriately determined without the consideation of the nearby sources and the background. The TECO emission points modeled concentrations are but one part of the concentrations impacting the NAAQS.

4. The scenarios modeled to determine the load or operating condition that causes maximum ground-level concentrations should consider applicable combinations of boilers and operational loads. The submitted demonstration included modeling each boiler at maximum load and variations of the lb/MMBtu emissions rates. The exit temperatures and velocities did not change with the different variations. Loads of 100, 75 and 50 percent are normally considered in air quality assessments. The combinations of boiler/loads modeled should be based on past and expected operations of the station.

5. The modeling should also address compliance with the three-hour NAAQS for the different load scenarios mentioned above and should use the maximum allowed hourly emission rate (i.e., 2.5 lb/MMBtu) that is identified in the Title V Air Operating Permit.

6. The exit temperatures used in the modeling and Table 1-2 do not agree with the values measured by the Continuous Emissions Monitors (CEMs) and reported in Table 1-3. Please explain why the CEM exit temperatures were not used in the modeling.

7. Table 1-2 should include the CT1 stack parameters since they were included as TECO modeling inputs.

8. A copy of the aerial photograph describing the receptor network (i.e., Figure 1.2) was not included in the submittal. Please include this figure in your response to this letter.

We look forward to working with you to resolve the modeled SO2 violations and reviewing the revised modeling for the TECO power plant. Please submit future responses to this letter to my attention. If questions arise regarding these comments, please contact Brenda Johnson of my staff at 404/562-9037.

Sincerely,

Linda Anderson-Carnahan

Linda Anderson-Carnahan
Chief
Air Planning Branch

Enclosure

cc: Doug Neeley
Gregg Worley
Stan Krivo
Air and Radiation Technology Branch

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

JUN 29 1992

MEMORANDUM

SUBJECT: Credit for Stack Height Increases Due to the Siting of New, Nearby Structures

FROM: John Calcagni, Director
Air Quality Management Division

TO: Director, Air, Pesticides and Toxics Management Division, Regions I and IV
Director, Air and Waste Management Division, Region II
Director, Air, Radiation and Toxics Division, Region III
Director, Air and Radiation Division, Region V
Director, Air, Pesticides and Toxics Division, Region VI
Director, Air and Toxics Division, Regions VII, VIII, IX, and X

The purpose of this memorandum is to present a further interpretation of the stack height regulations to account for those situations in which an existing source is impacted by the siting of a new, nearby structure. Specifically, we believe that in such a situation, it will generally be reasonable for a source seeking credit for additional stack height to recalculate its good engineering practice (GEP) formula height due to the siting of a nearby structure, without the need to justify the increase through fluid modeling.

It will be helpful to reiterate the historical basis for the demonstration requirement: in the 1982 stack height suit, Sierra Club v. EPA, 719 F. 2d 436, the U.S. Court of Appeals for the D.C. Circuit charged EPA with demonstrating that the GEP formula is so reliable that it may be used to establish stack height credit in lieu of a specific demonstration. For reasons explained in its 1985 rulemaking notice [50 FR 27892 July 8, 1985], EPA indicated that it was unable to do so and thus adopted a demonstration requirement to support credit for stack height increases up to formula height.

However, in the event of the siting of a new, nearby structure, we believe that the existence of such a structure falls outside of the presumption that the original stack height be regarded as GEP unless proven otherwise, as discussed above in Sierra Club v. EPA. This presumption should not apply to stacks affected by the later construction of upwind obstacles since such construction could generally not have been anticipated. Consequently, we believe that fluid modeling demonstrations or nuisance showings are necessary only in the context of less-than-formula stacks where there has been no subsequent siting of upwind obstacles.

Permitting the source owner to recalculate GEP does not provide automatic credit for increased stack height. Rather, recalculating GEP allows the source owner an opportunity to receive stack height credit and to calculate an emission rate which reflects accurate source parameters. Likewise, permitting a limited number of sources to recalculate GEP formula height does not represent a new opportunity or a substantive change for the regulated community. The opportunity to recalculate GEP is already available to sources which conduct a fluid modeling study to demonstrate a downwash problem or which demonstrate the existence of a downwash-related nuisance. Eliminating the necessity to fluid model in a limited number of cases merely lessens the burden and administrative delay associated with such a study. At the same time, States and EPA retain the authority to require fluid modeling to justify stack height increases in those situations where they believe such a study is warranted.

Any comments or questions regarding this memorandum should be addressed to Gwen Jacobs at (919) 541-5295.

cc: Dennis Atkinson, MD-14
Gary Blais, MD-15
Tom Eagles, OPAR
Patricia Embrey, OGC
Eric Ginsburg, MD-15
Gwen Jacobs, MD-15
Joe Paisie, MD-15
Stack Height Contacts, Regions I-X

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
Air, Pesticides and Toxics Management Division
Air Planning Branch
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-3104

Facsimile Transmission Sheet

Date: 5/21/99

Number of Pages (including cover sheet): 6

To: Clene Halladay Phone: (___)_____

Fax: (850) 922-6979

From: Brenda Johnson Phone: (404) 562-9037

Fax: (404) 562-9019

If fax is received poorly, please contact me at the above number.

Comments:

P2 was on ISC PRIME

Hello all!
It seems I need to weigh in here. Brenda is basically correct. The Calcagni memo doesn't seem to apply here, so there should be a fluid modeling demo. One or 2 fine points. They can physically raise the stack above GEP without our approval. They just can't take credit for the increase in a dispersion modeling run without justifying the increase through a fluid modeling demo or field study. Also, the 5000 tpy exemption applies only to plume enhancement techniques such as merging gas exhaust streams or manipulating other exhaust parameters. It does not apply to GEP questions. The height the stack was originally built to is considered GEP unless there is a demonstration proving otherwise. Credit for above GEP formula height cannot be granted (Calcagni memo aside) without a full demonstration to determine if excessive concentration criteria are met.

Unless I haven't made myself clear I don't think we need to have a call.

Gary

>>> <deanw> 04/29/99 11:54am >>>
I think we need to have a 3-way call on this one--Brenda, dean and Gary, and Warren if he wants. I am kind of busy with other Clearinghouse calls today, but could do it at say 11 am your time tomorrow or else 11am your time on Tuesday. I am out on Monday. Let me know. It saves on my long distance charges if you can call me.
-----Original Message-----
From: Johnson.Brenda@epamail.epa.gov <Johnson.Brenda@epamail.epa.gov>
To: deanw
Date: Thursday, April 29, 1999 7:38 AM
Subject: Re[2]: Stack height increase

>
> Welcome back Dean. The 1992 Calcagni and 1993 CP&L memos all relate to the need for stack
> height increases due to downwash problems resulting from the siting of
> new nearby structure. The CP&L stack increases were due to the need
> to replace stack in an area of new structures which required a higher
> stack. The 1992 memo This does not appear to be the case here. My
> current issue arises from the state modeling the power plant for a
> Title V permit. The plant was chosen because the state wanted to
> look at the emission limits for some facilities that
> hadn't been modeled in recent memory. They wanted to check out
> compliance with the NAAQS.
>
> The stack height regulations can be a bit confusing. However, I've
> often thought that the regulations assumed that an existing stack
> height of a facility is considered GEP unless it is demonstrated

> otherwise. This demonstration is by fluid modeling, unless the stack
> is being raised up to 65 m, unless the 5000 SO2 exemption applies, or
> the siting of new structures causes a problem. Therefore, regardless
> of what the BPIP program says the GEP height should be, you aren't
> allowed to raise a stack to some arbitrary height above 65 m unless
> fluid modeling is performed to justify that height, however small an
> increase.
>
>
>
>_____ Reply Separator

>Subject: Re: Stack height increase
>Author: deanw
>Date: 04/28/99 06:49 PM
>
>
>Brenda--In my new life I am chasing quite a few C/H issues, so don't have
>time to look at your questions in detail
>until later next week. (I probably need to talk to you to understand
>exactly where you are coming from in your questions.) However, an interim
>comment is : Isn't the June 29 1992 Calcagni memo in effect here. This
memo
>essentially says that stack height increases up to formula GEP are OK
>without a fluid modeling demo. Also look in SCRAM for Nov 29 1992 memo
from Gary Blais and myself to you on CP&L plant.
>Maybe Gary can confirm what I am saying.
>Gary--don't know if you are aware but I am doing my old C/H job now,
>dean
>-----Original Message-----
>From: Johnson.Brenda@epamail.epa.gov <Johnson.Brenda@epamail.epa.gov>
>To: deanw
>Date: Wednesday, April 28, 1999 1:24 PM
>Subject: Stack height increase
>
>
>>
>> I have a stack height increase question. There is this major utility
>> that has downwash problems identified in air dispersion modeling of
>> their current emission limits for two stacks. The stack heights are
>> 96m but below the GEP formula stack height of 133 m as determined by
>> BPIP. SO2 NAAQS violations occur for the 24-hour averaging period
>> using the actual stack height. The Company's consultant determined
>> through air dispersion modeling with the ISC3 model that raising the
>> stack to 110 m would resolve the downwash problems and the NAAQS

>> violations.
>>
>> The stack height regulations requires a demonstration for raising a
>> stack above the 65 m de minimis stack height. The GEP Technical
>> Support Document states that a demonstration may be required to
>> increase the stack height to the formula GEP height. It is rather
>> silent on whether or not a demonstration is required to incrementally
>> raise a stack up to the GEP formula height. Past memos from the old
>> SO2/Particulate Matter Programs Branch, specifically the 10/16/1991
>> memo, "Dade County, Florida, Stack Height Increase" from Gwen Jacobs
>> to Lew Nagler states that beyond the 65 m deminimis threshold, there
>> is no de minimis exemption for stack height increases. I have
written
>> the State and the companies to state that a fluid modeling
>> demonstration is required for stack height increases above the 65 m
>> threshold to be creditable in regulatory modeling. Credit for
>> incremental increases up to the formula GEP height are not allowed
>> unless the fluid modeling demonstration is performed. the formula
>> height is the height that one would normally build a stack to avoid
>> downwash problems. If this is not originally done, he stack height
>> regulations must be followed. The company does not see a need for
this
>> to justify such a small increase in the actual stack height and wants
>> to know if some other discretionary provisions exist for allowing the
>> proposed 110 m to be used in setting the emission limits. I do not
>> know of any.
>>
>> Please provide some input on the following questions:
>>
>> 1. The outstanding question here is whether or not fluid modeling is
>> required to use the 110 m stack height in the setting of an emission
>> limit.
>>
>> 2. If some demonstration is required, may air dispersion modeling be
>> used. The company has performed ISC3 modeling using the 96 km stack
>> height with and without downwash and shows that the high-second-high
>> concentrations exceeding the 40% excessive concentration criteria is
>> met which justifies a higher stack using 5 years of meteorological
>> data for the 24-hour averaging period only. Is this approach
allowed
>> under the stack height regulations? I do not think so.
>>
>>
>> If I am in error in my assumptions or reading of the regulations and
>> TSD please let me know where the error occurred. I have to give the

>> state some answer soon. Let me know when you can get to this issue.
>> Thanks
>> 3. Should the other SO2 averaging periods be addressed in the ISC
>> modeling demonstration for excessive concentration if the company's
>> approach is acceptable.
>
>