File's

F.J. GANNON STATION
UNITS 5 AND 6
STACK HEIGHT INCREASE
CONSTRUCTION PERMIT APPLICATION

RECEIVED
OCT 30 1998
BUREAU OF
AIR REGULATION

Prepared for:

TECO
TAMPA ELECTRIC

Prepared by:

ECT
Environmental Consulting & Technology, Inc.
3701 Northwest 98th Street
Gainesville, Florida 32606

ECT No. 98873-0100

October 1998

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INTRODUCTION

INTRODUCTION

The Tampa Electric Company (TEC) Francis J. Gannon Station located in Tampa, Hillsborough County, Florida is a nominal 1,317 megawatt (MW) electric generation facility. The F.J. Gannon Station consists of six steam boilers (Unit Nos. 1 through 6), six steam turbines, one simple-cycle combustion turbine (CT No. 1), a once-through cooling water system, solid fuels, fluxing material, fly ash, and slag storage and handling facilities, fuel oil storage tank, and ancillary support equipment.

TEC submitted a Title V permit application for the F.J. Gannon Station in June 1996. In its review of the Title permit application, the Florida Department of Environmental Protection (FDEP) expressed concern with potential exceedances of sulfur dioxide (SO_2) ambient air quality standards (AAQS).

In response to the Department's concern, TEC proposes to increase the stack height of F.J. Gannon Station Unit No. 5 and Unit No. 6 from their current height of 315 feet (96 meters) to 361 feet (110 meters) and to implement a new, *additional* 24-hour average SO_2 limit for F.J. Gannon Station Units 1 through 6. No revisions to any existing F.J. Gannon Station emission limitations are requested.

A completed FDEP Application for Air Permit - Long Form follows this introduction. This application only addresses the proposed increase in stack height for Unit No. 5 and Unit No. 6 and the new, additional 24-hour average SO_2 limit for F.J. Gannon Station Units 1 through 6. As previously mentioned, TEC is not requesting revisions to any existing F.J. Gannon Station emission limitation. Attachments A and B provide the F.J. Gannon Station Sulfur Dioxide Regulatory Compliance Plan and stack drawings, respectively.

APPLICATION

FLORIDA DEP LOGO

Department of Environmental Protection

DIVISION OF AIR RESOURCES MANAGEMENT

APPLICATION FOR AIR PERMIT - LONG FORM

See Instructions for Form No. 62-210.900(1)

I. APPLICATION INFORMATION

This section of the Application for Air Permit form identifies the facility and provides general information on the scope and purpose of this application. This section also includes information on the owner or authorized representative of the facility (or the responsible official in the case of a Title V source) and the necessary statements for the applicant and professional engineer, where required, to sign and date for formal submittal of the Application for Air Permit to the Department. If the application form is submitted to the Department using ELSA, this section of the Application for Air Permit must also be submitted in hard-copy.

Identification of Facility Addressed in This Application

Enter the name of the corporation, business, governmental entity, or individual that has ownership or control of the facility; the facility site name, if any; and the facility's physical location. If known, also enter the facility identification number.

1. Facility Owner/Company Name: **Tampa Electric Company**	
2. Site Name: **F.J. Gannon Station**	
3. Facility Identification Number: **0570040**	[ ] Unknown
4. Facility Location: Street Address or Other Locator: **Port Sutton Road** City: **Tampa** County: **Hillsborough** Zip Code: **33619**	
5. Relocatable Facility? [ ] Yes [X] No	6. Existing Permitted Facility? [X] Yes [ ] No

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	October 30, 1998
2. Permit Number:	0570040-009-AC
3. PSD Number (if applicable):	
4. Siting Number (if applicable):	

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   Gregory M. Nelson, P.E.
   Manager – Environmental Planning

2. Owner/Authorized Representative or Responsible Official Mailing Address:

   Organization/Firm: **Tampa Electric Company**
   Street Address: **6944 U.S. Highway 41 North**
   City: **Apollo Beach** State: **FL** Zip Code: **33572-9200**

3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: **(813) 641-5016** Fax: **(813) 641-5081**

4. Owner/Authorized Representative or Responsible Official Statement:

   I, the undersigned, am the owner or authorized representative of the non-Title V source addressed in this Application for Air Permit or the responsible official, as defined in Rule 62-210.200, F.A.C., of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*

Gregory M. Nelson — Signature

10/29/98 — Date

* Attach letter of authorization if not currently on file.

Scope of Application

This Application for Air Permit addresses the following emissions unit(s) at the facility. An Emissions Unit Information Section (a Section III of the form) must be included for each emissions unit listed.

Emissions Unit ID	Description of Emissions Unit	Permit Type
005	Unit No. 5 – Solid Fuel-Fired Steam Generator	AC1E
006	Unit No. 6 – Solid Fuel-Fired Steam Generator	AC1E

Purpose of Application and Category

Check one (except as otherwise indicated):

Category I: All Air Operation Permit Applications Subject to Processing Under Chapter 62-213, F.A.C.

This Application for Air Permit is submitted to obtain:

[ ] Initial air operation permit under Chapter 62-213, F.A.C., for an existing facility which is classified as a Title V source.

[ ] Initial air operation permit under Chapter 62-213, F.A.C., for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number: _____

[ ] Air operation permit renewal under Chapter 62-213, F.A.C., for a Title V source.

Operation permit to be renewed: _____

[ ] Air operation permit revision for a Title V source to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number: _____

Operation permit to be revised: _____

[ ] Air operation permit revision or administrative correction for a Title V source to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. Also check Category III.

Operation permit to be revised/corrected: _____

[ ] Air operation permit revision for a Title V source for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit to be revised: _____

Reason for revision: _____

_____

Category II: All Air Operation Permit Applications Subject to Processing Under Rule 62-210.300(2)(b), F.A.C.

This Application for Air Permit is submitted to obtain:

[ ] Initial air operation permit under Rule 62-210.300(2)(b), F.A.C., for an existing facility seeking classification as a synthetic non-Title V source.

Current operation/construction permit number(s): _____

[ ] Renewal air operation permit under Rule 62-210.300(2)(b), F.A.C., for a synthetic non-Title V source.

Operation permit to be renewed: _____

[ ] Air operation permit revision for a synthetic non-Title V source. Give reason for revision; e.g., to address one or more newly constructed or modified emissions units.

Operation permit to be revised: _____

Reason for revision: _____

_____

Category III: All Air Construction Permit Applications for All Facilities and Emissions Units

This Application for Air Permit is submitted to obtain:

[**X**] Air construction permit to construct or modify one or more emissions units within a facility (including any facility classified as a Title V source).

Current operation permit number(s), if any: **AO29-203511, AO29-203512**

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

Current operation permit number(s): _____

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

Application Processing Fee

Check one:

[X] Attached - Amount: $ 250 [ ] Not Applicable.

Construction/Modification Information

1. Description of Proposed Project or Alterations:

As part of its review of the F.J. Gannon Station Title V permit application, the Florida Department of Environmental Protection (FDEP) expressed concern with potential exceedances of ambient air quality standards (AAQS) for sulfur dioxide (SO_2). In response to this concern, Tampa Electric Company (TEC) proposes to increase the stack height of Unit No. 5 and Unit No. 6 from 315 ft (96 meters) to 361 ft (110 meters) and implement a new, additional 24-hour average SO_2 emission limit for the F.J. Gannon Station.

A dispersion modeling assessment of ambient SO_2 impacts due to F.J. Gannon Station operations was submitted to the Department on October 15, 1998. This assessment provides reasonable assurance that the stack height increase, together with the additional daily limit on F.J. Gannon Station SO_2 emissions, will result in ambient impacts that are below the applicable SO_2 AAQS. No revisions to existing F.J. Gannon Station SO_2 emission limitations are requested. TEC's SO_2 compliance plan for the F.J. Gannon Station is provided in Attachment A of this permit application.

Pursuant to guidance received from FDEP, TEC also requests permit revisions to Unit No. 1 through No. 6 to allow for the combustion of up to 48 gallon per minute of used oil, including liquid oil and oil-contaminated solids, in each unit.

2. Projected or Actual Date of Commencement of Construction:
   Unit 5 – 3rd Quarter 1999, Unit 6 – 3rd Quarter 2000

3. Projected Date of Completion of Construction:
   Unit 5 – 1/1/2000, Unit 6 – 1/1/2001

Professional Engineer Certification

1. Professional Engineer Name: **Thomas W. Davis**
   Registration Number: **36777**

2. Professional Engineer Mailing Address:

   Organization/Firm: **Environmental Consulting & Technology, Inc.**
   Street Address: **3701 NW 98th Street**
   City: **Gainesville** State: **FL** Zip Code: **32606**

3. Professional Engineer Telephone Numbers:
   Telephone: **(352) 332-0444** Fax: **(352) 332-6722**

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [ ] if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [ ] if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [X] if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Signature (seal) — Date: 10/28/98

* Attach any exception to certification statement.

Application Contact

1. Name and Title of Application Contact:

   Theresa J.L. Watley
   Consulting Engineer

2. Application Contact Mailing Address:

   Organization/Firm: **Tampa Electric Company**
   Street Address: **6944 U.S. Highway 41 North**
   City: **Apollo Beach** State: **FL** Zip Code: **33572-5081**

3. Application Contact Telephone Numbers:
   Telephone: **(813) 641-5034** Fax: **(813) 641-5081**

Application Comment

This application addresses only the stack height increase proposed for Unit No. 5 and Unit No. 6 and a new, additional daily average SO_2 emission limitation for the F.J. Gannon Station. No revisions to any existing F.J. Gannon Station emission limitations are requested.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: **17** East (km): **360.00** North (km): **3087.50**			
2. Facility Latitude/Longitude: Latitude (DD/MM/SS): Longitude (DD/MM/SS):			
3. Governmental Facility Code: **0**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s): **4911**
7. Facility Comment (limit to 500 characters):			

Facility Contact

1. Name and Title of Facility Contact: **Cindy Barringer, Environmental Coordinator**
2. Facility Contact Mailing Address: Organization/Firm: **Tampa Electric Company** Street Address: **Port Sutton Road** City: **Tampa** State: **FL** Zip Code: **33619**
3. Facility Contact Telephone Numbers: Telephone: **(813) 641-5497** Fax: **(813) 641-5566**

Facility Regulatory Classifications

1. Small Business Stationary Source? [ ] Yes [X] No [ ] Unknown
2. Title V Source? [X] Yes [ ] No
3. Synthetic Non-Title V Source? [ ] Yes [X] No
4. Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)? [X] Yes [ ] No
5. Synthetic Minor Source of Pollutants Other than HAPs? [ ] Yes [X] No
6. Major Source of Hazardous Air Pollutants (HAPs)? [X] Yes [ ] No
7. Synthetic Minor Source of HAPs? [ ] Yes [X] No
8. One or More Emissions Units Subject to NSPS? [ ] Yes [X] No
9. One or More Emission Units Subject to NESHAP? [ ] Yes [X] No
10. Title V Source by EPA Designation? [ ] Yes [X] No
11. Facility Regulatory Classifications Comment (limit to 200 characters): **NA**

B. FACILITY REGULATIONS

Rule Applicability Analysis (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

Not applicable

List of Applicable Regulations (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

A complete list of all federal and state applicable requirements was previously submitted with the initial F.J. Gannon Station Title V permit application.	

C. FACILITY POLLUTANTS

Facility Pollutant Information

1. Pollutant Emitted	2. Pollutant Classification
Provided with initial F.J. Gannon Station Title V permit application.	

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Detail Information: Pollutant __1__ of __2__

1. Pollutant Emitted: **Sulfur Dioxide**		
2. Requested Emissions Cap:	**10.6** (ton/hour)	**N/A** (tons/year)
3. Basis for Emissions Cap Code: **FDEP Rule 62-296.405(1)(c)2.a., F.A.C.**		
4. Facility Pollutant Comment (limit to 400 characters): **Hourly sulfur dioxide emission rate cap (Field 2) represents total sulfur dioxide emissions from F.J. Gannon Station Unit No. 1 through Unit No. 6 on a *weekly* average basis. This is an existing requirement per FDEP Rule 62-296.405(1)(c)2.a., F.A.C.**		

Facility Pollutant Detail Information: Pollutant __2__ of __2__

1. Pollutant Emitted: **Sulfur Dioxide**		
2. Requested Emissions Cap:	**276** (tons/day)	**N/A** (tons/year)
3. Basis for Emissions Cap Code: **Ambient**		
4. Facility Pollutant Comment (limit to 400 characters): **Daily sulfur dioxide emission rate cap (Field 2) represents total sulfur dioxide emissions from F.J. Gannon Station Unit No. 1 through Unit No. 6 on a 24-hour block average basis. This is a proposed new, *additional* emission limitation requested for the purpose of providing reasonable assurance to the FDEP that the F.J. Gannon Station will not cause nor contribute to any exceedance of the SO_2 AAQS. No change to existing F.J. Gannon Station emission limits are requested.**		

E. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements for All Applications

1. Area Map Showing Facility Location: [ ] Attached, Document ID:_____ [ ] Not Applicable [**X**] Waiver Requested **Previously submitted with initial Title V permit application.**
2. Facility Plot Plan: [**X**] Attached, Document ID:_____ [ ] Not Applicable [ ] Waiver Requested **Stack drawings are provided in Attachment B.**
3. Process Flow Diagram(s): [ ] Attached, Document ID:_____ [ ] Not Applicable [**X**] Waiver Requested **Previously submitted with initial Title V permit application.**
4. Precautions to Prevent Emissions of Unconfined Particulate Matter: [ ] Attached, Document ID:_____ [**X**] Not Applicable [ ] Waiver Requested
5. Fugitive Emissions Identification: [ ] Attached, Document ID:_____ [**X**] Not Applicable [ ] Waiver Requested
6. Supplemental Information for Construction Permit Application: [ ] Attached, Document ID:_____ [**X**] Not Applicable

Additional Supplemental Requirements for Category I Applications Only – N/A

7. List of Proposed Exempt Activities: [ ] Attached, Document ID:_____ [ ] Not Applicable
8. List of Equipment/Activities Regulated under Title VI: [ ] Attached, Document ID:_____ [ ] Equipment/Activities On site but Not Required to be Individually Listed [ ] Not Applicable
9. Alternative Methods of Operation: [ ] Attached, Document ID:_____ [ ] Not Applicable
10. Alternative Modes of Operation (Emissions Trading): [ ] Attached, Document ID:_____ [ ] Not Applicable

11. Identification of Additional Applicable Requirements: [ ] Attached, Document ID:_____ [ ] Not Applicable
12. Compliance Assurance Monitoring Plan: [ ] Attached, Document ID:_____ [ ] Not Applicable
13. Risk Management Plan Verification: [ ] Plan Submitted to Implementing Agency - Verification Attached, Document ID:_____ [ ] Plan to be Submitted to Implementing Agency by Required Date [ ] Not Applicable
14. Compliance Report and Plan: [ ] Attached, Document ID:_____ [ ] Not Applicable
15. Compliance Certification (Hard-copy Required): [ ] Attached, Document ID:_____ [ ] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

A. TYPE OF EMISSIONS UNIT
(Regulated and Unregulated Emissions Units)

Type of Emissions Unit Addressed in This Section

1. Regulated or Unregulated Emissions Unit? Check one:

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

B. GENERAL EMISSIONS UNIT INFORMATION
(Regulated and Unregulated Emissions Units)

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section (limit to 60 characters): **Unit No. 5, Solid Fuel Steam Generator**		
2. Emissions Unit Identification Number: [ ] No Corresponding ID [ ] Unknown **005**		
3. Emissions Unit Status Code: **A**	4. Acid Rain Unit? [X] Yes [ ] No	5. Emissions Unit Major Group SIC Code: **49**
6. Emissions Unit Comment (limit to 500 characters): **N/A**		

Emissions Unit Control Equipment

A.

1. Description (limit to 200 characters): **Electrostatic precipitator system.**
2. Control Device or Method Code: **10**

B.

1. Description (limit to 200 characters): **N/A**
2. Control Device or Method Code:

C.

1. Description (limit to 200 characters): **N/A**
2. Control Device or Method Code:

C. EMISSIONS UNIT DETAIL INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Details

1. Initial Startup Date: **N/A**			
2. Long-term Reserve Shutdown Date: **N/A**			
3. Package Unit: **N/A** Manufacturer:		Model Number:	
4. Generator Nameplate Rating:	**239**	MW	
5. Incinerator Information: **N/A** Dwell Temperature: Dwell Time: Incinerator Afterburner Temperature:			°F seconds °F

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate:		**2,284**	mmBtu/hr
2. Maximum Incineration Rate: **N/A**	lb/hr		tons/day
3. Maximum Process or Throughput Rate: **N/A**			
4. Maximum Production Rate: **N/A**			
5. Operating Capacity Comment (limit to 200 characters): **Maximum heat input rate of 2,284 MMBtu/hr is on a monthly average basis.**			

Emissions Unit Operating Schedule

Requested Maximum Operating Schedule:			
	24 hours/day	**7**	days/week
	52 weeks/year	**8,760**	hours/year

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

Rule Applicability Analysis (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

N/A

List of Applicable Regulations (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

A complete list of all federal and state applicable requirements was previously submitted with the initial F.J. Gannon Station Title V permit application.	

E. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram:	**CS-005**
2. Emission Point Type Code: [X] 1 [ ] 2 [ ] 3 [ ] 4	
3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **Unit No. 5 – Solid Fuel-Fired Steam Generator**	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **N/A**	
5. Discharge Type Code: [ ] D [ ] F [ ] H [ ] P [ ] R [X] V [ ] W	
6. Stack Height:	**361** feet
7. Exit Diameter:	**10.3** feet
8. Exit Temperature:	**293.4** °F

9. Actual Volumetric Flow Rate:	**837,100**	acfm
10. Percent Water Vapor :	**N/A**	%
11. Maximum Dry Standard Flow Rate:	**N/A**	dscfm
12. Nonstack Emission Point Height:	**N/A**	feet

13. Emission Point UTM Coordinates:
Zone: East (km): North (km):

14. Emission Point Comment (limit to 200 characters):

Stack exit temperature (Field 8) and exhaust flow rate (Field 9) are based on continuous emissions monitoring system (CEMS) data.

F. SEGMENT (PROCESS/FUEL) INFORMATION
(Regulated and Unregulated Emissions Units)

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Process/fuel information for Unit No. 5 was previously provided in the initial F.J. Gannon Station Title V permit application. This construction permit application does not request any changes in the process/fuel data previously provided.**	
2. Source Classification Code (SCC):	
3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur:	8. Maximum Percent Ash:
9. Million Btu per SCC Unit:	
10. Segment Comment (limit to 200 characters):	

Emissions Unit Information Section 1 **of** 2

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **N/A**	
2. Source Classification Code (SCC):	
3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur:	8. Maximum Percent Ash:
9. Million Btu per SCC Unit:	
10. Segment Comment (limit to 200 characters):	

G. EMISSIONS UNIT POLLUTANTS
(Regulated and Unregulated Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
Provided with initial F.J. Gannon Station Title V permit application.			

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **Sulfur Dioxide**		
2. Total Percent Efficiency of Control:		**N/A** %
3. Potential Emissions:	**5,481.60** lb/hour	**24,009.40** tons/year
4. Synthetically Limited? [ ] Yes [**X**] No		
5. Range of Estimated Fugitive/Other Emissions: **N/A** [ ] 1 [ ] 2 [ ] 3	_____ to _____	tons/year
6. Emission Factor: **2.40 lb/MMBtu** Reference: **Allowable Emission Rate**		
7. Emissions Method Code: [**X**] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5		
8. Calculation of Emissions (limit to 600 characters): **Potential emissions set equal to allowable emissions.**		
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):		

Allowable Emissions (Pollutant identified on front of page)

A.

1. Basis for Allowable Emissions Code: **Rule** 2.
3. Future Effective Date of Allowable Emissions: **N/A** 4.
3. Requested Allowable Emissions and Units: **2.40 lb/MMBtu**
4. Equivalent Allowable Emissions: **5,481.60 lb/hour** **24,009.40 tons/year**
5. Method of Compliance (limit to 60 characters): **Continuous emissions monitoring system (CEMS)**
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requested allowable emissions (Field 3) is on a weekly average basis, per Specific Condition No. 4 of FDEP Operation Permit AO29-203511 and FDEP Rule 62-296.405(1)(c)2.a., F.A.C.** **Equivalent allowable emissions (Field 4) represents total *maximum* emissions for Unit No. 1 through Unit No. 6 on an hourly (weekly average) and annual average basis.**

B.

1. Basis for Allowable Emissions Code: **Rule** 2.
2. Future Effective Date of Allowable Emissions: **N/A**
3. Requested Allowable Emissions and Units: **10.60 tons/hour**
4. Equivalent Allowable Emissions: **1,780.8 tons/week** **92,856.0 tons/year**
5. Method of Compliance (limit to 60 characters): **Continuous emissions monitoring system (CEMS)**
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requested allowable emissions (Field 3) represents total hourly emissions for Unit No. 1 through Unit No. 6 on a weekly average basis, per Specific Condition No. 4 of FDEP Operation Permit AO29-203511 and FDEP Rule 62-296.405(1)(c)(2.a., F.A.C.** **Equivalent allowable emissions (Field 4) represents total *maximum* emissions for Unit No. 1 through Unit No. 6 on a weekly and annual average basis.**

Allowable Emissions (Pollutant identified on front of page)

C.

1. Basis for Allowable Emissions Code: **Ambient**
2. Future Effective Date of Allowable Emissions: **N/A**
3. Requested Allowable Emissions and Units: **276.0 tons/day**
4. Equivalent Allowable Emissions: **276.0 tons/day** **N/A tons/year**
5. Method of Compliance (limit to 60 characters): **Continuous emissions monitoring system (CEMS)**
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requested allowable emissions (Fields 3 and 4) represents total *maximum* emissions for Unit No. 1 through Unit No. 6 on a daily (24-hour block) average basis. On a weekly average basis, daily SO_2 emissions will be lower consistent with the existing 1,780.8 tons/week cap for Unit No. 1 through Unit No. 6.**

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:
2. Basis for Allowable Opacity: [ ] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour
4. Method of Compliance:
5. Visible Emissions Comment (limit to 200 characters): **Visible emission information for Unit No. 5 was previously provided in the initial F.J. Gannon Station Title V permit application. This construction permit application does not request any change in visible emission limitations.**

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:
2. Basis for Allowable Opacity: [ ] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour
4. Method of Compliance:
5. Visible Emissions Comment (limit to 200 characters):

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	
6. Performance Specification Test Date:	
7. Continuous Monitor Comment (limit to 200 characters): **Continuous monitoring system information for Unit No. 5 was previously provided in the initial F.J. Gannon Station Title V permit application. This construction permit application does not request any change to the continuous monitoring systems.**	

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	
6. Performance Specification Test Date:	
7. Continuous Monitor Comment (limit to 200 characters):	

K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION
(Regulated and Unregulated Emissions Units)

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

   If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

   [ ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [X] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

[ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[X] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

3. Increment Consuming/Expanding Code:			
PM	[ ] C	[ ] E	[X] Unknown
SO2	[ ] C	[ ] E	[X] Unknown
NO2	[ ] C	[ ] E	[X] Unknown

4. Baseline Emissions:		
PM	lb/hour	tons/year
SO2	lb/hour	tons/year
NO2		tons/year

5. PSD Comment (limit to 200 characters):

L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements for All Applications

1. Process Flow Diagram [ ] Attached, Document ID:_____ [ ] Not Applicable [**X**] Waiver Requested **Previously submitted with initial Title V permit application.**
2. Fuel Analysis or Specification [ ] Attached, Document ID:_____ [ ] Not Applicable [**X**] Waiver Requested **Previously submitted with initial Title V permit application.**
3. Detailed Description of Control Equipment [ ] Attached, Document ID:_____ [ ] Not Applicable [**X**] Waiver Requested **Previously submitted with initial Title V permit application.**
4. Description of Stack Sampling Facilities [ ] Attached, Document ID:_____ [ ] Not Applicable [**X**] Waiver Requested **Previously submitted with initial Title V permit application.**
5. Compliance Test Report [ ] Attached, Document ID:_____ [ ] Previously submitted, Date:_____ [**X**] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:_____ [**X**] Not Applicable
7. Operation and Maintenance Plan [ ] Attached, Document ID:_____ [**X**] Not Applicable
8. Supplemental Information for Construction Permit Application [ ] Attached, Document ID:_____ [**X**] Not Applicable
9. Other Information Required by Rule or Statute [ ] Attached, Document ID:_____ [**X**] Not Applicable

Additional Supplemental Requirements for Category I Applications Only N/A

10. Alternative Methods of Operation [ ] Attached, Document ID:_____ [ ] Not Applicable
11. Alternative Modes of Operation (Emissions Trading) [ ] Attached, Document ID:_____ [ ] Not Applicable
12. Identification of Additional Applicable Requirements [ ] Attached, Document ID:_____ [ ] Not Applicable
13. Compliance Assurance Monitoring Plan [ ] Attached, Document ID:_____ [ ] Not Applicable
14. Acid Rain Application (Hard-copy Required) [ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Attached, Document ID:_____ [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) Attached, Document ID:_____ [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.) Attached, Document ID:_____ [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) Attached, Document ID:_____ [ ] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

A. TYPE OF EMISSIONS UNIT (Regulated and Unregulated Emissions Units)

Type of Emissions Unit Addressed in This Section

1. Regulated or Unregulated Emissions Unit? Check one:

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

B. GENERAL EMISSIONS UNIT INFORMATION
(Regulated and Unregulated Emissions Units)

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section (limit to 60 characters): **Unit No. 6, Solid Fuel Steam Generator**		
2. Emissions Unit Identification Number: [ ] No Corresponding ID [ ] Unknown **006**		
3. Emissions Unit Status Code: **A**	4. Acid Rain Unit? [X] Yes [ ] No	5. Emissions Unit Major Group SIC Code: **49**
6. Emissions Unit Comment (limit to 500 characters): **N/A**		

Emissions Unit Control Equipment

A.

1. Description (limit to 200 characters): **Electrostatic precipitator system.**
2. Control Device or Method Code: **10**

B.

1. Description (limit to 200 characters): **N/A**
2. Control Device or Method Code:

C.

1. Description (limit to 200 characters): **N/A**
2. Control Device or Method Code:

C. EMISSIONS UNIT DETAIL INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Details

1. Initial Startup Date: **N/A**			
2. Long-term Reserve Shutdown Date: **N/A**			
3. Package Unit: **N/A** Manufacturer:		Model Number:	
4. Generator Nameplate Rating:	**446**	MW	
5. Incinerator Information: **N/A** Dwell Temperature: Dwell Time: Incinerator Afterburner Temperature:			°F seconds °F

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate:		**3,798**	mmBtu/hr
2. Maximum Incineration Rate: **N/A**	lb/hr		tons/day
3. Maximum Process or Throughput Rate: **N/A**			
4. Maximum Production Rate: **N/A**			
5. Operating Capacity Comment (limit to 200 characters): **Maximum heat input rate of 3,798 MMBtu/hr is on a monthly average basis.**			

Emissions Unit Operating Schedule

Requested Maximum Operating Schedule:			
	24 hours/day	**7**	days/week
	52 weeks/year	**8,760**	hours/year

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

Rule Applicability Analysis (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

N/A

List of Applicable Regulations (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

A complete list of all federal and state applicable requirements was previously submitted with the initial F.J. Gannon Station Title V permit application.	

E. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **CS-006**	
2. Emission Point Type Code: [X] 1 [ ] 2 [ ] 3 [ ] 4	
3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **Unit No. 6 – Solid Fuel-Fired Steam Generator**	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **N/A**	
5. Discharge Type Code: [ ] D [ ] F [ ] H [ ] P [ ] R [X] V [ ] W	
6. Stack Height:	**361** feet
7. Exit Diameter:	**17.46** feet
8. Exit Temperature:	**260.0** °F

9. Actual Volumetric Flow Rate:	**1,568,400**	acfm
10. Percent Water Vapor :	**N/A**	%
11. Maximum Dry Standard Flow Rate:	**N/A**	dscfm
12. Nonstack Emission Point Height:	**N/A**	feet

13. Emission Point UTM Coordinates:
Zone: East (km): North (km):

14. Emission Point Comment (limit to 200 characters):

Stack exit temperature (Field 8) and exhaust flow rate (Field 9) are based on continuous emissions monitoring system (CEMS) data.

F. SEGMENT (PROCESS/FUEL) INFORMATION
(Regulated and Unregulated Emissions Units)

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Process/fuel information for Unit No. 6 was previously provided in the initial F.J. Gannon Station Title V permit application. This construction permit application does not request any changes in the process/fuel data previously provided.**	
2. Source Classification Code (SCC):	
3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur:	8. Maximum Percent Ash:
9. Million Btu per SCC Unit:	
10. Segment Comment (limit to 200 characters):	

Emissions Unit Information Section 2 of 2

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **N/A**	
2. Source Classification Code (SCC):	
3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur:	8. Maximum Percent Ash:
9. Million Btu per SCC Unit:	
10. Segment Comment (limit to 200 characters):	

G. EMISSIONS UNIT POLLUTANTS
(Regulated and Unregulated Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
Provided with initial F.J. Gannon Station Title V permit application.			

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **Sulfur Dioxide**		
2. Total Percent Efficiency of Control:		**N/A %**
3. Potential Emissions:	**9,115.2 lb/hour**	**39,924.6 tons/year**
4. Synthetically Limited? [ ] Yes [X] No		
5. Range of Estimated Fugitive/Other Emissions: **N/A** [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year		
6. Emission Factor: **2.40 lb/MMBtu** Reference: **Allowable Emission Rate**		
7. Emissions Method Code: [X] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5		
8. Calculation of Emissions (limit to 600 characters): **Potential emissions set equal to allowable emissions.**		
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):		

Allowable Emissions (Pollutant identified on front of page)

A.

1. Basis for Allowable Emissions Code: **Rule**
2. Future Effective Date of Allowable Emissions: **N/A**
3. Requested Allowable Emissions and Units: **2.40 lb/MMBtu**
4. Equivalent Allowable Emissions: **9,115.20 lb/hour** **39,924.60 tons/year**
5. Method of Compliance (limit to 60 characters): **Continuous emissions monitoring system (CEMS)**
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requested allowable emissions (Field 3) is on a weekly average basis, per Specific Condition No. 4 of FDEP Operation Permit AO29-203511 and FDEP Rule 62-296.405(1)(c)2.a., F.A.C.** **Equivalent allowable emissions (Field 4) represents total *maximum* emissions for Unit No. 1 through Unit No. 6 on an hourly (weekly average) and annual average basis.**

B.

1. Basis for Allowable Emissions Code: **Rule**
2. Future Effective Date of Allowable Emissions: **N/A**
3. Requested Allowable Emissions and Units: **10.60 tons/hour**
4. Equivalent Allowable Emissions: **1,780.8 tons/week** **92,856.0 tons/year**
5. Method of Compliance (limit to 60 characters): **Continuous emissions monitoring system (CEMS)**
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requested allowable emissions (Field 3) represents total hourly emissions for Unit No. 1 through Unit No. 6 on a weekly average basis, per Specific Condition No. 4 of FDEP Operation Permit AO29-203511 and FDEP Rule 62-296.405(1)(c)(2.a., F.A.C.** **Equivalent allowable emissions (Field 4) represents total *maximum* emissions for Unit No. 1 through Unit No. 6 on a weekly and annual average basis.**

Allowable Emissions (Pollutant identified on front of page)

C.

1. Basis for Allowable Emissions Code: **Ambient**
2. Future Effective Date of Allowable Emissions: **N/A**
3. Requested Allowable Emissions and Units: **276.0 tons/day**
4. Equivalent Allowable Emissions: **276.0 tons/day** **N/A tons/year**
5. Method of Compliance (limit to 60 characters): **Continuous emissions monitoring system (CEMS)**
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requested allowable emissions (Fields 3 and 4) represents total *maximum* emissions for Unit No. 1 through Unit No. 6 on a daily (24-hour block) average basis. On a weekly average basis, daily SO_2 emissions will be lower consistent with the existing 1,780.8 tons/week cap for Unit No. 1 through Unit No. 6.**

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:
2. Basis for Allowable Opacity: [ ] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour
4. Method of Compliance:
5. Visible Emissions Comment (limit to 200 characters): **Visible emission information for Unit No. 6 was previously provided in the initial F.J. Gannon Station Title V permit application. This construction permit application does not request any change in visible emission limitations.**

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:
2. Basis for Allowable Opacity: [ ] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour
4. Method of Compliance:
5. Visible Emissions Comment (limit to 200 characters):

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	
6. Performance Specification Test Date:	
7. Continuous Monitor Comment (limit to 200 characters): **Continuous monitoring system information for Unit No. 6 was previously provided in the initial F.J. Gannon Station Title V permit application. This construction permit application does not request any change to the continuous monitoring systems.**	

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	
6. Performance Specification Test Date:	
7. Continuous Monitor Comment (limit to 200 characters):	

K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION
(Regulated and Unregulated Emissions Units)

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

   If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

   [ ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [X] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

[ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[X] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

3. Increment Consuming/Expanding Code:			
PM	[ ] C	[ ] E	[X] Unknown
SO2	[ ] C	[ ] E	[X] Unknown
NO2	[ ] C	[ ] E	[X] Unknown

4. Baseline Emissions:		
PM	lb/hour	tons/year
SO2	lb/hour	tons/year
NO2		tons/year

5. PSD Comment (limit to 200 characters):

L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements for All Applications

1. Process Flow Diagram [ ] Attached, Document ID:_____ [ ] Not Applicable [**X**] Waiver Requested **Previously submitted with initial Title V permit application.**
2. Fuel Analysis or Specification [ ] Attached, Document ID:_____ [ ] Not Applicable [**X**] Waiver Requested **Previously submitted with initial Title V permit application.**
3. Detailed Description of Control Equipment [ ] Attached, Document ID:_____ [ ] Not Applicable [**X**] Waiver Requested **Previously submitted with initial Title V permit application.**
4. Description of Stack Sampling Facilities [ ] Attached, Document ID:_____ [ ] Not Applicable [**X**] Waiver Requested **Previously submitted with initial Title V permit application.**
5. Compliance Test Report [ ] Attached, Document ID:_____ [ ] Previously submitted, Date:_____ [**X**] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:_____ [**X**] Not Applicable
7. Operation and Maintenance Plan [ ] Attached, Document ID:_____ [**X**] Not Applicable
8. Supplemental Information for Construction Permit Application [ ] Attached, Document ID:_____ [**X**] Not Applicable
9. Other Information Required by Rule or Statute [ ] Attached, Document ID:_____ [**X**] Not Applicable

Additional Supplemental Requirements for Category I Applications Only N/A

10. Alternative Methods of Operation
[ ] Attached, Document ID:_____ [ ] Not Applicable

11. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID:_____ [ ] Not Applicable

12. Identification of Additional Applicable Requirements
[ ] Attached, Document ID:_____ [ ] Not Applicable

13. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID:_____ [ ] Not Applicable

14. Acid Rain Application (Hard-copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID:_____

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID:_____

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID:_____

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID:_____

[ ] Not Applicable

ATTACHMENT A

FRANCIS J. GANNON STATION
SULFUR DIOXIDE REGULATORY COMPLIANCE PLAN

ECT
Environmental Consulting & Technology, Inc.

PROPOSED

TAMPA ELECTRIC COMPANY

FRANCIS J. GANNON STATION

SULFUR DIOXIDE

REGULATORY COMPLIANCE PLAN

October 1998

PROPOSED

FRANCIS J. GANNON STATION

SULFUR DIOXIDE

REGULATORY COMPLIANCE PLAN

INTRODUCTION

This compliance plan was initially developed during the mid 1980's to explain how Tampa Electric Company (TEC) would demonstrate that the operation of F.J. Gannon Station would not increase current allowable sulfur dioxide (SO_2) emissions and that the Florida Ambient Air Quality Standards (AAQS) would be protected. The compliance methodology was fuel sampling and analysis.

Pursuant to the Clean Air Act Amendments of 1990, TEC installed continuous emissions monitors (CEMs) on Gannon Units 1-6. These monitors measure several process variables, including SO_2 emissions for verification of compliance with Acid Rain regulations. Based on this use of CEM's, it has become redundant for TEC to verify compliance with SO_2 AAQS via fuel analysis. Therefore, this submittal represents TEC's proposal of how compliance with the SO_2 AAQS at F.J. Gannon Station will be demonstrated through the sole use of CEMs.

COMPLIANCE WITH EMISSION LIMITS FOR PROTECTION OF FLORIDA AMBIENT AIR QUALITY STANDARDS

The current allowable SO_2 emission rate for individual coal burning units at F.J. Gannon Station is 2.4 pounds per million British Thermal Units (lb/MMBtu) on a weekly average. The current allowable SO_2 emission rate for the entire station is 10.6 tons per hour (tph) on a weekly average, (e.g., 1,780.8 tons/week). Allowable SO_2 emission rates over a 24-hour averaging time are limited by the ambient air impacts predicted with dispersion modeling.

Based on dispersion modeling conducted during the F.J. Gannon Station Title V permitting process, it was determined that the current SO_2 emission rates could contribute to modeled violations of the 24-hour AAQS.

To rectify this, TEC conducted updated dispersion modeling for F.J. Gannon Station to evaluate the potential worst case conditions that will become applicable per F.J. Gannon Station's Phase II Acid Rain Compliance plan. TEC determined that by increasing F.J. Gannon Station Units 5 and 6 stacks to 110 meters and limiting the Station to a SO_2 cap of 276 tons per day, (e.g., 11.5 tph on a 24-hour block average), the Station can demonstrate compliance with the air dispersion modeling.

As such, Tampa Electric Company is proposing the incorporation of an additional allowable SO_2 emission limitation for the entire station of 276 tons per day. TEC would still maintain compliance with the current allowable SO_2 emission rates of 2.4 lb/MMBtu on a weekly average for individual coal burning units; and 10.6 tph on a weekly average.

CONTINUOUS EMISSION MONITORING NETWORK AND ALARMS

To demonstrate TEC's compliance with emission limits that are protective of AAQS, data inputs will consist of hourly CEM data from the SO_2, Flow, and CO2 monitors for each of the six units at F.J. Gannon Station.

In the event any monitor fails for 4 hours or less, hourly data from the failed monitor(s) will be discarded and excluded from the Station's daily or weekly averages.

In the event any monitor fails for more than 4 hours up through 24 hours, TEC will incorporate Method of Determination Code (MODC) 6 pursuant to 40 CFR 75, Subpart D - The Missing Data Substitution Procedure. In general, this procedure allows for use of average hourly data from the hours before and after the outage.

In the event any monitor fails for more than 24 hours, TEC will incorporate MODC 11 pursuant to 40 CFR 75, Subpart D - The Missing Data Substitution Procedure. In general, this procedure allows for use of average hourly data from corresponding load ranges within the reporting quarter.

COMPLIANCE PLAN VERIFICATION

The CEMs at F.J. Gannon Station are subject to the quality assurance requirements of 40 CFR 70. Therefore, an examination of weekly and/or daily CEMs data will allow a straightforward evaluation of compliance with allowable SO_2 emission rates.

COMPLIANCE REPORTING

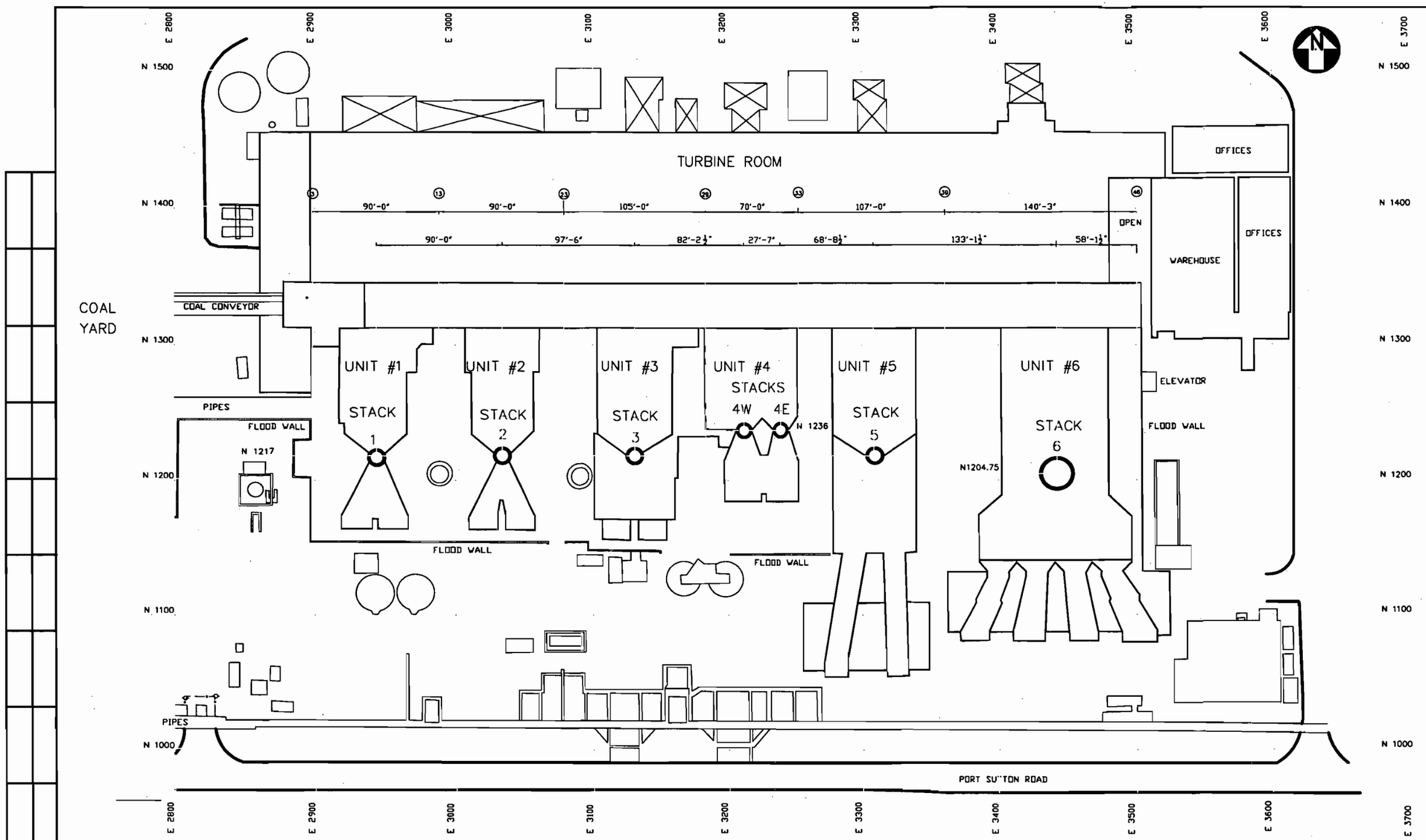
1. **Frequency** - Reporting of compliance status shall be performed on a quarterly calendar basis. Reports will be due no later than 45 days following the last day of the reporting quarter.

2. **Content** - Quarterly reports will consist of:

   - Weekly average SO_2 emissions rate per unit in lb/MMBtu;
   - Weekly average SO_2 emissions for the station in tons per hour; and
   - Daily average SO_2 emissions for the station in tons per day.

ATTACHMENT B

STACK DRAWINGS



STACK PLAN

1"=50'

ISSUE	DESCRIPTION	CHK'D	CORR	APP R	DATE
4					
3					
2	PERMITTING	DA	BS	FV	10/5 98
1	CLIENT REVIEW	DA	BS	FV	9/17 98

STONE & WEBSTER ENGINEERING CORP

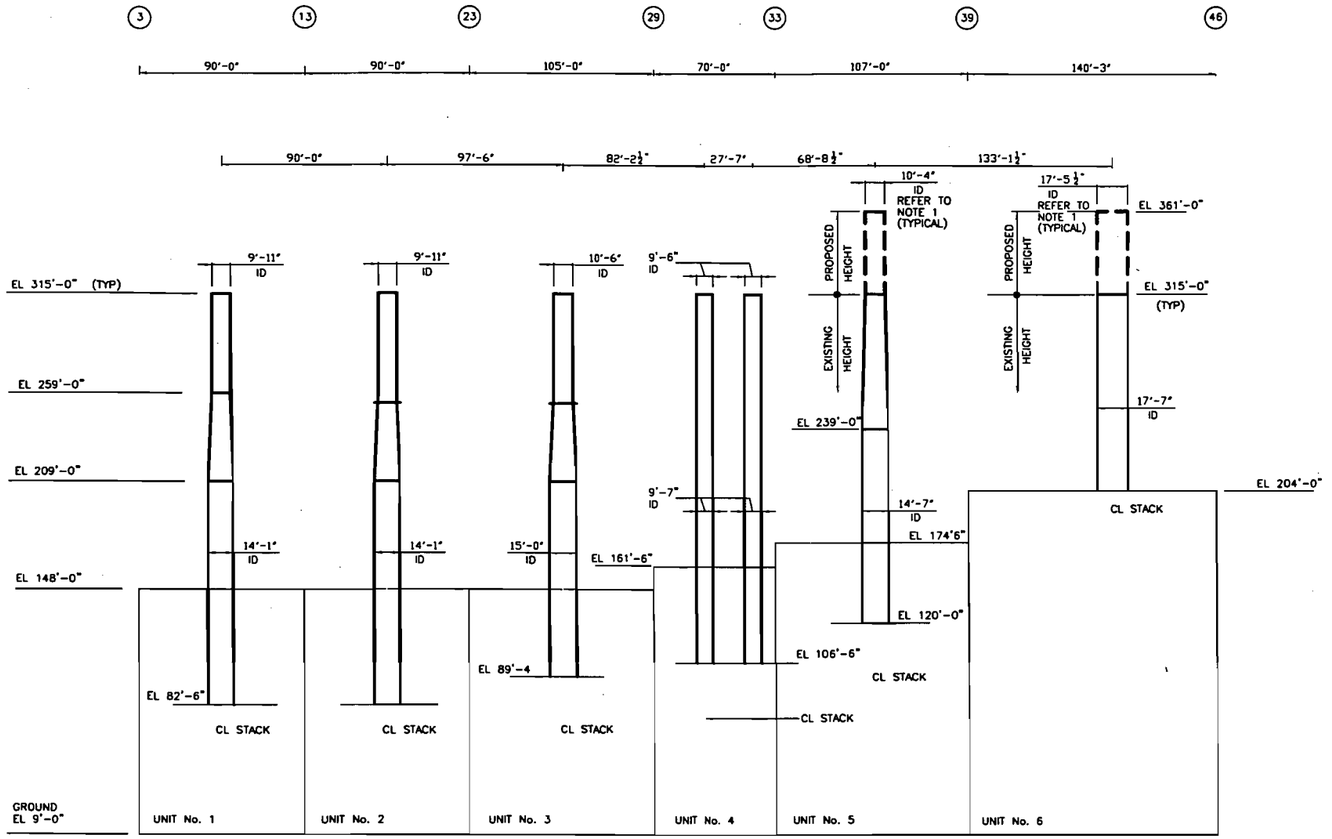
TAMPA ELECTRIC CO
GANNON STATION
UNITS 5 & 6
PROPOSED STACK EXTENSION
PLAN

DWG. NO. SWEC No. 0784402
TECO No. 359-BM-19A-2

RESP ENGR: B. SINGER SUPV: F. VINAS

DESIGNED BY B. SINGER DRAWN BY R. KELSAY DSGN CHK'D BY D. ANDREATTA CHK'D BY B. SINGER

PRINTS ISSUE
APP.CARD



NOTE:
1. STACK "ID'S" SHOWN ARE STACK EXIT INNER DIAMETERS.

STACK ELEVATION – LOOKING NORTH

1"=50'

ISSUE ○
PRINTS
APP.CARD

ISSUE	DESCRIPTION	CHKD	CORR	APP R	DATE
4					
3					
2	PERMITTING	DA	BS	FV	10/5 98
1	CLIENT REVIEW	DA	BS	FV	9/17 98

STONE & WEBSTER ENGINEERING CORP.

TAMPA ELECTRIC CO
GANNON STATION
UNITS 5 & 6
PROPOSED STACK EXTENSION ELEVATION

DWG. SWEC No. 0784402
NO. TECO No. 359-BM-19B-2

SUPV: F. VINAS
RESP ENGR: B.SINGER

DESIGNED BY B. SINGER DRAWN BY R. KELSAY DSGN CHK'D BY D. ANDREATTA CHK'D BY B. SINGER

AL

TAMPA ELECTRIC

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AUG 21 2000
BUREAU OF AIR REGULATION

August 16, 2000

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

Via Fax and U.S. Mail

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

Dear Mr. Fancy:

Tampa Electric Company requests to withdraw the above referenced permit application. Thank you for your assistance in this matter.

If you have any questions, please contact Shannon Todd or me at (813) 641-5125.

Sincerely,

Patrick L. Shell
Administrator - Air Programs
Environmental Affairs

EP\gm\SKT188

c: Mr. Al Linero - FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel - FDEP SW
Ms. Alice Harman - EPCHC

TECO
TAMPA ELECTRIC

August 16, 2000

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

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TAMPA ELECTRIC COMPANY
P. O. BOX 111 TAMPA, FL 33601-0111

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BUREAU OF AIR REGULATION

ORIGINAL FOR FILE

May 26, 2000

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

Via Fax and U.S. Mail

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

Dear Mr. Fancy:

With respect to the above referenced permit application, Tampa Electric Company is hereby granting a waiver of the 90-day period in which the Department is required to act on a permit pursuant to Section 120.60(1), Florida Statutes. This waiver will extend the period for Department action to and including August 26, 2000.

Please let me know if you have any questions.

Sincerely,

Patrick L. Shell
Administrator-Air Programs
Environmental Affairs

c: Mr. Al Linero – FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel – FDEP SW
Ms. Alice Harman – EPCHC

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Patty Please Remove from ARMS Events rightaway. Clint 8/16/00
Cleve

TECO
TAMPA ELECTRIC

FACSIMILE TRANSMITTAL SHEET

ENVIRONMENTAL AFFAIRS
813/641-5036
813/641-5081 FAX

DATE: 8/16/00 ✓ **FOR IMMEDIATE DELIVERY**

TO: Mr. Clair Fancy

COMPANY: FDEP

NUMBER OF PAGES (Including cover page): 2

FROM: Shannon Todd

COMMENTS:

Best Available Copy

TAMPA ELECTRIC

August 16, 2000

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

Via Fax and U.S. Mail

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FDEP File No. 0570040-009-AC

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Administrator - Air Programs
Environmental Affairs

EP\gm\SKT188

c: Mr. Al Linero - FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel - FDEP SW
Ms. Alice Harman - EPCHC

TECO
TAMPA ELECTRIC

May 26, 2000

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

Via Fax and U.S. Mail

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Units 5 and 6 Stack Height Increase Construction Permit Application
FDEP File No. 0570040-009-AC

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Please let me know if you have any questions.

Sincerely,

Patrick L. Shell
Administrator-Air Programs
Environmental Affairs

c: Mr. Al Linero – FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel – FDEP SW
Ms. Alice Harman – EPCHC

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FACSIMILE TRANSMITTAL SHEET

ENVIRONMENTAL AFFAIRS
813/641-5036
813/641-5081 FAX

DATE: 5/26/00 ___ **X FOR IMMEDIATE DELIVERY**

TO: Cleve Holladay

COMPANY: DEP

NUMBER OF PAGES (Including cover page): 2

FROM: Shannon Todd

COMMENTS:

Cleve,

As promised, I am faxing you a letter addressing the Gannon Station stack extension project. If you have any questions, please call me at (813) 641-5125

Thanks,

Shannon

TAMPA ELECTRIC

May 26, 2000

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

Via Fax and U.S. Mail

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

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Please let me know if you have any questions.

Sincerely,

Patrick L. Shell
Administrator-Air Programs
Environmental Affairs

c: Mr. Al Linero – FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel – FDEP SW
Ms. Alice Harman – EPCHC

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FEB 11 2000

BUREAU OF AIR REGULATION

February 8, 2000

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

Re: Tampa Electric Company (TEC) - F.J. Gannon Station
Units 5 and 6 Stack Height Increase Construction Permit Application
REVISED Notice of Waiver of 90-Day Period
FDEP File No. 0570040-009-AC

Dear Mr. Fancy:

With respect to the above referenced permit application, Tampa Electric Company is hereby granting a waiver of the 90-day period in which the Department is required to act on a permit pursuant to Section 120.60(1), Florida Statutes. This waiver supplements the waiver submitted on November 3, 1999 and will extend the period for Department action to and including May 18, 2000.

Please let me know if you have any questions. You can contact Shannon Todd or me at (813) 641-5125.

Sincerely,

J. James Hunter
Administrator - Air Programs
Environmental Planning

EP\gm\SKT142

c: Mr. Al Linero - FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel - FDEP SW
Mr. Rick Kirby - EPCHC

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TAMPA ELECTRIC

February 8, 2000

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

Re: Tampa Electric Company (TEC) - F.J. Gannon Station
Units 5 and 6 Stack Height Increase Construction Permit Application
REVISED Notice of Waiver of 90-Day Period
FDEP File No. 0570040-009-AC

Dear Mr. Fancy:

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Please let me know if you have any questions. You can contact Shannon Todd or me at (813) 641-5125.

Sincerely,

J. James Hunter
Administrator - Air Programs
Environmental Planning

EP\gm\SKT142

c: Mr. Al Linero - FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel - FDEP SW
Mr. Rick Kirby - EPCHC

Z 031 391 958

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
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0570040-009-AC	
FJ Gannon 546	

PS Form **3800**, April 1995

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- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
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- The Return Receipt will show to whom the article was delivered and the date delivered.

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Consult postmaster for fee.

3. Article Addressed to:
Mr. Gregory Nelson, PE
Tampa Electric Co
6944 US Hwy 41 North
Apollo Beach, Fl
33572-9200

4a. Article Number
Z 031 391 958

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery
10-15-99

5. Received By: *(Print Name)*
Nancy Foley

6. Signature: *(Addressee or Agent)*
X Nancy Foley

8. Addressee's Address *(Only if requested and fee is paid)*

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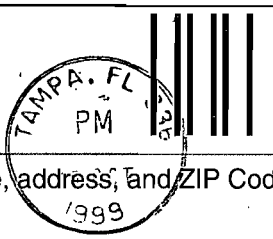

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Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation, NSRS
2600 Blair Stone Road, MS 5505
Tallahassee, Florida 32399-2400

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OCT 20 1999
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Department of
Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

October 13, 1999

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: Review of Proposed Wind Tunnel Study Protocol
DEP File No. 0570040-009-AC
F.J. Gannon Station, Units 5 and 6 Stack Height Increase Construction Permit Application

Dear Mr. Nelson:

The Department is forwarding the following correspondence from the United States EPA Region 4 containing review comments on your Wind Tunnel Study Protocol associated with the above referenced permit application. Please address these comments. We will forward your response to the United States EPA Region 4.

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. Linda Anderson-Carnahan (w/o enclosure), EPA
Mr. Greg Worley (w/o enclosure), EPA
Mr. Bill Thomas, P.E., SWD
Mr. Jerry Campbell, HCEPC

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

4APT-APB

DEC 29 1999

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

Dear Mr. Holladay:

This letter responds to the November 8, 1999, letter from Jamie Hunter of the Tampa Electric Company to Clair Fancy of the Florida Department of Environmental Protection. The November 8 letter responded to Region 4's comments on the fluid modeling protocol used to support increasing to110 meters the stack heights for the Frances J. Gannon Generating Station's Units 5 and 6 smokestacks. These new stack heights will be less than the formula Good Engineering Practice (GEP) stack height of 133 meters.

The letter appears to satisfactorily address Region 4's fluid modeling protocol concerns. However, it remains to be demonstrated that the sub-GEP stack heights of 110 meters and whatever emission limits that Units 5 and 6 are subject to will show compliance with the sulfur dioxide (SO2) National Ambient Air Quality Standards (NAAQS) under any downwash conditions that may exist. Specifically, air dispersion modeling, conforming to modeling guidance, should demonstrate that for the 100% operating load conditions (and other applicable load conditions) and including background ambient concentrations and nearby sources, do not adversely impact the SO2 NAAQS for the three averaging periods.

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

cc: SWD
Hillsboro Co.
G. Nelson, TECO

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)
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Mr. Jerry Campbell, EPCHC

WIND TUNNEL GOOD ENGINEERING STACK HEIGHT STUDY OF THE FRANCIS J. GANNON GENERATING STATION

Prepared by
David E. Neff

STUDY PROTOCOL
(August 1999)

for

Tampa Electric Company
Tampa, Florida

Revised November 1999

FLUID MECHANICS AND WIND ENGINEERING PROGRAM

Colorado State University

TABLE OF CONTENTS

1 INTRODUCTION

This protocol describes wind tunnel simulations sought in support of Tampa Electric's effort to increase the stack height of units 5 and 6 at the Francis J. Gannon Generating Station above the existing height, to a new height up to and including the Good Engineering Practice (GEP) formula stack height.

Background

Tampa Electric operates an electrical generating station located in Tampa, Florida known as the Francis J. Gannon Generating Station. Tampa Electric wants to confirm that the existing stacks on units 5 and 6 are experiencing downwash effects from the nearby boiler structures associated with units 1 through 6. Analysis of GEP stack height for these stacks as provided in 40 CFR §51.100(ii) concluded that the GEP formula stack height is 133 meters.

Tampa Electric proposed to the Florida Department of Environmental Protection (FDEP) to raise the unit 5 and 6 stacks to a height of 110 meters. In comments from the Environmental Protection Agency (EPA) Region 4 to FDEP, EPA Region 4 requested that a fluid modeling study be performed to justify raising the stacks above the existing 96 meter height, such that credit for this new stack height can be used in air dispersion modeling.

Facility Description

The stacks for boiler units 5 and 6 are located on the east end of the generating station. Both stacks are presently 96 meters tall. Unit 5 stack has an inside stack diameter of 3.15 meters, an effluent velocity of 50.7 m/s and an effluent temperature of 418 °K. Unit 6 stack has an inside stack diameter of 5.32 meters, an effluent velocity of 33.3 m/s and an effluent temperature of 400 °K. These values are for 100% load. Units 5 and 6 are frequently ramped down to 50% loads. The primary "nearby" structure which can produce plume downwash effects is composed of open lattice and solid structures housing six boiler/turbine units. This structure was used to establish the GEP stack height of 133 meters pursuant to 40 CFR §51.100(ii)(2)(ii).

Fluid Model Testing Program

A wind-tunnel measurement program is proposed to assess the effects of site and topographic influences on plumes from the Francis J. Gannon generating station units five and six. This proposed fluid model of air pollutant dispersion will accomplish the following objectives:

1) Determine whether structures near the unit five and six stacks cause a maximum ground-level concentration due in whole or in part to downwash, wakes or eddy effects that is at least 40 percent in excess of the maximum concentration experienced in the absence of such downwash, wakes or eddy effects.

2) Insure that all modeling is consistent with EPA requirements for wind tunnel testing including those provided in Guideline for Use of Fluid Modeling to Determine Good Engineering Practice Height (EPA-450/4-81-003, July, 1981). Henceforth this document is referred to as EPA-FM-GEP Guideline.

2 SIMILARITY CRITERIA COMPLIANCE

Snyder (1981) discusses in general terms the scaling techniques for a wide range of atmospheric diffusion problems. The EPA-FM-GEP Guideline specifically states the fluid modeling requirements for stack height determination studies. This fluid model will be in compliance with the EPA-FM-GEP Guideline. The major modeling requirements specified in the EPA-FM-GEP Guideline are summarized in the following list :

1) 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. The more stringent requirement of the height being 1/30th the distance should be used for structures with a large (width ten times greater than height) crosswind profile. The less stringent requirement of width being 1/20th the distance should be used for tall slender structures.

2) The flow blockage of the model in an adjustable roof wind tunnel will be less than 10 percent.

3) The design wind speed should be less than the 98th percentile wind speed expected at the site.

4) The model boundary layer's roughness length, z_o, friction velocity, u_*, and power law index, p, should be representative of the expected field conditions as stipulated in the EPA-FM-GEP Guideline's Table 1 and Figure 1.

5) The roughness Reynolds number, $z_o u_*/\upsilon$, characterizing the turbulent structure of the model boundary layer should be greater than 2.5.

6) The model should be covered with roughness of size ε such that $\varepsilon u_*/\upsilon \geq 20$.

7) The flow over significant nearby structures and terrain should be Reynolds number independent. For sharp edged obstacles an object Reynolds number, $U_H L/\upsilon$, greater than 11,000 is sufficient. For any obstacles with an Re# <11,000 or for any smooth shaped obstacles a Reynolds number independence test should be performed.

8) The fluid model stack effluent Reynolds number, $W_s D/\upsilon$, should be greater than 2,000. If below this value then experimentation to show model to field plume similarity is necessary.

9) The model boundary layer should be characteristic of Pasquill-Gifford C to D stability category with a field equivalent boundary layer height of 600 m.

10) The model plume rise, dominated by the momentum length scale, should match to the field plume rise by maintaining equality of the plume velocity ratio, W_s/U_s, the plume specific gravity, ρ_s/ρ_a, and stack geometric similarity, D/H_s.

To satisfy these ten similarity requirements for a fluid model of the Gannon Power Station Units 5 and 6 the following modeling parameters were selected:

Model to Field Length Scale Ratio	=	1:600
Field Study Area downwind extent	=	3 km
Site Roughness Length, z_o	=	0.20 m
Site Power Law Index, p	=	0.18
Field Wind Speed at Airport (6.1 m high)	=	8.8 m/s
Model Wind Speed at Existing Stack Height	=	3.6 m/s
Unit 5 Field Stack Effluent Velocity (50% load)	=	30.0 m/s
Unit 5 Model Stack Effluent Velocity	=	9.0 m/s
Unit 5 Field Stack Effluent Temperature (50% load)	=	389 K
Unit 5 Model Stack Effluent Specific Gravity	=	0.76
Unit 6 Field Stack Effluent Velocity (50% load)	=	16.8 m/s
Unit 6 Model Stack Effluent Velocity	=	5.0 m/s
Unit 6 Field Stack Effluent Temperature (50% load)	=	369 K
Unit 6 Model Stack Effluent Specific Gravity	=	0.80

Table 1 Parameter Chart for Model Scale Selection, details all pertinent scaled parameters and scaling criteria for both the full scale input data and several different possible model scales including the selected model scale of 1:600. Table 2 and 3 show, for units 5 and 6, ground level model concentrations obtained by using Pasquill-Gifford category C-D dispersion estimates for this 1:600 model plume scenario. The distance to maximum ground level concentration (GLC_{max}) is seen to be approximately 1.5 km for both units. The study area downwind distance of 3 km should encompass all expected excessive concentration areas. Figure 1 show the frequency of occurrence of wind speeds at the St. Petersburg airport (height of 6.1 meters). The two percentile value is seen to be 8.8 meters per second.

3 MODEL CONSTRUCTION AND PLACEMENT IN WIND TUNNEL

3.1 Boundary Layer Wind Tunnel Configuration

All model tests will be performed in the Environmental Wind Tunnel (EWT) test facility at Colorado State University (CSU). This tunnel has a 3.66 m wide by 2.13 m high cross section, a 17.4 m length, a wind speed range of 0 to 15 m/s and a flexible test section roof. A complete description of this facility is provided in Appendix A. Appropriate boundary layer development techniques will be utilized to accurately represent wind conditions approaching the plant stack from all wind directions. The project model will be placed on a 2.44 meter diameter turntable located ~11 meters into the test section. This placement will permit convenient changing of wind directions, provide sufficient upwind fetch, and provide a sufficient downwind measurement zone. The zones upwind and downwind of the turntable area will be modeled with a generic roughness design to create the desired model boundary layer.

3.2 Model Construction and Coverage

Based on atmospheric data over the site area, the size of the concentration measurement grid, and modeling constraints discussed in Section 2, a model scale of 1:600 was selected. The 2.44 meter turntable allows for the reduced scale construction of all significant buildings within a 730 meter radius of the plant stack. The tunnel test section extends 6 meters downwind of this stack location thus providing for scaled concentration measurements out to 3.6 km.

From an inspection of the generating station complex several wind directions were identified as having the potential to create "excessive concentrations." The primary wind direction of interest is the alignment of the power station structure upwind of the stack, winds from the west to northwest sector. The secondary wind direction of interest is the alignment of the power station structure downwind of the stack, winds from the east to southeast sector. Figure 2 displays the extent of the modeled area on the west by northwest and east by southeast wind directions overlaid on a map.

The buildings surrounding the plant stack will be fabricated from rigid foam and placed in their appropriate locations on a 2.44 meter diameter, 0.63 cm thick masonite sheet. Reference features will be painted on this masonite sheet. Modeled upwind and downwind structural and terrain features will also be fabricated if their heights exceed 1/20th the distance to the plant stack. All significant topography changes within the modeled area will be included on the model. The effluent stacks will be constructed from tubing and will be continuously adjustable over the range of interest. A 100 meter modeled stack is for use in the atmospheric dispersion comparability test program. The necessary model roughness, as specified in the GEP standards, will be added to all rounded structures.

4 ATMOSPHERIC DISPERSION COMPARABILITY

The EPA-FM-GEP Guideline requires that the wind tunnel testing facility demonstrate atmospheric dispersion comparability by acquiring and documenting a set of velocity and concentration profiles on a standardized stack plume released into a standardized model boundary layer. The EPA-FM-GEP Guideline outlines in detail the testing requirements for this comparability demonstration and only an abbreviated description of specific compliance needs will be stated here.

The model scale (1:600) and model flow velocity (U_s = 3.62 m/s at height = 100m/600) will be the same as for the main test program. The standardized model boundary layer must have a roughness length, $z_o < 0.2$ meters. The boundary layer development techniques may thus be different from those employed in the main test program. The model stack will represent a field stack of 100m height and 5 meter inside diameter, i.e. 16.7 cm high with I.D. = 0.83 cm. This stack will be placed at the same location in the wind tunnel as that used in the main test program. A neutrally buoyant stack gas will be released at a flow rate such that the exhaust velocity is 1.5 times the mean velocity at the stack top. Table 4 Atmospheric Dispersion Comparability Test Parameters, lists the different prototype and model parameter values for this atmospheric dispersion comparability test program. Table 5 ADCT Field Test Conditions, details the field conditions for each type of data test to be performed in this test series. Table 6 ADCT Model Test Conditions, details the model conditions for each type of data test to be performed in this test series.

The following test data will be acquired, analyzed and documented:[1]

1) Vertical profiles of mean velocity, longitudinal turbulent intensity, vertical turbulent intensity and Reynolds stress at the stack location, at the end of the planned study area (prototype 4 km downwind) and midway between these two locations,

2) Lateral profiles of mean velocity and longitudinal turbulent intensity at three elevations at the end of the study area (prototype 3 km downwind).[2]

---

[1]No temperature profile is required since test facility is temperature controlled and the free stream wind speed is greater than 3 m/s.

[2]This is similar to the tests reported by Snyder and Lawson in EPA/600/3-85/022 in figure 8 on page 52.

3) Vertical and lateral mean concentration profiles through the plume centerline at quarter intervals between the stack and the end of study area (prototype 0.75 km, 1.5 km and 2.25 km)[3].

4) Ground level longitudinal concentration profile through the ground level plume centerline with lateral points verifying location of ground level plume centerline.

The velocity profiles will be regressed upon to determine their power law index, roughness length, and friction velocity. These values will be compared to the expected atmospheric values for the site. The concentration data will be converted to the equivalent field values of $\chi U_s/Q$ [m^{-2}] and compared to estimates from the Pasquill-Gifford diffusion categories C and D. The measured model plume rise will be compared to estimates from the EPA-FM-GEP Guidelines suggested model.

[3]See EPA-GEP-FM Guideline page 34, Step4:(b).

5 STACK EXTENSION JUSTIFICATION AND DOCUMENTATION

Table 7, Test Parameters, lists the different prototype and model parameter values for the stack plume tests. Table 8 displays the Field and Model stack parameters, including the values used for units 1, 2, 3, 4 east and 4 west. Tables 9 and 10, Field Test Conditions, details the field conditions for each type of data test to be performed in each test series. Table 11, Model Test Conditions, details the model conditions for each type of data test to be performed in each test series. In Table 9, under the heading of "Building Config. ", Out refers to the removal of all significant structures terrain that may alter the stack plume dispersion, In refers to the inclusion of significant structures.

5.1 Wind Direction Determination Test Series

The 96 meter high stack will be tested for "excessive concentrations" effects. Table 11, shows that eight wind directions will be initially tested via plume visualizations for adverse effects. Upon examination of the visual plume results, four wind directions will be selected for concentration examination. Both visual and concentration data will document the magnitude of these adverse effects if present. If "excessive concentrations" are not observed then the test program will be terminated.

5.2 Reynolds Number Independence Verification

No Reynolds Number Independence Verification tests need to be performed in this study since the building Reynolds number is above 11,000, the stack Reynolds numbers are always above 2,000, the approach flow roughness Reynolds number is above 2.5 and primary nearby structure is composed of sharp edges.

5.3 Stack Height Testing and Documentation

The testing and documentation of the existing stack heights will be in full compliance with the testing and documentation procedures stated in the EPA-FM-GEP Guideline. One stack height and one wind direction (worst case) will be tested.

Tables 11 and 14 show that there will be testing and documentation on:

1) Lateral profiles of mean velocity and longitudinal turbulent intensity at three elevations (prototype 30 m, 90 m, 120 m) near the stack and at three elevations (prototype 30 m, 90 m, 120 m) at the end of the study area (prototype 3 km downwind), to document wind tunnel flow uniformity,

2) Three vertical profiles of mean velocity, longitudinal turbulent intensity, vertical turbulent intensity and Reynolds stress at the stack location, at the end of the planned study area

(prototype 3 km downwind) and midway between these two locations, to document wind field similarity between model and atmosphere,

3) Two plume visualizations, one with all significant structures removed and one with all the significant structures present,

4) Two general coverage ground level longitudinal concentration profiles through the ground level plume centerline with lateral points verifying location of ground level plume centerline, one with all significant structures removed and one with all the significant structures present,

5) Two detailed ground level grids near the maximum ground level concentration, repeated three times each to assure that the true maximum has been determined, one with all significant structures removed and one with all the significant structures present,

6) Four vertical and four lateral concentration profiles through the plume centerline (four downwind positions of prototype 0.75 km, 1.5 km, 3.0 km and the distance to ground level maximum concentrations for building configurations of one with all significant structures removed and one with all the significant structures present.

The concentration data will be reported in tables as stipulated in the section on data logging and presentation.

6 INSTRUMENTATION AND MEASUREMENT METHODOLOGY

Laboratory measurement techniques are discussed in this section, along with conversion methods used to convert measured model quantities to their meaningful field equivalents.

6.1 Velocity Measurement Techniques

The techniques employed in the acquisition of velocity profiles are discussed in detail in Appendix A including basic equations and errors associated with each technique. Single-hot-film (TSI 1220 Sensor) and Cross-film (TSI 1241) probes will be used to measure velocity statistics. TSI 1125 Velocity Calibrator System and Pitot-static Probes will be used for velocity calibration.

6.2 Plume Visualization Techniques

Techniques employed to obtain a visible plume are discussed in Appendix A. A Smoke Generator-System and a Video Image Analysis System are available for plume visualization. The Video Image System may be used to capture plume centerline trajectories. A table logging each of the visual test observations on stack downwash, building downwash, cavity mixing, plume descent, plume lofting and other comments will be provided. Documentation on CDROM of all visual tests will be provided to the sponsor. Given a field to model wind speed ratio of 3.34 (=[16.7m/s]/[5 m/s]) and a model to field length scale ratio of 600, then the time scale ratio between the model and the field is 1:180. Thus phenomena observed over the model in the wind tunnel will occur 180 times faster than observed at full scale. If the video recordings were replayed in slow motion (180 times slower than the recorded speed), the observed plume trajectories and motions would appear realistic.

6.3 Concentration Measurement Techniques

Techniques employed to obtain the concentration data are discussed in Appendix A. A gas chromatograph with flame ionization detector (FID) will be used to measure gas concentrations.

7 DATA PRESENTATION

Log sheets record daily accomplishments for velocity, concentration measurements and video tests. The person working on the experiments will log data whenever tests are performed.

7.1 Velocity Data Presentation

The approach mean velocity and turbulent statistics profiles are obtained from velocity measurement techniques. The approach mean velocity profiles for a suburban roughness condition will be regressed to find the best log-log and log-linear fit. The log-log regression will find a power law exponent, p, such that $U/U_r = (z/z_r)^p$. The log-linear regression ($U/u_* = 2.51n\{(z-d)/z_o\}$) will find a best fit roughness length z_o, friction velocity u_*, and displacement height d. The design values for these regression constants are $p = 0.18$ and $z_o = 0.2$ meters field scale. These values of the power law exponent and the roughness length are appropriate for the suburban industrial roughness condition at the Plant Site.

Velocity measurements obtained in this study will be summarized and presented through plots of vertical profiles of mean velocity, longitudinal and vertical turbulence intensity, and Reynold stress. The height and velocity coordinates for these figures will be normalized by a model reference height and the model velocity at the reference height. Since a neutral boundary layer's velocity is invariant with respect to wind speed, the normalized profiles can be converted to any field velocity at a specific height by the appropriate multiplicative constant. Each of the vertical profiles of mean velocity will be plotted on log-log and log-linear paper to display the best fit regressions.

7.2 Concentration Data Presentation

Concentration data will be reported in terms of normalized concentrations, K, where $K = \chi U_s /Q$; $[m^{-2}]$. This normalized format is convenient because the concentration results, χ, from a test at one particular combination of wind speed, U_s, and flow rate, Q, can be extrapolated to other U_s and Q values provided that the ratio, U_s /Q, remains the same. Note that U_s is the wind speed at the stack height, and the total stack flow rate, Q, is evaluated at ambient temperature. An example of conversion between model and field is show in Snyder [1981] page 148.

Concentration data obtained in this study will be presented in plots of ground-level longitudinal concentration profiles along the plume centerline and lateral ground-level profiles including one at the position of maximum ground-level concentration. Each of these figures will have two curves, one representing the data from the no structures present test and one representing the data taken with the structures in question present. For each run, the normalized concentration, K, along with sampling point location will be presented.

7.3 Visual Data Presentation

All visual data obtained will be summarized and observations of plume behavior for each visualization run. The observations note the presence or absence of

(i) Stack Downwash - plume flagging or suction of smoke into stack wake,

(ii) Plume Deflection - elevated plume is deflected by structural influence,

(iii) Cavity Mixing - structure sucks plume downward into its wake zone,

(iv) Terrain Impingement - plume prematurely hits the ground.

REFERENCES

Following is a list of reference materials related to this study. This list is not meant to be all inclusive.

1. EPA, Guideline for Use of Fluid Modeling to Determine Good Engineering Practice Stack Height. EPA-450/4-81-003, U.S. Environmental Protection Agency, Research Triangle Park, NC, July, 1981.

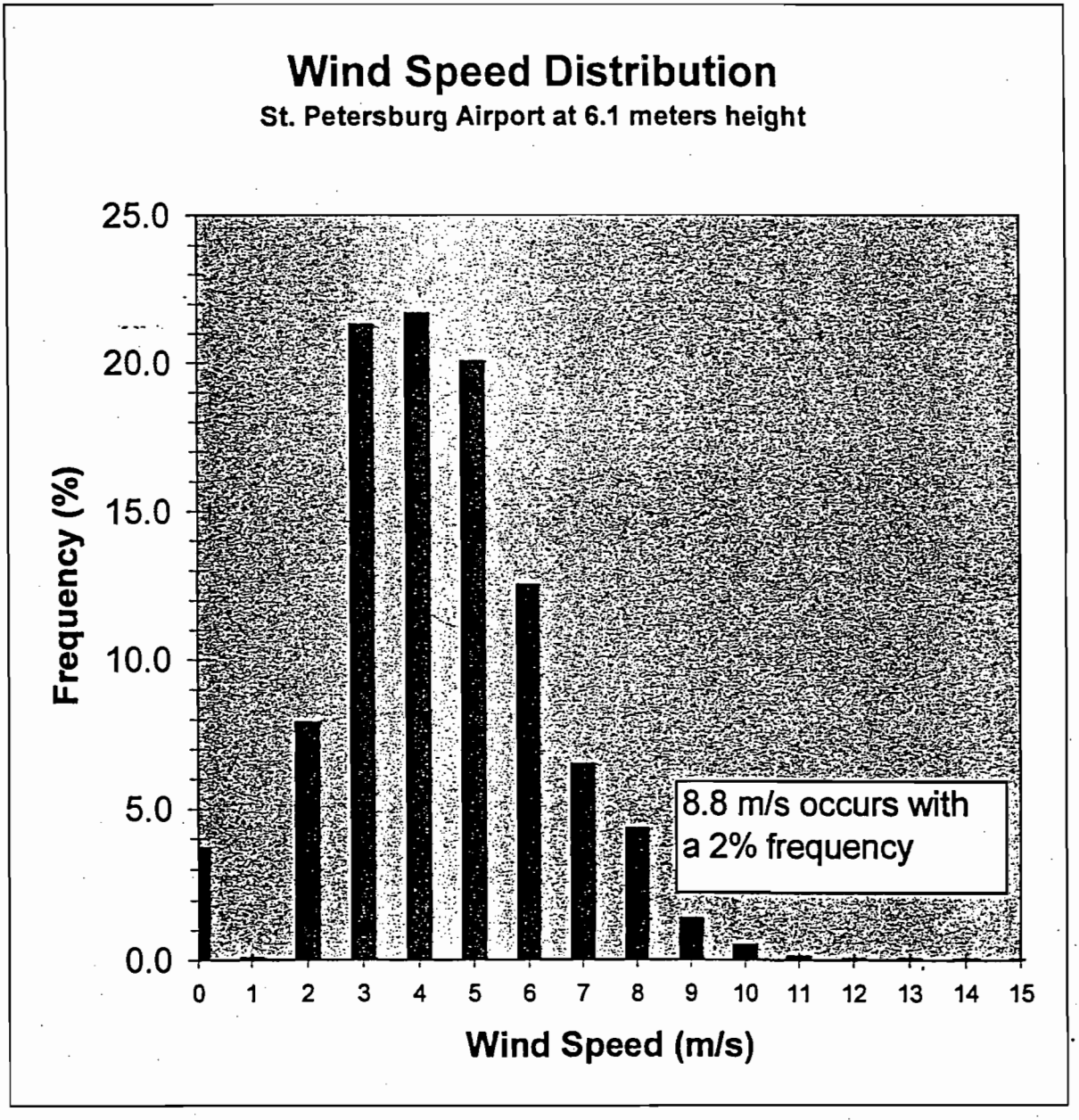
2. EPA, Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document For the Stack Height Regulations (revised). EPA-450/4-80-023R, U.S. Environmental Protection Agency, Research Triangle Park, NC, June 1985.

3. EPA, Determination of Good Engineering Practice Stack Height - A Fluid Model Demonstration Study for a Power Plant. EPA/600/3-85/022, U.S. Environmental Protection Agency, Research Triangle Park, NC, April 1983.

4. EPA, Fluid Model Demonstration of Good Engineering Practice Stack Height in Complex Terrain. EPA/600/3-85/022, U.S. Environmental Protection Agency, Research Triangle Park, NC, April 1985.

5. Snyder, W.H., "Guideline for Fluid Modeling of Atmospheric Diffusion", EPA-600/8-8cl-009. U.S. Environmental Protection Agency, Research Triangle Park, NC, 1981.

FIGURES


Wind Speed Distribution
St. Petersburg Airport at 6.1 meters height
Frequency (%)
25.0
20.0
15.0
10.0
5.0
0.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Wind Speed (m/s)
8.8 m/s occurs with
a 2% frequency

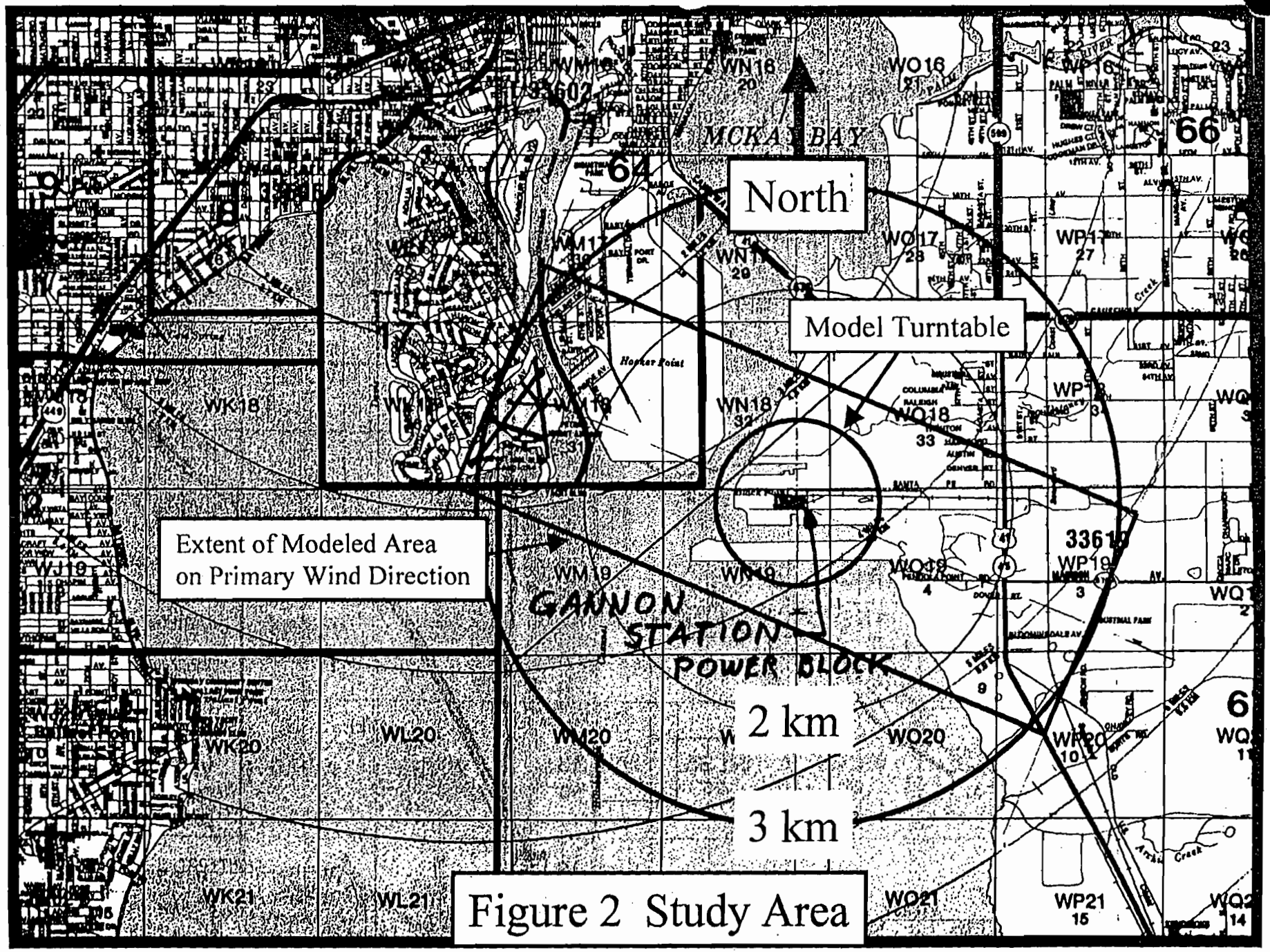


Figure 2 Study Area

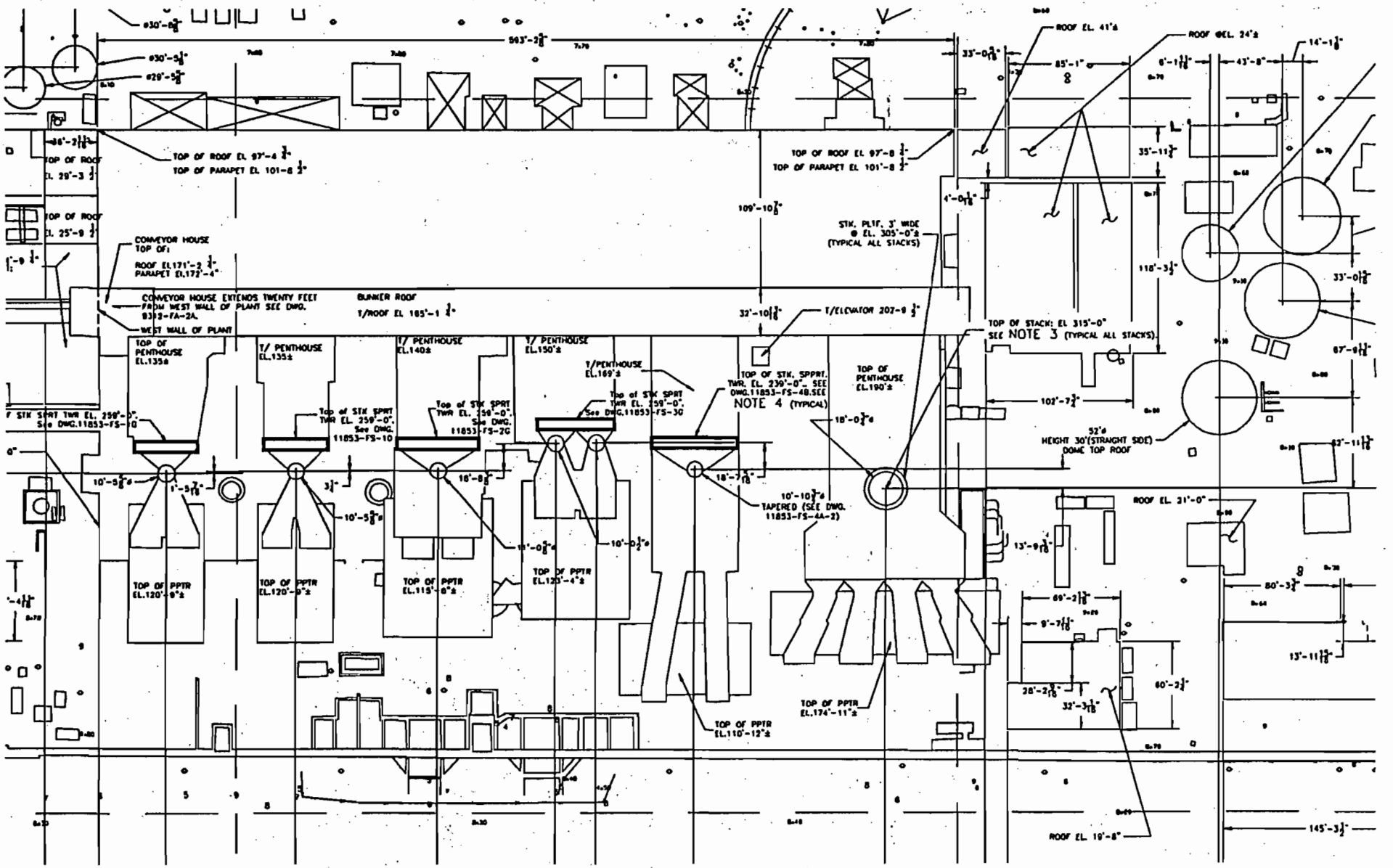


Figure 3 Power Station Plan View

TABLES

Table 1 Parameter Chart for Model Scale Selection

GEOMETRIC SCALE =	Full	Field Units	400	500	600	700	800	Model Units
SELECTED HEIGHTS								
Generic Roughness Element Height >=			0.12	0.12	**0.12**	0.12	0.12	cm
Wind Instrument Height =	6.1	m	1.5	1.2	**1.0**	0.9	0.8	cm
Reference Height 10 m =	10.0	m	2.5	2.0	**1.7**	1.4	1.3	cm
Building Height =	44.0	m	11.0	8.8	**7.3**	6.3	5.5	cm
Base Case Stack Height =	96.0	m	24.0	19.2	**16.0**	13.7	12.0	cm
Boundary Layer Height =	600.0	m	150.0	120.0	**100.0**	85.7	75.0	cm
SELECTED DISTANCES								
Distance to 0.8 km =	800.0	m	200.0	160.0	**133.3**	114.3	100.0	cm
Distance to 2 km =	2000.0	m	500.0	400.0	**333.3**	285.7	250.0	cm
Distance to 3 km =	3000.0	m	750.0	600.0	**500.0**	428.6	375.0	cm
APPROACH FLOW CHARACTER								
Max. 2% Wind Speed at Wind Instr. =	8.8	m/s	263.0	263.0	263.0	263.0	263.0	cm/s
Power Law Index at Wind Instr. =	0.14		0.14	0.14	**0.14**	0.14	0.14	
Power Law Index Approaching Site =	0.18		0.18	0.18	**0.18**	0.18	0.18	
Roughness Length =	0.20	m	0.050	0.040	**0.033**	0.029	0.025	cm
Friction Velocity =	0.82	m/s	24.39	24.39	**24.39**	24.39	24.39	cm/s
Wind Speed @ 10m =	8.0	m/s	238.6	238.6	**238.6**	238.6	238.6	cm/s
Wind Speed @ Building Top =	10.4	m/s	311.8	311.8	**311.8**	311.8	311.8	cm/s
Wind Speed @ Base Case Stack =	12.0	m/s	359.0	359.0	**359.0**	359.0	359.0	cm/s
Wind Speed @ BL =	16.7	m/s	500.0	500.0	**500.0**	500.0	500.0	cm/s
Ambient Temperature =	22.4	C	22.0	22.0	**22.0**	22.0	22.0	C
Generic Roughness RE # =			20.0	20.0	**20.0**	20.0	20.0	
Roughness RE # =	109		8.1	6.5	**5.4**	4.6	4.1	
Building RE # =	306042		22867	18294	**15245**	13067	11434	
STACK FLOW CHARACTER - Unit #5 - 50% Load								
Stack I.D. =	3.15	m	0.79	0.63	**0.53**	0.45	0.39	cm
Stack Exit Velocity =	30.0	m/s	896.6	896.6	**896.6**	896.6	896.6	cm/s
Stack Flow Rate =	233.8	m^3/s	436.7	279.5	**194.1**	142.6	109.2	ccs
Stack gas Temp. =	116.5	C	22.0	22.0	**22.0**	22.0	22.0	C
Stack Gas Equivalent MW =	28.96		21.96	21.96	**21.96**	21.96	21.96	
W/U velocity ratio for Base Stack =	2.5		2.5	2.5	**2.5**	2.5	2.5	
Stack Gas Specific Gravity =	0.758		0.758	0.758	**0.758**	0.758	0.758	
Stack RE # =	63000		4707	3766	**3138**	2690	2354	
STACK FLOW CHARACTER - Unit #6 - 50% Load								
Stack I.D. =	5.32	m	1.33	1.06	**0.89**	0.76	0.67	cm
Stack Exit Velocity =	16.8	m/s	503.3	503.3	**503.3**	503.3	503.3	cm/s
Stack Flow Rate =	374.3	m^3/s	699.2	447.5	**310.8**	228.3	174.8	ccs
Stack gas Temp. =	95.7	C	22.0	22.0	**22.0**	22.0	22.0	C
Stack Gas Equivalent MW =	28.96		23.20	23.20	**23.20**	23.20	23.20	
W/U velocity ratio for Base Stack =	1.4		1.4	1.4	**1.4**	1.4	1.4	
Stack Gas Specific Gravity =	0.801		0.801	0.801	**0.801**	0.801	0.801	
Stack RE # =	59726		4463	3570	**2975**	2550	2231	

Table 2 PG Estimate for Unit #5

Center Plane Dispersion Estimates for Stack Plumes (Pasquill-Gifford)

Input Parameters	Field (mks)	Model (cgs)
Length Scale =	600.0	1.0
Stability =	C-D	C-D
Fetch (Open/Urban) =	Open	Open
Max. Downwind Dist. =	5000.0	833.3
Lateral Distance =	0	0.0
Stack Height =	96.0	16.0
Stack Diameter =	3.15	0.53
Gas Temp (C) =	116.5	20.0
Amb. Temp (C) =	22.4	20.0
Tracer Fraction =	100.0	0.691
Stack Exit Velocity =	30.0	898
Wind Speed @H =	12.3	368
Stack Flow Rate =	233.8	194.3

Calculated Parameters	Field (mks)	Model (cgs)
Velocity Ratio W/U =	2.44	2.44
Stack Gas S.G. =	0.758	0.758
LM/Hs =	0.035	0.035
LB/Hs =	0.000987295	1.83827E-05
Sigma Ymax =	387.8	64.6
Sigma Zmax =	192.9	32.1

Input Options			
Output 1 (Field/Model) =	Model		
Output 2 (K/Conc) =	Conc	Tracer MW =	30.0
Plume Rise (Yes/No) =	No	2nd comp. MW =	4.0
Model method (1,2,or3) =	3	Umodel=	368.0

Handbook on Atm. Diffusion; Hanna				
	Open		Urban	
Stab.	Sig Y	Sig Z	Sig Y	Sig Z
A	898.1	1000.0	923.8	2939.4
B	653.2	600.0	923.8	2939.4
C	449.1	282.8	635.1	1000.0
C-D	387.8	192.9	548.5	721.4
D	326.6	102.9	461.9	442.7
E	244.9	60.0	317.5	302.4
F	163.3	32.0	317.5	302.4
For X =	5000	meters		

C-D Weight 0.50

Distortions	
inactive>	2.0
inactive>	3.0
inactive>	0.35

Final Height Calculations - Turner	
PG Category A-D	
Buoy. Flux =	176.4
Buoy. Final del H =	70.1
Moment Final del H =	23.0
Final Eff. Height (m) =	166.1
PG Category E-F	
dT/dz =	0.020
s =	0.013
Buoy. Final del H =	26.8
Moment Final del H =	8.8
Final Eff. Height (m) =	122.8
Final Eff. Height (m) =	166.1

Field Xp (m) =			0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4500	5000
Model Xm (cm) =			0.0	41.7	83.3	125.0	166.7	208.3	250.0	291.7	333.3	375.0	416.7	458.3	500.0	541.7	583.3	625.0	666.7	750.0	833.3
X/Xmax =			0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.90	1.00
Field Zp (m)	Model Zm (cm)	(Z-h)/sigZ	Model Conc (PPM)																		
0	0.0	-4.00																			
0	0.0	-3.75																			
0	0.0	-3.50																			
0	0.0	-3.25																			
0	0.0	-3.00																			
0	0.0	-2.75																			
0	0.0	-2.50																			
0	0.0	-2.25																			
0	0.0	-2.00																			
0	0.0	-1.75																			
0	0.0	-1.50																			
0	0.0	-1.25																			
0	0.0	-1.00																			
0	0.0	-0.75																			
0	0.0	-0.50		0	20	121	186	199	189	171	152	135	120	108	97	88	80	73	67	57	49
48	8.0	-0.25		64	422	381	300	243	204	174	151	132	117	104	94	85	77	71	65	56	48
96	16.0	0.00		5515	1483	701	417	284	212	169	141	121	106	95	85	77	70	65	60	51	45
144	24.0	0.25		64	422	378	285	216	169	137	115	100	88	79	71	65	60	55	52	45	40
192	32.1	0.50		0	10	59	82	99	94	86	77	70	64	59	54	51	47	44	42	37	34
241	40.1	0.75		0	0	3	14	27	36	40	41	41	40	39	37	36	34	33	32	29	27
289	48.1	1.00		0	0	0	1	4	9	14	18	20	22	23	23	23	23	23	22	22	21
337	56.2	1.25		0	0	0	0	0	2	4	6	8	10	11	13	13	14	14	15	15	15
385	64.2	1.50		0	0	0	0	0	0	1	2	3	4	5	6	7	8	8	9	10	10
434	72.3	1.75		0	0	0	0	0	0	0	0	1	1	2	3	3	4	5	5	6	7
482	80.3	2.00		0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	3	3	4
530	88.3	2.25		0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2
578	96.4	2.50		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
626	104.4	2.75		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
675	112.4	3.00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
723	120.5	3.25		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
771	128.5	3.50		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
819	136.5	3.75		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
867	144.6	4.00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
field Heff (m) =			96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
field SigY (m) =				23	46	69	91	112	133	153	173	193	212	231	250	268	286	304	321	355	388
field SigZ (m) =				16	30	43	55	67	78	88	98	107	116	125	133	141	149	157	165	179	193
COEFF =				5515	1483	701	416	279	203	155	123	101	85	72	63	55	49	44	40	33	28

Table 3 PG Estimate for Unit #6

Center Plane Dispersion Estimates for Stack Plumes (Pasquill-Gifford)

Input Parameters	Field (mks)	Model (cgs)
Length Scale =	600.0	1.0
Stability =	C-D	C-D
Fetch (Open/Urban) =	Open	Open
Max. Downwind Dist. =	5000.0	833.3
Lateral Distance =	*0*	*0.0*
Stack Height =	96.0	16.0
Stack Diameter =	5.32	0.89
Gas Temp (C) =	95.7	20.0
Amb. Temp (C) =	22.4	20.0
Tracer Fraction =	100.0	0.400
Stack Exit Velocity =	16.8	503
Wind Speed @H =	12.3	368
Stack Flow Rate =	373.4	310.4

Calculated Parameters	Field (mks)	Model (cgs)
Velocity Ratio W/U =	1.37	1.37
Stack Gas S.G. =	0.801	0.801
LM/Hs =	0.034	0.034
LB/Hs =	0.00129773	2.4163E-05
Sigma Ymax =	*387.8*	*64.6*
Sigma Zmax =	192.9	32.1

Input Options			
Output 1 (Field/Model) =	Model		
Output 2 (K/Conc) =	Conc	Tracer MW =	16.0
Plume Rise (Yes/No) =	No	2nd comp. MW =	28.0
Model method (1,2,or3) =	3	Umodel=	368.0

Handbook on Atm. Diffusion; Hanna				
	Open		Urban	
Stab.	Sig Y	Sig Z	Sig Y	Sig Z
A	898.1	1000.0	923.8	2939.4
B	653.2	600.0	923.8	2939.4
C	449.1	282.8	635.1	1000.0
C-D	*387.8*	*192.9*	*548.5*	*721.4*
D	326.6	102.9	461.9	442.7
E	244.9	60.0	317.5	302.4
F	163.3	32.0	317.5	302.4
For X =	5000	meters		

C-D Weight 0.50

Distortions	
inactive>	2.0
inactive>	3.0
inactive>	0.35

Final Height Calculations - Turner	
PG Category A-D	
Buoy. Flux =	231.8
Buoy. Final del H =	82.6
Moment Final del H =	21.8
Final Eff. Height (m) =	178.6
PG Category E-F	
dT/dz =	0.020
s =	0.013
Buoy. Final del H =	29.4
Moment Final del H =	12.7
Final Eff. Height (m) =	125.4
Final Eff. Height (m) =	178.6

Field Xp (m) =			0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4500	5000
Model Xm (cm) =			0.0	41.7	83.3	125.0	166.7	208.3	250.0	291.7	333.3	375.0	416.7	458.3	500.0	541.7	583.3	625.0	666.7	750.0	833.3
X/Xmax =			*0.00*	*0.05*	*0.10*	*0.15*	*0.20*	*0.25*	*0.30*	*0.35*	*0.40*	*0.45*	*0.50*	*0.55*	*0.60*	*0.65*	*0.70*	*0.75*	*0.80*	*0.90*	*1.00*
Field Zp (m)	Model Zm (cm)	(Z-h)/sigZ	Model Conc (PPM)																		
0	0.0	-4.00																			
0	0.0	-3.75																			
0	0.0	-3.50																			
0	0.0	-3.25																			
0	0.0	-3.00																			
0	0.0	-2.75																			
0	0.0	-2.50																			
0	0.0	-2.25																			
0	0.0	-2.00																			
0	0.0	-1.75																			
0	*0.0*	*-1.50*																			
0	0.0	-1.25																			
0	0.0	-1.00																			
0	0.0	-0.75																			
0	0.0	-0.50	0	19	112	172	184	174	158	141	125	111	100	89	81	74	67	62	53	48	
48	8.0	-0.25	59	390	352	277	225	188	181	140	122	108	97	87	78	71	65	60	51	45	
96	16.0	0.00	5097	1370	648	385	262	196	157	131	112	98	87	79	71	65	60	55	47	42	
144	24.0	0.25	59	390	349	264	199	156	127	107	92	81	73	68	60	55	51	48	42	37	
192	32.1	0.50	0	9	55	85	91	87	79	71	65	59	54	50	47	44	41	39	35	31	
241	40.1	0.75	0	0	3	13	25	33	37	38	38	37	36	35	33	32	31	29	27	25	
289	48.1	1.00	0	0	0	1	4	9	13	16	19	20	21	21	21	21	21	21	20	19	
337	56.2	1.25	0	0	0	0	0	1	3	5	7	9	11	12	12	13	13	14	14	14	
385	64.2	1.50	0	0	0	0	0	0	1	1	2	4	5	6	6	7	8	8	9	10	
434	72.3	1.75	0	0	0	0	0	0	0	0	1	1	2	2	3	4	4	5	6	6	
482	80.3	2.00	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	3	4	
530	88.3	2.25	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	
578	96.4	2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	
626	104.4	2.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
675	112.4	3.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
723	120.5	3.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
771	128.5	3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
819	136.5	3.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
867	144.6	4.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
field Heff (m) =			96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
field SigY (m) =				23	46	69	91	112	133	153	173	193	212	231	250	268	286	304	321	355	388
field SigZ (m) =				16	30	43	55	67	78	88	98	107	116	125	133	141	149	157	165	179	193
COEFF =				5097	1370	648	384	258	187	143	114	93	78	67	58	51	45	40	37	30	26

Table 4 Atmospheric Dispersion Comparability Test Parameters

GEOMETRIC SCALE =	Full	Field Units	600	Model Units
SELECTED HEIGHTS				
Wind Instrument Height =	6.1	m	1.0	cm
Reference Height 10 m =	10.0	m	1.7	cm
Base Case Stack Height =	96.0	m	16.0	cm
ADCT Stack Height =	100.0	m	16.7	cm
Boundary Layer Height =	600.0	m	100.0	cm
SELECTED DISTANCES				
Distance to 1 km downwind =	1000.0	m	166.7	cm
Distance to 2 km downwind =	2000.0	m	333.3	cm
Distance to 3 km downwind =	3000.0	m	500.0	cm
Distance to 4 km downwind =	4000.0	m	666.7	cm
APPROACH FLOW CHARACTER				
Max. 2% Wind Speed at Wind Instr. =	7.3	m/s	218.2	cm/s
Power Law Index at Wind Instr. =	0.14		0.14	
Power Law Index Approaching Site =	0.18		0.18	
Roughness Length < or = to 0.2m	0.20	m	0.033	cm
Friction Velocity =	0.82	m/s	24.4	cm/s
Wind Speed @ 10m =	8.0	m/s	239	cm/s
Wind Speed @ Base Case Stack =	12.0	m/s	359	cm/s
Wind Speed @ ADCT Stack =	12.1	m/s	362	cm/s
Wind Speed @ BL =	16.7	m/s	500	cm/s
Ambient Temp. =	22.0	C	22.0	C
Roughness RE # =	109		5.4	
ADCT STACK FLOW CHARACTERISTICS				
Stack I.D. =	5.00	m	0.83	cm
Stack Exit Velocity =	18.2	m/s	542.5	cm/s
Stack Flow Rate =	356.4	m^3/s	295.9	ccs
Stack gas Temp. =	22.0	C	22.0	C
Stack Gas Equivalent MW =	29.0		29.0	
ADCT W/U velocity ratio =	1.50		1.50	
ADCT Stack Gas Specific Gravity =	1.00		1.00	
ADCT Stack RE # =	60509		3014	

Table 5 Field Test Conditions - Atmospheric Dispersion Comparability Tests

Measurement Type	Model Config	Stack Config	Building Config	Wind Dir. (deg)	Ref. Velocity (m/s)	Ref. Height (m)	Stack Height (m)	Effluent Velocity (m/s)	Position X (m)	Position Y (m)	Position Z (m)
ADCT Series											
Vel. Lateral Profile U,u'	Generic	Out	No		12.1	100.0			0	Profile	30.0
Vel. Lateral Profile U,u'	Generic	Out	No		12.1	100.0			0	Profile	90.0
Vel. Lateral Profile U,u'	Generic	Out	No		12.1	100.0			0	Profile	120.0
Vel. Lateral Profile U,u'	Generic	Out	No		12.1	100.0			3000	Profile	30.0
Vel. Lateral Profile U,u'	Generic	Out	No		12.1	100.0			3000	Profile	90.0
Vel. Lateral Profile U,u'	Generic	Out	No		12.1	100.0			3000	Profile	120.0
Vel. Vertical Profile U,u',w',uw	Generic	Out	No		12.1	100.0			0	0	Profile
Vel. Vertical Profile U,u',w',uw	Generic	Out	No		12.1	100.0			1500	0	Profile
Vel. Vertical Profile U,u',w',uw	Generic	Out	No		12.1	100.0			3000	0	Profile
Visualization of Plume Elevation	Generic	In	No		12.1	100.0	100.0	18.2	Profile	0	Profile
Concentration Vertical Profile	Generic	In	No		12.1	100.0	100.0	18.2	750	0	Profile
Concentration Vertical Profile	Generic	In	No		12.1	100.0	100.0	18.2	1500	0	Profile
Concentration Vertical Profile	Generic	In	No		12.1	100.0	100.0	18.2	2250	0	Profile
Concentration Lateral Profile	Generic	In	No		12.1	100.0	100.0	18.2	750	Profile	Heff
Concentration Lateral Profile	Generic	In	No		12.1	100.0	100.0	18.2	1500	Profile	Heff
Concentration Lateral Profile	Generic	In	No		12.1	100.0	100.0	18.2	2250	Profile	Heff
Conc. Ground Level Profile	Generic	In	No		12.1	100.0	100.0	18.2	Profile	Profile	0.0

Table 6 Model Test Conditions - Atmospheric Dispersion Comparability Tests

Measurement Type	Model Config	Stack Config	Building Config	Wind Direction (deg)	Reference Velocity (cm/s)	Reference Height (cm)	Stack Height (cm)	Effluent Velocity (cm/s)	Position X (cm)	Position Y (cm)	Position Z (cm)
ADCT Series											
Vel. Lateral Profile U,u'	Generic	Out	No	-	362	16.7			0	Profile	5.0
Vel. Lateral Profile U,u'	Generic	Out	No	-	362	16.7			0	Profile	15.0
Vel. Lateral Profile U,u'	Generic	Out	No	-	362	16.7			0	Profile	20.0
Vel. Lateral Profile U,u'	Generic	Out	No	-	362	16.7			500	Profile	5.0
Vel. Lateral Profile U,u'	Generic	Out	No	-	362	16.7			500	Profile	15.0
Vel. Lateral Profile U,u'	Generic	Out	No	-	362	16.7			500	Profile	20.0
Vel. Vertical Profile U,u',w',uw	Generic	Out	No	-	362	16.7			0	0	Profile
Vel. Vertical Profile U,u',w',uw	Generic	Out	No	-	362	16.7			250	0	Profile
Vel. Vertical Profile U,u',w',uw	Generic	Out	No	-	362	16.7			500	0	Profile
Visualization of Plume Elevation	Generic	In	No	-	362	16.7	16.7	544	Profile	0	Profile
Concentration Vertical Profile	Generic	In	No	-	362	16.7	16.7	544	125	0	Profile
Concentration Vertical Profile	Generic	In	No	-	362	16.7	16.7	544	250	0	Profile
Concentration Vertical Profile	Generic	In	No	-	362	16.7	16.7	544	375	0	Profile
Concentration Lateral Profile	Generic	In	No	-	362	16.7	16.7	544	125	Profile	Heff
Concentration Lateral Profile	Generic	In	No	-	362	16.7	16.7	544	250	Profile	Heff
Concentration Lateral Profile	Generic	In	No	-	362	16.7	16.7	544	375	Profile	Heff
Conc. Ground Level Profile	Generic	In	No	-	362	16.7	16.7	544	Profile	Profile	0.0

Table 7 GEP Test Parameters

GEOMETRIC SCALE =	Full	Field Units	600	Model Units
SELECTED HEIGHTS				
Generic Roughness Element Height >=			0.12	cm
Wind Instrument Height =	6.1	m	1.0	cm
Reference Height 10 m =	10.0	m	1.7	cm
Building Height =	44.0	m	7.3	cm
Base Case Stack Height =	96.0	m	16.0	cm
Boundary Layer Height =	600.0	m	100.0	cm
SELECTED DISTANCES				
Distance to 0.8 km =	800.0	m	133.3	cm
Distance to 2 km =	2000.0	m	333.3	cm
Distance to 3 km =	3000.0	m	500.0	cm
APPROACH FLOW CHARACTER				
Max. 2% Wind Speed at Wind Instr. =	8.8	m/s	263.0	cm/s
Power Law Index at Wind Instr. =	0.14		0.14	
Power Law Index Approaching Site =	0.18		0.18	
Roughness Length =	0.20	m	0.033	cm
Friction Velocity =	0.82	m/s	24.39	cm/s
Wind Speed @ 10m =	8.0	m/s	238.6	cm/s
Wind Speed @ Building Top =	10.4	m/s	311.8	cm/s
Wind Speed @ Base Case Stack =	12.0	m/s	359.0	cm/s
Wind Speed @ BL =	16.7	m/s	500.0	cm/s
Ambient Temperature =	22.4	C	22.0	C
Generic Roughness RE # =			20.0	
Roughness RE # =	109		5.4	
Building RE # =	306042		15245	
STACK FLOW CHARACTER - Unit #5 - 50% Load				
Stack I.D. =	3.15	m	0.53	cm
Stack Exit Velocity =	30.0	m/s	896.6	cm/s
Stack Flow Rate =	233.8	m^3/s	194.1	ccs
Stack gas Temp. =	116.5	C	22.0	C
Stack Gas Equivalent MW =	28.96		21.96	
W/U velocity ratio for Base Stack =	2.5		2.5	
Stack Gas Specific Gravity =	0.758		0.758	
Stack RE # =	63000		3138	
STACK FLOW CHARACTER - Unit #6 - 50% Load				
Stack I.D. =	5.32	m	0.89	cm
Stack Exit Velocity =	16.8	m/s	503.3	cm/s
Stack Flow Rate =	374.3	m^3/s	310.8	ccs
Stack gas Temp. =	95.7	C	22.0	C
Stack Gas Equivalent MW =	28.96		23.20	
W/U velocity ratio for Base Stack =	1.4		1.4	
Stack Gas Specific Gravity =	0.801		0.801	
Stack RE # =	59726		2975	

Table 8 Field and Model Stack Parameters

FIELD STACK PARAMETERS

50% LOAD

Ambient Temperature (K) = 295.4

Emissions Unit	Height above MSL (m)	Outside Diameter (m)	Inside Diameter (m)	Exit Velocity (m/s)	Volume Flow Rate (m3/s)	Exit Temperature (K)	Gas Specific Gravity
Boiler 1	96.0	3.19	3.02	24.87	178	398.5	0.741
Boiler 2	96.0	3.19	3.02	24.52	176	395.7	0.747
Boiler 3	96.0	3.37	3.2	23.73	191	388.3	0.761
Boiler 4E	96.0	3.06	2.88	19.95	130	416	0.710
Boiler 4W	96.0	3.06	2.88	19.27	126	421.9	0.700
Boiler 5	96.0	3.32	3.15	30.02	234	389.5	0.758
Boiler 6	96.0	5.51	5.32	16.84	374	368.7	0.801

MODEL STACK PARAMETERS

Length Scale = 600

50% LOAD

Velocity Scale = 3.35

Emissions Unit	Height (cm)	Outside Diameter (cm)	Inside Diameter (cm)	Exit Velocity (cm/s)	Volume Flow Rate (ccs)	Exit Temperature (C)	Gas Specific Gravity
Boiler 1	16.00	0.53	0.50	742	148	22	1.000
Boiler 2	16.00	0.53	0.50	732	146	22	1.000
Boiler 3	16.00	0.56	0.53	708	158	22	1.000
Boiler 4E	16.00	0.51	0.48	596	108	22	1.000
Boiler 4W	16.00	0.51	0.48	575	104	22	1.000
Boiler 5	16.00	0.55	0.53	896	194	22	0.758
Boiler 6	16.00	0.92	0.89	503	310	22	0.801

Table 9 Field Test Conditions - Wind Direction Determination Tests

Measurement Type	Model Config	Stack Config	Building Config	Wind Dir. (deg)	Ref. Velocity (m/s)	Ref. Height (m)	Stack Height (m)	Effluent Velocity (m/s)	Position X (m)	Position Y (m)	Position Z (m)
Wind Direction Determination											
Visualization of Plume Elevation	In	In	Out	0.0	12.0	96	96	30, 16.8	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	90.0	12.0	96	96	30, 16.8	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	112.5	12.0	96	96	30, 16.8	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	135.0	12.0	96	96	30, 16.8	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	120.0	12.0	96	96	30, 16.8	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	292.5	12.0	96	96	30, 16.8	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	315.0	12.0	96	96	30, 16.8	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	337.5	12.0	96	96	30, 16.8	Profile	0	Profile
Conc. Ground Level Profile	In	In	In	Worst 1	12.0	96	96	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst 2	12.0	96	96	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst 3	12.0	96	96	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst 4	12.0	96	96	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	Out	Worst 4	12.0	96	96	30, 16.8	Profile	Profile	0.0

Table 10 Field Test Conditions - Stack Height Determination Tests

Measurement Type	Model Config	Stack Config	Building Config	Wind Dir. (deg)	Ref. Velocity (m/s)	Ref. Height (m)	Stack Height (m)	Effluent Velocity (m/s)	Position X (m)	Position Y (m)	Position Z (m)
Stack Height Determination											
Conc. Ground Level Profile	In	In	Out	Worst Case	12.0	96.0	96.0	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst Case	12.0	96.0	96.0	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	Out	Worst Case	12.0	96.0	110.0	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst Case	12.0	96.0	110.0	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	Out	Worst Case	12.0	96.0	Opt #1	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst Case	12.0	96.0	Opt #1	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	Out	Worst Case	12.0	96.0	Opt #2	30, 16.8	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst Case	12.0	96.0	Opt #2	30, 16.8	Profile	Profile	0.0

Table 11 Model Test Conditions – Wind Direction Determination Tests

Measurement Type	Model Config	Stack Config	Building Config	Wind Direction (deg)	Reference Velocity (cm/s)	Reference Height (cm)	Stack Height (cm)	Effluent Velocity (cm/s)	Position X (cm)	Position Y (cm)	Position Z (cm)
Wind Direction Determination											
Visualization of Plume Elevation	In	In	Out	0.0	359	16.0	16.0	897, 503	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	90.0	359	16.0	16.0	897, 503	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	112.5	359	16.0	16.0	897, 503	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	135.0	359	16.0	16.0	897, 503	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	120.0	359	16.0	16.0	897, 503	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	292.5	359	16.0	16.0	897, 503	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	315.0	359	16.0	16.0	897, 503	Profile	0	Profile
Visualization of Plume Elevation	In	In	In	337.5	359	16.0	16.0	897, 503	Profile	0	Profile
Conc. Ground Level Profile	In	In	In	Worst 1	359	16.0	16.0	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst 2	359	16.0	16.0	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst 3	359	16.0	16.0	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst 4	359	16.0	16.0	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	Out	Worst 4	359	16.0	16.0	897, 503	Profile	Profile	0.0

Table 12 Model Test Conditions – Stack Height Determination Tests

Measurement Type	Model Config	Stack Config	Building Config	Wind Direction (deg)	Reference Velocity (cm/s)	Reference Height (cm)	Stack Height (cm)	Effluent Velocity (cm/s)	Position X (cm)	Position Y (cm)	Position Z (cm)
Stack Height Determination											
Conc. Ground Level Profile	In	In	Out	Worst Case	359	16.0	16.0	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst Case	359	16.0	16.0	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	Out	Worst Case	359	16.0	18.3	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst Case	359	16.0	18.3	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	Out	Worst Case	359	16.0	Opt #1	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst Case	359	16.0	Opt #1	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	Out	Worst Case	359	16.0	Opt #2	897, 503	Profile	Profile	0.0
Conc. Ground Level Profile	In	In	In	Worst Case	359	16.0	Opt #2	897, 503	Profile	Profile	0.0

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 $1/20^{th}$ 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 $1/20^{th}$ 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

AL

TAMPA ELECTRIC

RECEIVED

NOV 08 1999

BUREAU OF AIR REGULATION

November 3, 1999

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

Re: Tampa Electric Company (TEC) - F.J. Gannon Station
Units 5 and 6 Stack Height Increase Construction Permit Application
REVISED Notice of Waiver of 90-Day Period
FDEP File No. 0570040-009-AC

Dear Mr. Fancy:

With respect to the above referenced permit application, Tampa Electric Company is hereby granting a waiver of the 90-day period in which the Department is required to act on a permit pursuant to Section 120.60(1), Florida Statutes. This waiver supplements the waiver submitted on August 3, 1999 and will extend the period for Department action to and including February 18, 2000.

Please let me know if you have any questions. You can contact me at (813) 641-5033.

Sincerely,

J. James Hunter
Administrator - Air Programs
Environmental Planning

EP\gm\SKT120

c: Mr. Al Linero - FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel - FDEP SW
Mr. Rick Kirby - EPCHC

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AL

TAMPA ELECTRIC

October 27, 1999

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

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

Dear Mr. Fancy:

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Please let me know if you have any questions. You can contact me at (813) 641-5033.

Sincerely,

J. James Hunter
Administrator - Air Programs
Environmental Planning

EP\gm\SKT119

c: Mr. Al Linero - FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel - FDEP SW
Mr. Rick Kirby - EPCHC

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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

TECO
0570040-009-AC

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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AUG 09 1999
BUREAU OF AIR REGULATION

August 3, 1999

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

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

Dear Mr. Fancy:

With respect to the above referenced permit application, Tampa Electric Company is hereby granting a waiver of the 90-day period in which the Department is required to act on a permit pursuant to Section 120.60(1), Florida Statutes. This waiver supplements the waiver submitted on May 11, 1999 and will extend the period for Department action to and including November 19, 1999.

Please let me know if you have any questions. You can contact me at (813) 641-5033.

Sincerely,

J. James Hunter
Administrator - Air Programs
Environmental Planning

EP\gm\SKT109

c: Mr. Al Linero - FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel - FDEP SW
Mr. Rick Kirby - EPCHC

FAX # 813-641-5345

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TECO
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August 20, 1999

Mr. Cleve Holladay
Florida Department of Environmental Protection
111 S. Magnolia Ave., Suite 4
Tallahassee, Florida 32301

Via FedEx
Airbill No. 8132 1667 7530

Mrs. Linda Anderson-Carnahan
Chief-Air Planning Branch
United States Environmental Protection Agency
Region 4
Atlanta Federal Center
51 Forsyth Street
Atlanta, Georgia 30303-3960

Via FedEx
Airbill No. 8132 1667 7585

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

Dear Mr. Holladay and Mrs. Anderson-Carnahan:

Please find enclosed the Wind Tunnel Study Protocol associated with the above referenced permit application. Recall that this study is required by EPA in support of Title V permitting at F.J. Gannon Station to ensure that increasing the stack heights on Units 5 and 6 will allow the station to comply with the sulfur dioxide National Ambient Air Quality Standard.

Please let me know if you have any questions. You can contact me at (813) 641-5033.

Sincerely,

James Hunter
Administrator - Air Programs
Environmental Planning

EP\gm\SKT110

Enclosure

c: Mr. Al Linero - FDEP
Mr. Jerry Kissel - FDEP SW
Mr. Rick Kirby - EPCHC

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October 15, 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

Via Hand Delivery

Re: Tampa Electric Company
F. J. Gannon Station
Ambient Sulfur Dioxide (SO_2) Modeling
Draft Title V Air Operation Permit
FDEP File No. 0570040-002-AV

Dear Mr. Holladay:

As requested in the Department's correspondence dated October 1, 1998, and as previously discussed in conjunction with the issuance of a Title V draft permit, please find enclosed TEC's detailed SO_2 modeling analysis for the F.J. Gannon Station. The enclosed analysis reveals that no modeled exceedances of the Florida or National Ambient Air Quality Standards are recorded for any of the selected emission scenarios when using maximum SO_2 emissions of 11.5 tons per hour as a Station cap. The dispersion modeling does assume that Unit 5 and Unit 6 stacks at F.J. Gannon Station will be extended to 110 meters. An aerial photograph describing the nearby receptors is also provided.

Please feel free to telephone me at (813) 641-5034, if you have any questions.

Sincerely,

813-641-5081

Theresa J.L. Watley
Consulting Engineer
Environmental Planning

EP\gm\TJLW

Enclosure

c/enc: Mr. Clair Fancy, FDEP-Tallahassee
Mr. Scott Sheplak, FDEP-Tallahassee
Mr. Jerry Kissel, FDEP-SW District
Mr. Lenon Anderson, FDEP-Tallahassee
Mr. Richard Kirby, EPCHC

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August 3, 1999

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

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

Dear Mr. Fancy:

With respect to the above referenced permit application, Tampa Electric Company is hereby granting a waiver of the 90-day period in which the Department is required to act on a permit pursuant to Section 120.60(1), Florida Statutes. This waiver supplements the waiver submitted on May 11, 1999 and will extend the period for Department action to and including November 19, 1999.

Please let me know if you have any questions. You can contact me at (813) 641-5033.

Sincerely,

J. James Hunter
Administrator - Air Programs
Environmental Planning

EP\gm\SKT109

c: Mr. Al Linero - FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel - FDEP SW
Mr. Rick Kirby - EPCHC

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October 29, 1998

Via FedEx
Airbill No. 808266927161

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

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

0570040-009-AC

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.

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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

TECO PRODUCTION SERVICES
PETTY CASH
6944 US HIGHWAY 41 NORTH
APOLLO BEACH, FL 33572
813-671-3361

0391

Oct. 22, 19 98

63-469/631
31

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Apollo Beach, Florida 33572

FOR Gannon Stack Extensions
T. Watley

Nancy E Foley

404-562-9095

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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.

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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

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Cleve has main File

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May 11, 1999

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

Via Facsimile and U.S. Mail

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

Dear Mr. Fancy:

In accordance with your telephone conference calls with Theresa Watley and others to discuss the Gannon Station Units 5 and 6 construction permit application, this letter constitutes a waiver of the 90-day period in which the Department is required to act on a permit pursuant to Section 120.60(1), Florida Statutes. The waiver is granted on behalf of the applicant Tampa Electric Company. The waiver will extend the period for Department action for an additional 90 days, to and including August 12, 1999.

Please let me know if you have any questions.

Sincerely,

for

Gregory M. Nelson, P.E.
Manager
Environmental Planning Department

EP\bj\tjlw642

c: Mr. Al Linero – FDEP
Mr. Cleve Holladay - FDEP
Mr. Jerry Kissel – FDEP SW
Mr. Rick Kirby – EPCHC

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

4APT-APB

APR 13 1999

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

Dear Mr. Holladay:

The March 4, 1999, Tampa Electric Company (TECO) responses to the Region 4 comments of December 8, 1998, have been reviewed. These responses were submitted to the Environmental Protection Agency (EPA) via a fax to Stan Krivo of the Air and Radiation Technology Branch. Region 4's December 1998 comments centered on increasing the existing stack height (i.e., 96 meters (m)) of F. J. Gannon Station Units 5 and 6 to 110 m without a fluid modeling demonstration. The 100 m stack height is apparently needed to avoid pollutant concentrations related to downwash that may adversely impact air quality. The modeling concerning this issue was originally submitted to address title V permit compliance with the sulfur dioxide (SO2) National Ambient Air Quality Standards (NAAQS) for the Tampa Electric Company's F. J. Gannon Station. Region 4 comments pursuant to the review of the March 4, 1999 response follow.

1. TECO states that the Good Engineering Practice (GEP) formula stack height is 133 m; however, TECO is only proposing to raise the stack height for Units 5 and 6 to 82 percent (%) of the GEP formula height, or 110 m. The use of 110 m would require fluid modeling to justify this height as the GEP stack height for setting an emission limit. As previously stated in Region 4's December 8 1998 comments, according to the 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 m, provided prohibited dispersion techniques are not employed. Raising a stack above the 65 m *de minimis* height requires evidence that the additional height is necessary to avoid downwash-related pollutant concentrations that raise health and welfare concerns. This evidence can be achieved through either of two methods: (1) demonstrate by fluid modeling, using the existing stack and emission rate (before the stack is raised) and adding in the background air quality, that excessive pollutant concentrations will occur, or (2) show by site-specific information that the existing short stack(s) has in fact caused a local nuisance. EPA does not regulate the actual height of a stack and a company is free to build a stack to any height; however, section 123 of the Clean Air Act provides that the EPA Administrator shall regulate that portion of the stack height that is used in calculating emission limitations. Therefore, to use the stack height in regulatory modeling, the new Units 5 and 6 stack height that TECO proposes must be validated in the manner presented above.

2. The TECO letter cites Rule 62-210.550(3) of the Florida State Implementation Plan (SIP) which provides that EPA or the local air program may require the use of fluid modeling or a field study to verify the GEP stack height for the setting an emission limit. It has been the policy of Region 4 and other EPA Regional Offices to adhere to the requirement of developing, by fluid modeling, the GEP stack height that should be used in modeling if a stack is being raised above the *de minimis* stack height of 65 m. Region 4 continues to use this policy and requires the appropriate fluid modeling to be developed to justify the 110 m stack height for TECO Units 5 and 6. Without this policy, the use of a 110 m stack in regulatory modeling to avoid excessive pollutant concentrations would be considered a prohibitive dispersion technique.

3. Additional air dispersion modeling was performed for Units 5 and 6 based on the current sulfur dioxide (SO2) allowable emission limits using the 96 m stack height with and without building downwash to address the 40% excessive concentration criteria. Modeling results for the high-second-high concentration for the 24-hour averaging periods was used. Upon further review of the stack height guidance, the 40% excessive concentration criterion can only be demonstrated through fluid modeling. The submitted Industrial Source Complex (ISC3) model modeling does not meet this requirement.

Region 4 looks forward to working with you to resolve the stack height issue and is willing to provide assistance in developing a fluid modeling protocol for the Gannon Unit 5 and 6 stacks. If this assistance is required, please submit future a response to my attention. If questions arise regarding these comments, please contact Brenda Johnson of my staff at (404) 562-9037.

Sincerely,

Kay Prince for

Linda Anderson-Carnahan
Chief
Air Planning Branch

cc: Stan Krivo, Air and Radiation Technology Branch

CC: File
S. Sheplak, TV

Z 333 612 568

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6944 US HWY 41 N
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Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation, NSRS
2600 Blair Stone Road, MS 5505
Tallahassee, Florida 32399-2400

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

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0570040-009-AC

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Manager-Env. Planning
Tampa Electric Co
6944 US Hwy 41 North
Apollo Beach, FL
33572-9200

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Department of Environmental Protection

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

November 25, 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 Nos. 0570040-009-AC
F.J. Gannon Station, Units 5 and 6 Stack Height Increase Request

Dear Mr. Nelson:

The Department has received your application for the Unit 5 and 6 stack height increase construction. The application was received on October 30, 1998. In order to continue processing your application, the Department will need the additional information below. Should your response to any of the below items require new calculations, please submit the new calculations, assumptions, reference material and appropriate revised pages of the application form.

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.

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.

3. The comments above address similar comments contained in the enclosed correspondence from EPA Region 4.

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.

The Department will resume processing your application after receipt of the requested information. 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,

A.A. Linero, P.E.
New Source Review Section

AAL/ch

Enclosure

cc: Mr. Brian Beals, EPA
Mr. Thomas Davis, P.E.
Mr. Bill Thomas, P.E., SWD
Mr. Iwan Choronenko, HCEPC

11/24/98

To: Cleve Holladay - FL DEP

From: Stan Krivo - USEPA Region 4

Subject: Review Comments
Units 5 and 6 Stack Height Increase
TECO - F.J. Gannon Station
Tampa, Florida

We have completed our review of the information provided in the *F.J. Gannon Station Units 5 and 6 Stack Height Increase Construction Permit Application* dated October 1998. Our review comments were discussed with you on 19 November 1998. This memorandum summarizes the results of this discussion:

1. Air Quality Impact Assessment - An air quality impact modeling assessment was performed for the proposed modified stack/emission configuration and submitted to Florida Department of Environmental Protect (FL DEP) on 15 October 1998. This document was not available for our review. Copies of the air quality report were requested for the Air & Radiation Technology and the Air Planning Branches.

2. Modifications - The proposed modifications to the Gannon Station include: 1) A more stringent 24-hour maximum plant wide emission limit of 276 tons and 2) Rasing Units 5 and 6 stacks to 361 feet. The current allowable hourly and weekly emission limits of 2.4 lb/MMBtu and 1780.8 tons, respectively, are still applicable.

3. 3-Hour NAAQS - The proposed 24-hour maximum plant emission limit of 267 tons provides an average hourly emission rate (11.5 tons) for use in the assessment of compliance with the 24-hour NAAQS. The appropriate emission rate for assessing the 3-hour NAAQS is the allowable 2.4 lb/MMBtu for each unit. The air quality impact modeling should include assessment of this 3-hour standard.

4. Load Variation - 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 6 boilers.

5. Class I Area Impacts - Because of the nearness of the Chassahowitzka Wilderness Area to the Gannon Station, the Land Manager (USFWS) for this Class I area should be notified of this project.

Please let me know if you have any comments or questions concerning this summary.

Date: 11/24/98 9:56:00 AM
From: Krivo.Stanley
Subject: F.J. Gannon Station - Discussion Summary
To: holladay_c

Cleve,

Attached is a memorandum summarizing last week's discussion on the F.J. Gannon Station proposed modifications to meet the SO2 NAAQS.

Please let me know if you have any questions or if the memorandum does not properly reflect our discussion.

Thanks...sjk