One Energy Place
Pensacola, Florida 32520

Tel 850.444 6111

AC
Dur 30 - 2/24

GULF POWER
A SOUTHERN COMPANY

Certified Mail

January 18, 2005

Jonathan Holtom
Florida Department of Environmental Protection
Division of Air Resources Management
2600 Blair Stone Road
Mail Station #5510
Tallahassee, Florida 32399-2400

JAN 25 2005

0330045-012-AC

Dear Mr. Holtom:

RE: CRIST ELECTRIC GENERATING PLANT
CONSTRUCTION PERMIT APPLICATION
SNCR, Cooling Tower Replacement, Biomass, Mercury Test Center
Permit No: 0330045-009-AV

Please find enclosed Gulf Power's application for construction permit for several projects currently in planning at the Crist Electric Generating Plant located in Pensacola, Florida. Included in the application are the required certifications by the Responsible Official and Professional Engineer registered in Florida.

As you may be aware, Gulf Power's schedule to begin construction on these projects is critical pursuant to damages sustained by Hurricane Ivan and due to engineering & design delays due to the hurricane's impact on planning. Please advise Gulf Power as soon as possible any delay to the construction schedules due to permitting processes.

We appreciate your efforts to work with us regarding the startup of these emission control and research control systems. Please call me regarding any additional questions or concerns.

Sincerely,

Dwain Waters, Q.E.P.

G. Dwain Waters, Q.E.P.
Air Quality Programs Supervisor

cc: w/att: Trina Vielhauer, FDEP – Tallahassee Office
Jim Vick, Gulf Power Company
Wright, Terry, Gulf Power Company
John Dominey, Gulf Power Company
Ms. Sandra Veazey, FDEP Northwest District Office, Pensacola, Florida
Mr. Richard Fancher, FDEP Northwest District Office, Pensacola, Florida

Department of Environmental Protection

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Air Construction Permit – Use this form to apply for an air construction permit for a proposed project:

- subject to prevention of significant deterioration (PSD) review, nonattainment area (NAA) new source review, or maximum achievable control technology (MACT) review; or
- where the applicant proposes to assume a restriction on the potential emissions of one or more pollutants to escape a federal program requirement such as PSD review, NAA new source review, Title V, or MACT; or
- at an existing federally enforceable state air operation permit (FESOP) or Title V permitted facility.

Air Operation Permit – Use this form to apply for:

- an initial federally enforceable state air operation permit (FESOP); or
- an initial/revised/renewal Title V air operation permit.

Air Construction Permit & Revised/Renewal Title V Air Operation Permit (Concurrent Processing Option) – Use this form to apply for both an air construction permit and a revised or renewal Title V air operation permit incorporating the proposed project.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: Gulf Power Company	
2. Site Name: Crist Electric Generating Plant	
3. Facility Identification Number: 0330045	
4. Facility Location...: Street Address or Other Locator: Pate Road (Off of 10 Mile Road) City: Pensacola County: Escambia Zip Code: 32520-0340	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☒ Yes ☐ No

Application Contact

1. Application Contact Name: G. Dwain Waters
2. Application Contact Mailing Address... Organization/Firm: Gulf Power Company Street Address: One Energy Place City: Pensacola State: Florida Zip Code: 32520-0328
3. Application Contact Telephone Numbers... Telephone: (850) 444-6527 ext. Fax: (850) 444-6217
4. Application Contact Email Address: gdwaters@southernco.com

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	1-25-05
2. Project Number(s):	0330045-012-AC
3. PSD Number (if applicable):	

APPLICATION INFORMATION

4. Siting Number (if applicable):	

APPLICATION INFORMATION

Purpose of Application

This application for air permit is submitted to obtain: (Check one)

Air Construction Permit

☒ Air construction permit.

Air Operation Permit

☐ Initial Title V air operation permit.
☐ Title V air operation permit revision.
☐ Title V air operation permit renewal.
☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.
☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)

☐ Air construction permit and Title V permit revision, incorporating the proposed project.
☐ Air construction permit and Title V permit renewal, incorporating the proposed project.

Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:

☐ I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

Application Comment

The purpose of this application is to request a construction permit for several projects at Plant Crist located in Pensacola, Florida. These projects include: 1) Construction of a Selective Non-Catalytic Reduction (SNCR) System on Crist Unit 6 to support the facility wide NOx emission limitation as outlined under the Gulf-FDEP Ozone Reduction Agreement. 2) Re-construction of the damaged Unit 6 cooling tower from Hurricane Ivan. 3) Continuation of the previously issued biomass use permit for Units 4 and 5 and incorporation of long term use of biomass fuel in the Title V permit. 4) Construction of a Mercury Test Center on Unit 5.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Proc. Fee
004	Unit 4 Electric Utility Boiler - 1096.7 MMBtu/hr		
005	Unit 5 Electric Utility Boiler - 1096.7 MMBtu/hr		
006	Unit 6 Electic Utility Boiler - 3704.8 MMBtu/hr		
012	Cooling Towers (3)		

Application Processing Fee

Check one: ☐ Attached - Amount: $_____ ☒ Not Applicable

APPLICATION INFORMATION

Owner/Authorized Representative Statement

Complete if applying for an air construction permit or an initial FESOP.

1. Owner/Authorized Representative Name :

2. Owner/Authorized Representative Mailing Address...
   Organization/Firm:
   Street Address:
   City: State: Zip Code:

3. Owner/Authorized Representative Telephone Numbers...
   Telephone: ( ) - ext. Fax: ( ) -

4. Owner/Authorized Representative Email Address:

5. Owner/Authorized Representative Statement:

   I, the undersigned, am the owner or authorized representative of the facility addressed in this air permit application. 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 and all other requirements identified in this application to which the facility is subject. 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 the facility or any permitted emissions unit.

   Signature Date

APPLICATION INFORMATION

Application Responsible Official Certification

Complete if applying for an initial/revised/renewal Title V permit or concurrent processing of an air construction permit and a revised/renewal Title V permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name:
   Gene L. Ussery, Jr.

2. Application Responsible Official Qualification (Check one or more of the following options, as applicable):
   - ☒ For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C.
   - ☐ For a partnership or sole proprietorship, a general partner or the proprietor, respectively.
   - ☐ For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official.
   - ☐ The designated representative at an Acid Rain source.

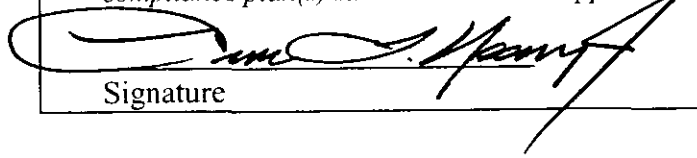
3. Application Responsible Official Mailing Address...
   Organization/Firm: Gulf Power Company
   Street Address: One Energy Place
   City: Pensacola State: Fl Zip Code: 32520-0100

4. Application Responsible Official Telephone Numbers...
   Telephone: (850) 444-6383 ext. Fax: (850) 444-6744

5. Application Responsible Official Email Address: GLUSSERY@southernco.com

6. Application Responsible Official Certification:

   I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. 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 and all other applicable requirements identified in this application to which the Title V source is subject. 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 the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.



Signature

1-18-05
Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: Gregory N. Terry
   Registration Number: 52786
2. Professional Engineer Mailing Address...
   Organization/Firm: Gulf Power Company
   Street Address: One Energy Place
   City: Pensacola State: Fl Zip Code: 32520-0340
3. Professional Engineer Telephone Numbers...
   Telephone: (850) 429-2381 ext. Fax: (850) 429-2246
4. Professional Engineer Email Address: GNTERRY@southernco.com
5. 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.

(3) If the purpose of this application is to obtain a Title V 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 plan and schedule is submitted with this application.

(4) If the purpose of this application is to obtain an air construction permit (check here ☒, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, 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.

(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here ☐, 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.

Gregory N. Terry
Signature

1-14-2005
Date

(seal)

* Attach any exception to certification statement.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone 16 East (km) 478.27 North (km) 3381.36		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) 30 33 58 Longitude (DD/MM/SS) 87 13 44	
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 :			

Facility Contact

1. Facility Contact Name: G. Dwain Waters
2. Facility Contact Mailing Address... Organization/Firm: Gulf Power Company Street Address: One Energy Place City: Pensacola State: FL Zip Code: 32520-0329
3. Facility Contact Telephone Numbers: Telephone: (850) 444-6527 ext. Fax: (850) 444-6217
4. Facility Contact Email Address: gdwaters@southernco.com

Facility Primary Responsible Official

Complete if an "application responsible official" is identified in Section I. that is not the facility "primary responsible official."

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Facility Primary Responsible Official Email Address:

Facility Regulatory Classifications

Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a "major source" and a "synthetic minor source."

1.	☐ Small Business Stationary Source	☐ Unknown
2.	☐ Synthetic Non-Title V Source	
3.	☒ Title V Source	
4.	☒ Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5.	☐ Synthetic Minor Source of Air Pollutants, Other than HAPs	
6.	☒ Major Source of Hazardous Air Pollutants (HAPs)	
7.	☐ Synthetic Minor Source of HAPs	
8.	☐ One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9.	☐ One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10.	☐ One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11.	☐ Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment:		

FACILITY INFORMATION

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
No Change from previous Title V application		

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant - Subject to Emissions Cap	2. Facility Wide Cap [Y or N]? (all units)	3. Emissions Unit ID No.s Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap
NOx					

7. Facility-Wide or Multi-Unit Emissions Cap Comment:
Units 4, 5,6 & 7 are is subject to a NOx emissions cap of 0.20 lb/mmbtu (30 day rolling average) as outlined in the Gulf - FDEP Ozone Reduction Agreement.

C. FACILITY ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID:_____ ☒ Previously Submitted, Date:06/22/2004
2. Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID:_____ ☒ Previously Submitted, Date:06/22/2004

Need New Process Flow

3. Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID:_____ ☒ Previously Submitted, Date:06/22/2004

Need New

Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location:
   ☐ Attached, Document ID:_____ ☒ Not Applicable (existing permitted facility)
2. Description of Proposed Construction or Modification:
   ☒ Attached, Document ID:_____
3. Rule Applicability Analysis:
   ☐ Attached, Document ID:_____
4. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.):
   ☐ Attached, Document ID:_____ ☒ Not Applicable (no exempt units at facility) ✓
5. Fugitive Emissions Identification (Rule 62-212.400(2), F.A.C.): (2)(b)
   ☐ Attached, Document ID:_____ ☒ Not Applicable ✓
6. Preconstruction Air Quality Monitoring and Analysis (Rule 62-212.400(5)(f), F.A.C.):
   ☐ Attached, Document ID:_____ ☒ Not Applicable ✓
7. Ambient Impact Analysis (Rule 62-212.400(5)(d), F.A.C.):
   ☐ Attached, Document ID:_____ ☒ Not Applicable Not if collocated source is ✓ Significant
8. Air Quality Impact since 1977 (Rule 62-212.400(5)(h)5., F.A.C.):
   ☐ Attached, Document ID:_____ ☒ Not Applicable ✓
9. Additional Impact Analyses (Rules 62-212.400(5)(e)1. and 62-212.500(4)(e), F.A.C.):
   ☐ Attached, Document ID:_____ ☒ Not Applicable ✓
10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): Non attainment ✓
    ☐ Attached, Document ID:_____ ☒ Not Applicable

Additional Requirements for FESOP Applications

1. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.):
   ☐ Attached, Document ID: ☐ Not Applicable (no exempt units at facility)

Additional Requirements for Title V Air Operation Permit Applications

1. List of Insignificant Activities (Required for initial/renewal applications only):
   ☐ Attached, Document ID:_____ ☐ Not Applicable (revision application)
2. Identification of Applicable Requirements (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought):
   ☐ Attached, Document ID:_____
   ☐ Not Applicable (revision application with no change in applicable requirements)
3. Compliance Report and Plan (Required for all initial/revision/renewal applications):
   ☐ Attached, Document ID:_____
   Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.
4. List of Equipment/Activities Regulated under Title VI (If applicable, required for initial/renewal applications only):
   ☐ Attached, Document ID:_____
   ☐ Equipment/Activities On site but Not Required to be Individually Listed
   ☐ Not Applicable
5. Verification of Risk Management Plan Submission to EPA (If applicable, required for initial/renewal applications only) :
   ☐ Attached, Document ID:_____ ☐ Not Applicable
6. Requested Changes to Current Title V Air Operation Permit:
   ☐ Attached, Document ID:_____ ☐ Not Applicable

Title V only

Additional Requirements Comment

Crist Electric Generating Plant
Unit 6 Cooling Tower Project

Due to damage sustained during Hurricane Ivan in September, 2004, Gulf Power has elected to re-build the Crist Unit 6 Cooling Tower. The structure will be re-constructed as a like kind replacement with the exception that the drift and evaluation percent of flow will be reduced from 2.4% to 2.1%. This change will slightly reduce volatile organic matter and particulate matter. Attached is a comparison of the new emission estimates for the Crist Unit 6 Cooling Tower and a replacement sheet for Plant Crist Emissions Unit #12 as previously submitted for Title V permitting.

Cooling Tower Information

	Cr 1-5	Crist 6	Crist 7	Total
GPM Design		150960	165000	
Evaporation Loss Design		2.10%	3.10%	
Dift Loss Design		0.0005%	0.20%	
Max Cu Ft/sec Flow (EIA 767)	426	310	344	
GPM	191444.4	139314	154593.6	
Cu Ft/sec Consumption (Eia 767)	0	7.3	9.9	
GPM	0	3280.62	4449.06	
Note: Consumption is Makeup less Blowdown				
Emission Calculations:				
Based on Circulating Flow & Apparent Factor				
Flow (GPM)	191444.4	150960	165000	
Flow (Annual Gallons)	1.00623E+11	7.9345E+10	86724000000	
PM10 Tons (=.019 lb/1000 gal/2000 lb/lb))	955.9	753.8	823.9	2,533.6
Based on Design Drift & Drift Factor				
Drift & Evaporation % of Flow	2.1%	2.1%	3.3%	
Drift & Evap (GPM)	4021.3	3170.9	5445.0	
Drift (Annual Gallons)	2113589825	1666632819	2861892000	
PM 10 Tons (=1.7 lb/1000 gal/(2000 lb/ton))	**1796.6**	**1416.6**	**2432.6**	**5,645.8**
Based on Estimated Drift & Drift Factor				
Drift & Evaporation % of Flow	2.0%	0.005%	2.0%	
Drift (GPM)	3828.9	7.5	3300.0	
Drift (Annual Gallons)	2012463533	3967228.8	1734480000	
PM 10 Tons (=1.7 lb/1000 gal/(2000 lb/ton))	1710.6	3.4	1474.3	3,188.3
Based on Consumption & Drift Factor				
Drift (GPM)	unknown	3280.62	4449.06	
Drift (Annual Gallons)		1724293872	2338425936	
PM 10 Tons (=1.7 lb/1000 gal/(2000 lb/ton))		1465.6	1987.7	3,453.3
Maximum Annual PM10 Tons	**1796.6**	**1465.6**	**2432.6**	**5,694.8**
Based on Design Drift & Drift Factor				
Drift (Annual Gallons)	2113589825	1666632819	2861892000	
VOC's Tons (=6.0 lb/10^6 gallons/(2000 lb/ton))	**6.34**	**5.00**	**8.59**	**19.93**
Based on Estimated Drift & Drift Factor				
Drift (Annual Gallons)	2012463533	3967228.8	1734480000	
VOC's Tons (=6.0 lb/10^6 gallons/(2000 lb/ton))	6.04	0.01	5.20	11.25
Based on Consumption & Drift Factor	0	1724293872	2338425936	
Drift (Annual Gallons)	0.00	5.17	7.02	12.19
VOC's Tons (=6.0 lb/10^6 gallons/(2000 lb/ton))				
Maximum Annual VOC Tons	**6.34**	**5.17**	**8.59**	**20.10**

Cooling Tower Information

		Old Crist 6	New Crist 6
GPM Design		150960	150960
Evaporation Loss Design		2.20%	2.10%
Dift Loss Design		0.20%	0.0005%
Max Cu Ft/sec Flow (EIA 767)		310	310
GPM		139314	139314
Cu Ft/sec Consumption (Eia 767)		7.3	7.3
GPM		3280.62	3280.62
Note: Consumption is Makeup less Blowdown			
Emission Calculations:			
Based on Circulating Flow & Apparent Factor			
Flow (GPM)		150960	150960
Flow (Annual Gallons)		7.9345E+10	79344576000
PM10 Tons (=.019 lb/1000 gal/2000 lb/lb))		753.8	753.8
Based on Design Drift & Drift Factor			
Drift & Evaporation % of Flow		2.4%	2.1005%
Drift & Evap (GPM)		3623.0	3170.9
Drift (Annual Gallons)		1904269824	1666632819
PM 10 Tons (=1.7 lb/1000 gal/(2000 lb/ton))		**1618.6**	**1416.6**
Based on Estimated Drift & Drift Factor			
Drift & Evaporation % of Flow		2.0%	0.005%
Drift (GPM)		3019.2	7.5
Drift (Annual Gallons)		1586891520	3.967E+06
PM 10 Tons (=1.7 lb/1000 gal/(2000 lb/ton))		1348.9	3.4
Based on Consumption & Drift Factor			
Drift (GPM)		3280.62	3280.62
Drift (Annual Gallons)		1724293872	1724293872
PM 10 Tons (=1.7 lb/1000 gal/(2000 lb/ton))		1465.6	1465.6
Maximum Annual PM10 Tons		**1618.6**	**1465.6**
Based on Design Drift & Drift Factor			
Drift (Annual Gallons)		1904269824	1666632819
VOC's Tons (=6.0 lb/10^6 gallons/(2000 lb/ton))		**5.71**	**5.00**
Based on Estimated Drift & Drift Factor			
Drift (Annual Gallons)		1586891520	3967228.8
VOC's Tons (=6.0 lb/10^6 gallons/(2000 lb/ton))		4.76	0.01
Based on Consumption & Drift Factor		1724293872	1724293872
Drift (Annual Gallons)		5.17	5.17
VOC's Tons (=6.0 lb/10^6 gallons/(2000 lb/ton))			
Maximum Annual VOC Tons		**5.71**	**5.17**

GDW 01/10/05

decrease in design per increase in effic.

why big drop in estimate vs design?

Plant Crist, Unit 6
Selective Non-Catalytic Reduction Retrofit
System Description

Gulf Power Company is making application to install selective non-catalytic reduction, or "SNCR," technology on the Plant Crist Unit 6 boiler. The SNCR systems will be designed to provide approximately 25% removal of nitrogen oxides (NO_x) when operating. when will it operate

SNCR is a post-combustion technology for reducing NO_x emissions from flue gases by chemical conversion. This chemical reaction requires the injection of urea into the hot flue gas stream in the upper regions of the furnace to reduce the nitrogen oxides to nitrogen, water, and small quantities of carbon dioxide. The reduction is normally expressed by the following equations:

Can will apply

(1) $4NO + 2CO(NH_2)_2 + O_2 \Rightarrow 4N_2 + 4H_2O + 2CO_2$

(2) $2NO_2 + 2CO(NH_2)_2 + O_2 \Rightarrow 3N_2 + 4H_2O + 2CO_2$

N_2O is also a by-product of the SNCR process and is typically in the range of 10-20% of the NO_x reduced. Small amounts of CO emissions can also be expected from the process. There are no other known organic emissions from the SNCR process beyond CO and CO_2.

The SNCR process takes place in a temperature range between 1600°F to 2200°F, which normally occurs in the convective sections of the boiler. Urea is delivered and stored on-site at a concentration of ~40%. 112 R Prior to injection into the boiler, the urea is further diluted to a concentration somewhat less than 30%. Dilution is required to improve the mixing characteristics of the urea stream with the flue gas stream. The urea/water mixture is injected into the boiler via air atomizing wall lances.

The SNCR equipment to be installed at Crist Unit 6 is fabricated by Fuel Tech, Inc.

The SNCR system will be tuned to achieve the maximum level of NO_x reduction while limiting average ammonia slip across the duct to 5 ppmvd corrected to 3% O2 (24 hour basis). Ammonia slip can react with small quantities of sulfur trioxide (SO_3) present in the flue gas to form ammonium bisulfate (NH_4HSO_4), which can foul and corrode downstream equipment (especially the air preheater). Predictive (?) or Monitor

The components of the SNCR system include a reagent unloading station, reagent storage tanks, reagent circulation module, reagent metering modules, reagent distribution modules, and air atomized injectors.

Below is a list of information previously requested by FDEP for the Crist Unit 6 SCR.

1. SNCR System Design Information:

	Crist 6
Heat Input, MBtu/hr	3704.8
Current NO_x, lbs/MBtu Permit Limit 0.95	0.578
SNCR Inlet NO_x, lbs/Mbtu because of New Low NOx Burner	0.35
SNCR Inlet NO_x, lbs/hr	1296.68
NO_x Emissions (SNCR Outlet), lbs/MBtu	0.28 ← Target
NO_x Emissions (SNCR Outlet), lbs/hr	1037.34
NH_3 slip, ppmvd @ 3% O_2	5
SNCR Design NOx removal, %	25%
SNCR Guaranteed NOx removal, %	20% ← 25% design

2. Flow Diagram:
See attachment flow diagram.

3. Narrative of the SNCR process:
See introduction

4. Reagent Circulation and Distribution Loop:
Urea is delivered and stored as a 40% aqueous solution that is maintained at a temperature of approximately 40° by circulating through the SNCR system piping loop and heating module. Using plant service water or other dilution water source, the metering module further dilutes the reagent to a predetermined concentration and precisely controls the flow of diluted reagent to distribution modules located near the boiler injection point. The distribution modules provide the final control of diluted reagent and atomizing/cooling (plant) air being delivered to each injector. The diluted reagent is injected into the boiler via wall-mounted air atomizing lances.

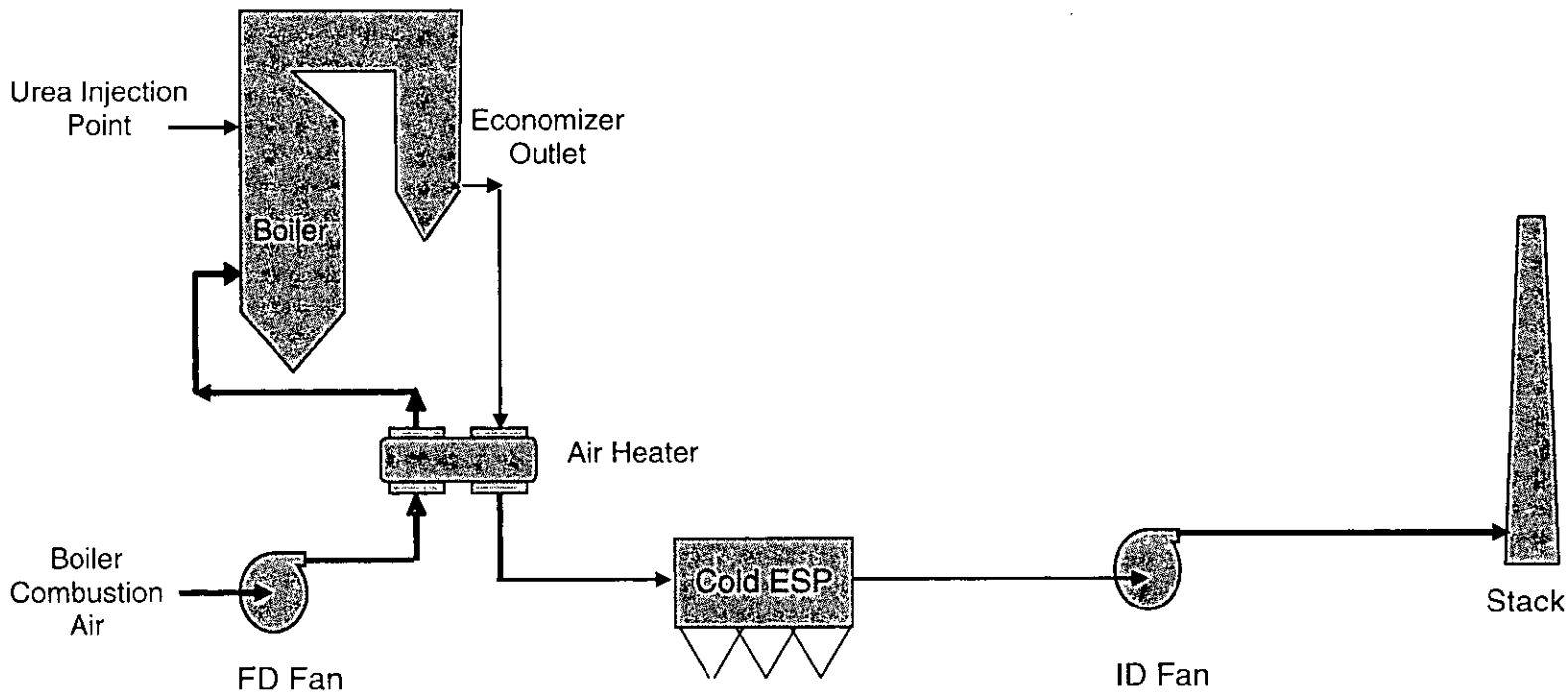
5. Plant Equipment Modifications:
The only anticipated change to the Unit 6 boiler is an adaptation of the boiler tube panels to accommodate the installation of wall-mounted injection lances. The Unit 6 SNCR will be designed with 6 wall-mounted injectors.

6. Peak Urea Injection Rate:
At peak load for Crist Unit 6, with 0.35 lbs./MBtu inlet NO_x and 20% reduction, urea injection would be 741 lb/hr on a dry basis. This translates to an ammonia flow of 333.8 lb/hr.

7. Ammonia Tank Sizes:
Liquid urea at a concentration of 40% will be stored in 1 tank with capacity to store 45,000 gallons of solution. This arrangement will provide a minimum of 7 days operating inventory.

8. Peak Ammonia Slip:
The SNCR is designed and guaranteed to have an ammonia slip concentration of 5 ppm by volume (dry basis) corrected to 3% O_2 as averaged over a 24 hour period in the duct cross sectional area for all boiler operating loads.

9. Construction Schedule:
- Mobilize Construction – June 27, 2005
- Equipment Deliveries – June 28, 2005 – July 1, 2005
- Pre-Outage Construction - June 28, 2005 – September 9, 2005
- Unit 6 Outage – September 10, 2005 – November 20, 2005
- Optimized System – May 1, 2006



Gulf Power Company
Plant Crist, Unit 6
SNCR Process Flow Diagram

With - drawn

Crist Electric Generating Plant
Biomass Fuels for Units 4 & 5

Gulf Power is making application to include the following fuel for use in at Plant C
Units 4 and 5 as previously outlined in the 2004 Title V Renewal Application. Use
this fuel was not incorporated in the recently finalized Crist Title V permit. Gulf Po
successfully demonstrated Crist 4 and 5 as units being "capable of accommodatin
biomass fuels under a construction permit issued in 2003. Below is the information
previously submitted in the 2004 Title V renewal application.

SCC Code: 10100903
Units: Tons Wood Burned
Description 1: External Combustion Boiler
Description 2: Electric Generation
Description 3: Wood/Bark Waste
Description 4: Wood-fired Boiler - Wet Wood (>= 20% moisture)
Is this a valid segment? Yes
Segment Description: Biomass (wood, switchgrass, sawdust, and sander dust)

Segment comment: Permit allows up to 97.7 equivalent mmbtu/hr of biomass (wood, switchgrass, sawdust, and sander dust) with TPH limits for each biomass fuel.

Gulf Power Proposed Mercury Research Center (MerRC)

In March 2005, the U.S. EPA is scheduled to promulgate rules that will require utilities to significantly reduce their Hg emissions. Currently, there are no commercially available Hg control technologies with documented long term performance on coal flue gas. Because of the lack of experience, Hg chemistry in flue gas is not very well understood. However, research performed over the past couple of years has shown that pollution control technologies designed to control NO_x, SO_2, and PM can significantly affect overall Hg performance. In order to investigate these relationships, Gulf Power is planning a 5 MW equivalent slip-stream facility equipped with a complete system of flue gas cleanup technologies.

System Description

The proposed slip-stream facility will incorporate a Selective Catalytic Reduction (SCR) system, rotary air-preheater, Electrostatic Precipitator (ESP), baghouse (BH), and wet Flue Gas Desulphurization (wFGD). Each system will be designed with the appropriate level of functionality so that a large number of existing plants can be represented. Because of the complex interactions of Hg with various surfaces in flue gas, it is difficult to generate representative data for full scale installations at the pilot scale. However, the 5 MW scale is sufficiently large enough to provide the appropriate surface to volume ratios to gather representative data. Figure 1 shows a schematic for the proposed system.

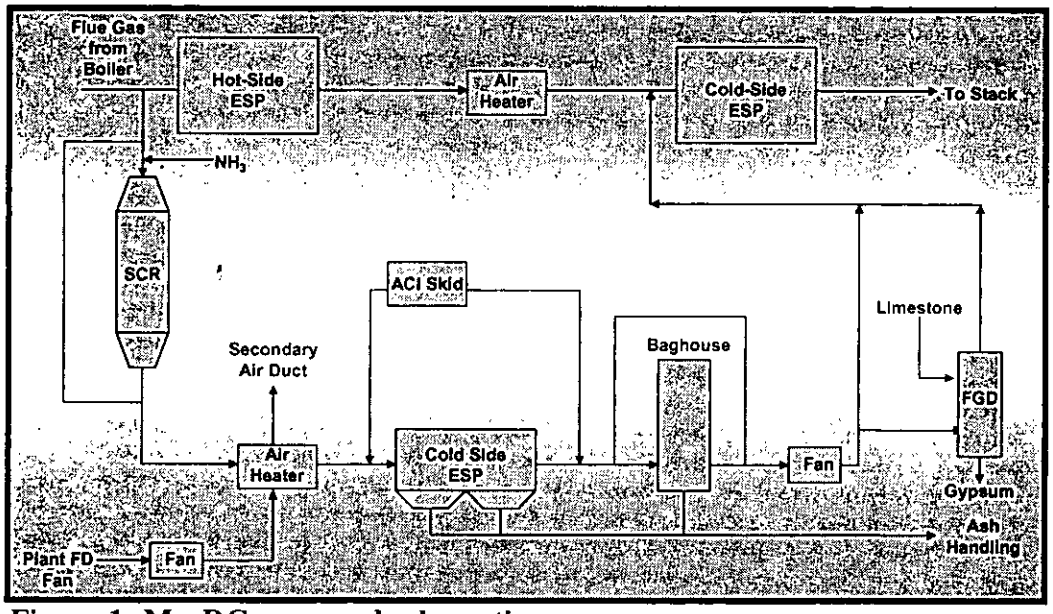


Figure 1: MerRC proposed schematic.

Host Facility

Because of its history with research facilities of this magnitude, Plant Crist Unit 5 was chosen as the host plant for the slip-stream facility. Crist Unit 5 is a wall fired PC boiler

burning low-sulfur bituminous coals and is equipped with hot and cold side ESPs arranged in series. The process gas supplied to the MerRC will be drawn from the inlet of the hot-ESP. The typical flue gas characteristics for this gas stream are presented in Table 1.

Table 1: Typical flue gas characteristics for MerRC inlet.

	Value	Units
Temperature	600	°F
Pressure	-6	inches H_2O
N_2	80	%
CO_2	15	%
O_2	3	%
SO_2	0.6-2.4	lb/mmBtu
NO_x	0.5-0.7	lb/mmBtu
Particulate	7	lb/mmBtu
Hg	6	lb/tBtu
MerRC System Flow	25,000	wacfm

Flue Gas Temperature Control

Because Hg chemistry has been shown to be temperature dependent, temperature control at the inlet of the research facility is crucial. This will be accomplished by using a combination of an economizer bypass line, providing ~ 900°F gas to the facility, or a flue gas heater. The heater will be sized to allow for a wide range of operating temperatures, up to and including 750°F. The heaters will be simple resistance type and will not introduce any additional compounds to the process gas. Typical heater characteristics are presented in Table 2.

Table 2: Flue gas heater parameters.

Heater Type	Electric Resistance heater	
Inlet Temp	600	°F
Max Outlet Temp	750	°F
Heat Input Requirement	3.5	mmBtu/hr
Power Requirement	600	kW

Selective Catalytic Reduction (SCR) system

SCR for NO_x control has been widely incorporated throughout the world and is well understood. However, there is little known on the details of Hg chemistry in the SCR. The SCR designed for MerRC will resemble a typical full scale system installed at any number of plants. The scale of MerRC will allow for the use of full scale catalyst modules, with the cross section designed to achieve representative space velocities for the system. Typical SCR design points are shown in Table 3. The SCR will be equipped with 3 catalyst layers, which will allow for greater than 80% control of NO_x and a maximum pressure drop of 6 in. H_2O.

Table 3: Typical SCR system design points.

SCR System Inlet NO_x	0.7 lb/mmBtu
Expected SCR Performance	90%
Typical SCR Outlet	0.07 lb/mmBtu
Number of Catalyst Layers	3
Typical Maximum NH_3 slip	5 ppm_{vd} @ 3% O_2

The research facility will also incorporate a SCR reactor by-pass to allow for testing of alternate designs. Although research has shown that SCRs do not control Hg, data has shown it can significantly affect the chemistry of downstream devices, which could significantly change the performance of those systems. The ability to operate with and without SCR in service is a necessary requirement in order to investigate seasonal operation as well as alternate plant configurations.

In order to achieve NO_x reductions within the SCR, ammonia must be fed as a reagent to react with NO and NO_2 per the following equations.

$$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$$
$$2NO_2 + 4NH_3 + O_2 \rightarrow 3N_2 + 6H_2O$$

Typically 95% of NO_x in the flue gas stream is NO, with the remainder NO_2. At these ratios, an ammonia flow rate of ~25 lb/hr to the SCR can be expected in order to achieve the stated NO_x reduction goals. At these rates, an ammonia slip of less than 5 ppm (0.065 lb/hr) is expected. However, during some research programs, this value could be exceeded for short periods of time.

Air Pre-heater (APH)

In order to mimic the time-temperature profile of a full scale system, the MerRC will incorporate a rotary type APH for flue gas cooling. The APH will cool the flue gas from ~700°F to 300°F before sending it to the downstream air pollution control equipment. In order to reject the heat transferred from the flue gas, a cooling air fan will be installed. The cooling air fan will provide ambient air supplied from the plant forced draft fan to the APH and, after heating, will force the air back into the plant secondary air duct in order to minimize the efficiency impacts of the MerRC. Table 5 presents pertinent APH design information.

Table 5: APH typical design criteria.

APH Type	Rotary (Lungstrom)
Heat load	5.5 mmBtu/hr
Flue Gas inlet Temp	700 °F
Air inlet Temp	72 °F
Flue Gas outlet	300 °F
Air Outlet	550 °F

Electrostatic Precipitator (ESP)

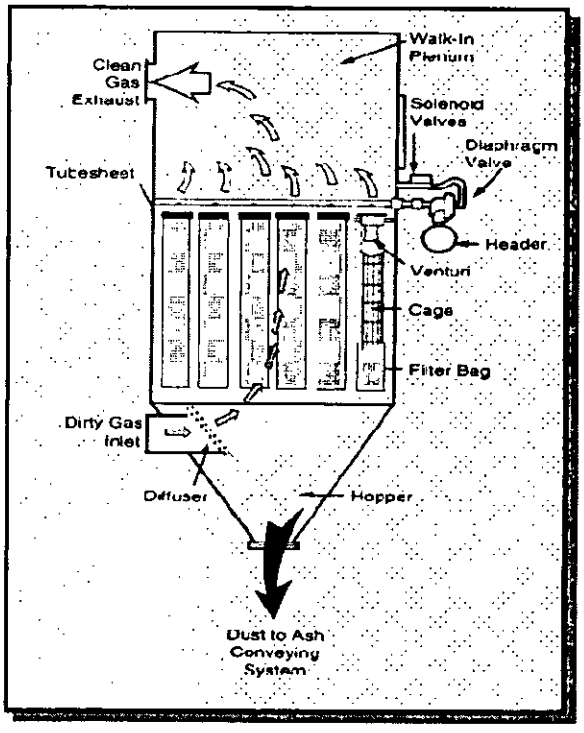
The utility industry has operated ESPs for several decades. However, in the future, more stringent particulate emission requirements will force operators to make incremental improvements in performance. Additionally, the co-benefit of Hg removal in these ESPs could play a significant role in achieving least cost compliance. The ESP installed in the MerRC will be designed as a single casing 4 field unit, able to achieve >99% removal efficiency of particulate matter. Typical design data are listed in Table 6.

Table 6: Typical ESP design data.

Number of fields	4
Field Length	5 ft
Field Height	12 ft
SCA (ft^2/1000acfm)	225
Efficiency	>99%

Baghouse

Currently, the most mature Hg control technology is TOXECON™. TOXECON™ is an EPRI patented technology that incorporates a high (air to cloth) ratio fabric filter downstream of an ESP, with activated carbon injection (ACI) between. The high ratio baghouse, or COHPAC baghouse, is designed to minimize conserve footprint while weighing increased pressure drop due to higher bag face velocities. There are only a handful of installations of this technology in the industry, and 2 of them are located at Alabama Power's Plant Gaston near Birmingham, AL. Southern Company has significantly contributed to the development, and would be able to continue this development at the MerRC. The baghouse will be designed to allow for multiple bag configurations, bag types, and inlet loadings so that critical parameters for long term performance of these systems can be investigated. Figure 2 shows a schematic for a typical COHPAC baghouse.



Activated Carbon Injection (ACI)

As stated above, the most mature Hg control technology is TOXECON (ACI into COHPAC baghouse). Significant work has been performed by Southern Company and others to investigate ACI into existing ESPs. Although results from these programs show promising Hg control results, there is concern that the additional solids loading to the ESP will degrade the particulate removal performance. In order to understand long term performance and BOP issues of both of these control concepts, the MerRC will

incorporate a carbon injection skid. The skid will be designed with enough variability to allow for both injection schemes. Typical injection rates for ACI into ESPs vary from 5-20 lbs Carbon/mmacf (5-20 lbs/hr) of flue gas, and for TOXECON from 0.5-2 lbs/mmacf (0.5-2 lbs/hr). As the art of ACI matures over time, the MerRC will also provide a testing ground for the latest innovation in sorbents. Assuming an annual capacity factor of 10% for ESP injection, you could expect ~7.5 tons of activated carbon, and ~0.5 tons of activated carbon for the TOXECON injection case.

Wet Flue-gas Desulphurization

Over the next decade, Southern Company will be installing a large number of FGD systems throughout its fleet, including some of Gulf Power's units. In order to achieve the lowest cost Hg compliance, it will be paramount that these systems be optimized for Hg removal efficiency. Tests have shown that wet FGD systems can efficiently capture oxidized Hg. However, little about Hg chemistry in the FGD is understood. Research to uncover the critical factors affecting these chemical processes is needed.

Southern Company currently owns a 1 MW scale pilot wet FGD system. This system will be incorporated into the MerRC to study the effects described above. The FGD will require a limestone feed for SO_2 control, and will produce a gypsum byproduct. Typical process flows are presented in Table 7. Applying an annual capacity factor of 20% to the FGD projects an annual gypsum production of ~45 tons.

Table 7: Typical stream flows for FGD pilot.

System Flow	3000 acfm @ 300°F
SO_2 Concentration	1100 ppm_v
SO_2 Feed (lb/hr)	24
Limestone Feed (lb/hr)	37.5
Gypsum Draw off (lb/hr)	51

Crist Mercury Research Center