

Emission Reduction Strategy

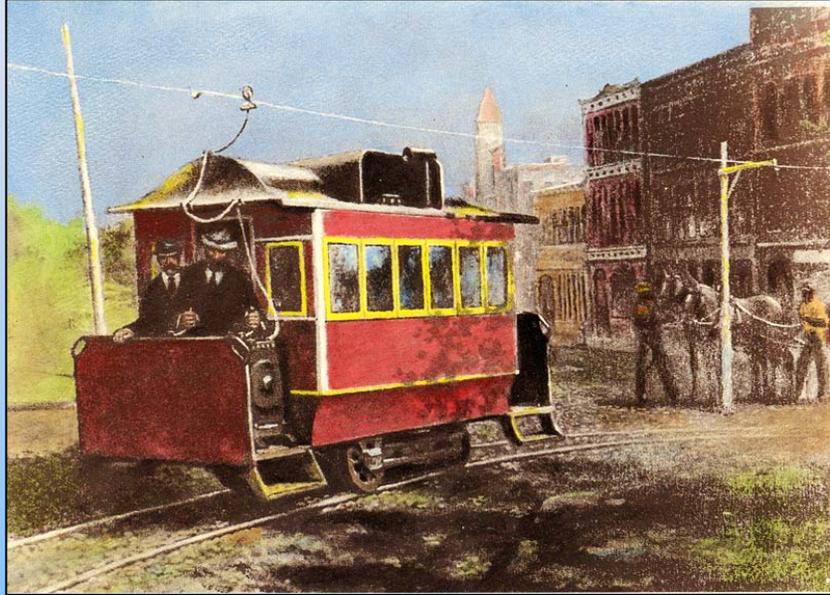
Southern Company SF₆ Program

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Southern Company

*2009 Workshop on SF₆ Emission
Reduction Strategies*

February 4, 2009

Southern Company



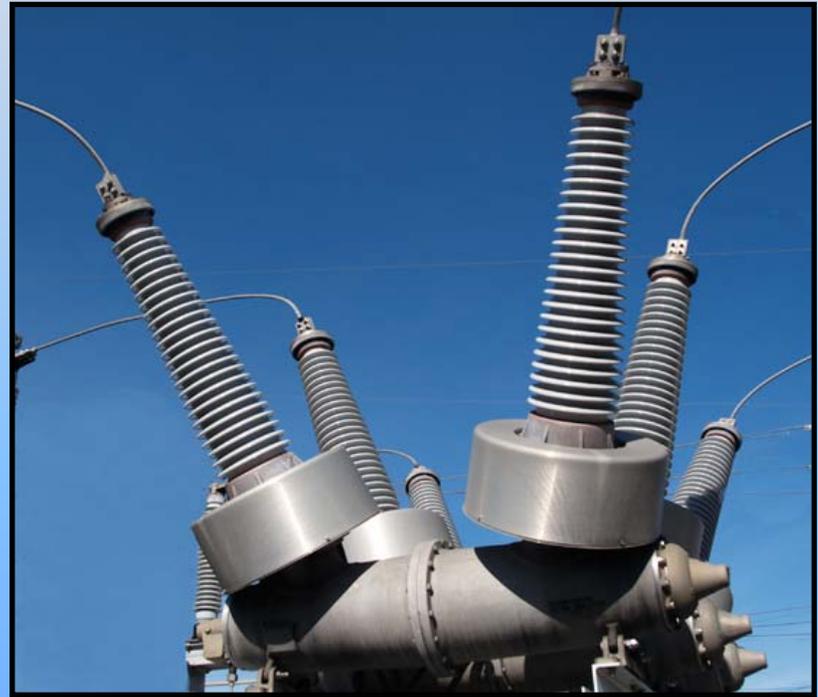
The Lightning Route

The Early Bird



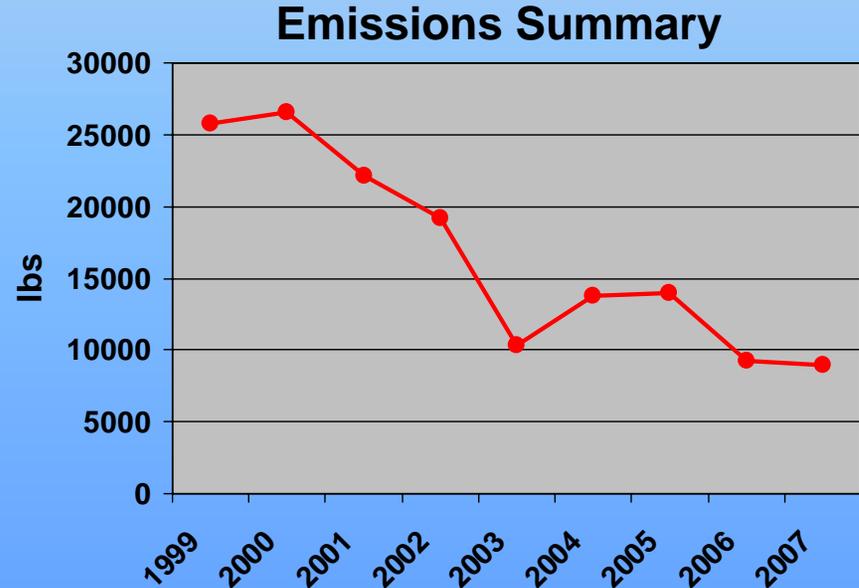
Southern Company

- > 42,000 megawatts of electric generating capacity
- > 27,000 miles of transmission lines
- ≈ 500 Substations with SF₆
- ≈ 350,000 lb SF₆ Capacity
- ≈ 1700 SF₆ Puffer Breakers
- ≈ 40 Two-Pressure Breakers
- ≈ 120,000 mi² Territory



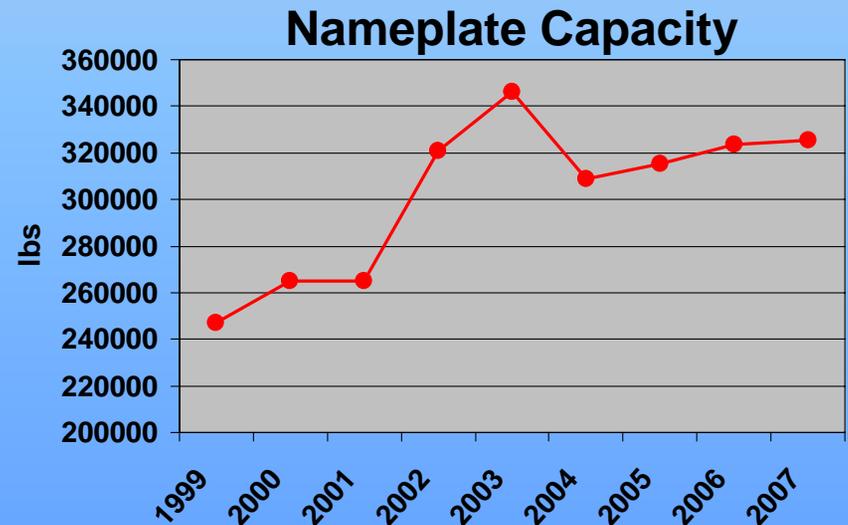
Emission Reduction Goals

- Original goal – Emissions to less than 20,000 lb/yr by 2005 (met in 2002)
- Revised and extended goal – Emissions to less than 7,500 lbs by 2012
- Baseline Emissions – 63,950 lb/yr
- Charter Member of EPA Partnership



Southern Company SF₆ Results

- 2007 SF₆ Emission Rate – 2.8%
- 2007 Emissions – 9000 lb
- 2007 Emission Reduction Versus Baseline Year – 86%
- Emission Rate with Current Generation of Breakers – < 0.1 – 0.01 %
- Percent of Total Program Nameplate Capacity – 6%



Southern Company Program – Highlights

- Extensive Written Procedures and Training for Handling SF₆.
- SF₆ Tracking Software (STOMP).
- Cylinders Weighed Annually.
- Quantity Received/Used Is Reported.
- Breakers Purchased Without SF₆.
- Own and Operate SF₆ Charging and Reclaim Equipment.
- Breakers with >15 lbs of SF₆ Included in Reports.
- Own and Operate Laser Leak Detection Equipment.
- SF₆ Is Tested and Reused.
- SF₆ Removed before Breakers Sold/Scrapped.
- Bottles Returned for Refill Assumed to Contain 10% of SF₆.



Oil Breaker Strategy

- Some equipment dates to 1950s and earlier.
- No schedule or plan for total replacement.
- Most work very well.
- Several thousand still on system.
- Some serviced and reinstalled.
- Replaced or moved if overstressed or maintenance costs or parts become issue.
- No PCB issues.



Oil Breakers

ITS Transmission Maintenance Strategy

- Contracts to service and maintain co-op and municipal breakers.
- Involves 100 – 1000 lb SF₆/year.
- Handled through work order transactions.
- SF₆ from Southern Company inventory.
- Some serviced and reinstalled.
- Mostly in Georgia.



SF₆ Breaker Installation Activities

- Install ~ 6 – 10 breakers per month.
- Replace smaller breakers in growth areas.
- Exchange breakers for maintenance.



- Replace two-pressure breakers with puffers.
- Replace oil breakers with puffers.
- Most activities in spring and fall seasons.

Two-Pressure Breaker Update by State

- **Mississippi** – No two-pressure breakers remaining on system. Lost/damaged in hurricanes.
- **Florida** – No two-pressure breakers. Newer system and hurricane damage.
- **Alabama** – No two-pressure breakers. Aggressive replacement strategy.
- **Georgia** – Plans to have all or most gone by 2013. Rebuilt some newer two-pressure breakers about 5 years ago. Piping and joints reworked; very low leakage rates.



Standard Transmission Operation and Maintenance Program

- STOMP – Southern Company software for managing transmission system operations and maintenance.
- Used for tracking:
 - Tracking SF₆ inventories
 - Maintaining equipment information and maintenance issues.
 - Reporting emissions for EPA partnership report



Example Breaker Information from STOMP

SUBS - Breaker GPCO

File Options Toolbar Help

WAR.

* Facility:	HATCH	Plant Location:	8220		
* Type:	NP	Facility Id:	36	Facility No.:	2632
* Status:	In Service	Company No.:	B8483		
* Status Date:	04/07/2004	Onsite Date:	03/19/2004		
* Operating KV:	230	Date Manufactured:	03/01/2004		
* Eqp. Subclass:	SF6 Puffer	Date Installed:	03/23/2004		
* Manufacturer:	ABB	Mfr. Rated KV:	242		
* Owner:	GPCO	Cont. Amp Rating:	3000		
* Maint Spec Code:	SES3	Interrupt Rating:	63		
Serial Number:	BOO3924-01	Interr. Rating UOM:	KA		
Original S/N:	BUME	Switch No.:	179400		
Mfr. Device Des:	242PMI63-30	PO Number:	0168501		
Application Des:			1		
No. Phases:	3				

Save Close



Example Breaker SF₆ Data from STOMP

The screenshot shows a software window titled "SUBS - Breaker Details GPCO" with a close button in the top right corner. The window contains two columns of input fields. The first column includes: "Pounds of SF6:" (text box with "270" and a red circle around it), "Mech. Serial No.:" (text box), "Compressor Pump:" (dropdown menu), "Tank Lift:" (dropdown menu), "Live Tank:" (dropdown menu with "N" selected), "Animal Protectors:" (dropdown menu), "External CT's:" (dropdown menu), and "Relays:" (dropdown menu). The second column includes: "Capacitor Bank No.:" (dropdown menu), "Capacitor Duty Rating:" (text box), "Continuous Amp Rating:" (text box with "3000"), "Interrupt Rating:" (text box with "63"), "Interrupt Rating UOM:" (dropdown menu with "KA" selected), "Preinsertion Capacitance:" (text box), and "Preinsertion Resistance:" (text box). At the bottom right, there are "Save" and "Close" buttons.

Current Status and Issues

- Management understands and supports program.
- Commitment to reduce emissions, save money, increase system reliability, and protect the environment.
 - Improve accuracy
 - Review equipment issues
 - Enhance handling/tracking procedures
- Emphasis on sharing information.
- Strategy for maintaining awareness of emission reduction goal.



<http://www.southerncompany.com/planetpower/climate.aspx>

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