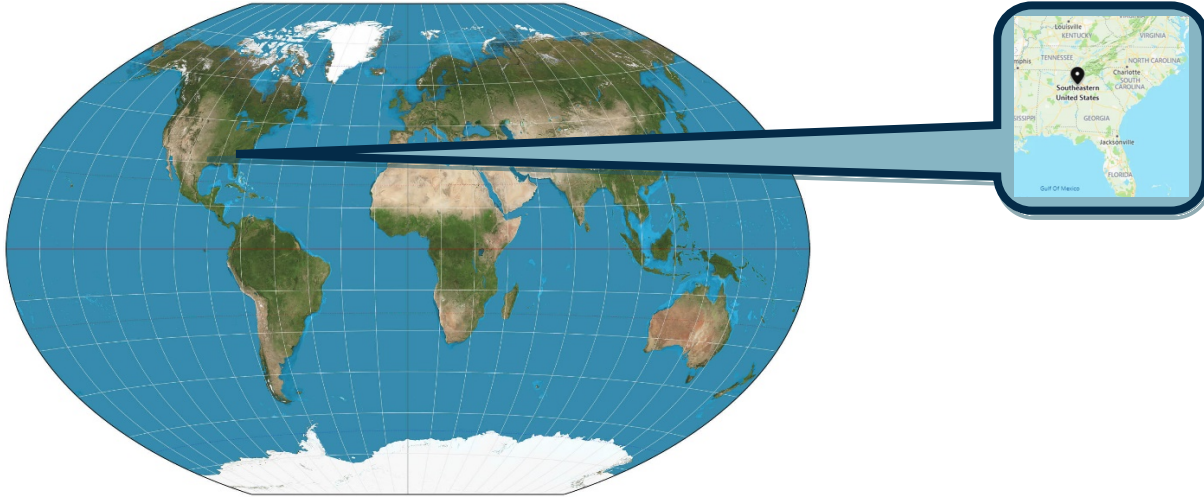


COMBINED CYCLE POWER PLANT
Post Cleaning Summary

USA
Southeast

BACKGROUND:

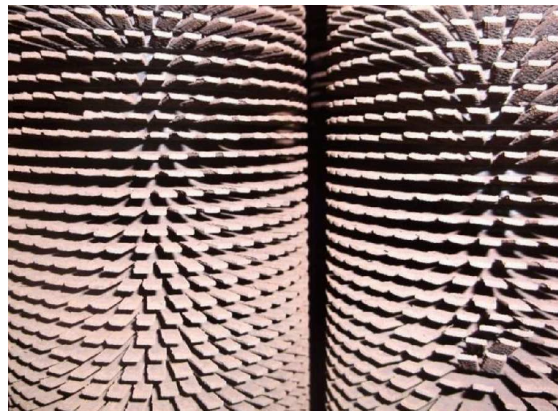
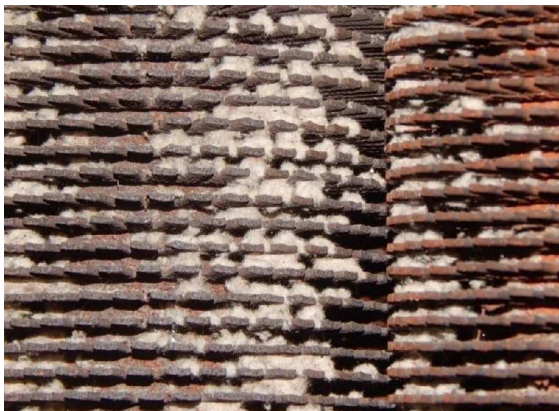
- 2005 Commissioned
- Natural Gas
- Horizontal Gas Flow
- Base Load
- No previous cleaning
- November 2015 date PIC Deep Cleaning
- 4 Modules Cleaned per unit

HRSG	GT & Design	Output
<ul style="list-style-type: none"> • 2- Nooter/Eriksen • Triple wide (60' x 32') 	<ul style="list-style-type: none"> • Two GE 7FA Gas Turbines • One GE D-11 Steam 	<ul style="list-style-type: none"> • 320 MW GTs • 210 MW Total

ASSESSMENT: HRSG fouling causing issues

- Decreased MW output from design
- Increased Fuel Usage
- Increased back pressure on gas turbines
- Decreased Heat Transfer
- Reduced thermal efficiency
- Increased Heat Rate

CLEANING RESULTS: Benefits to the Plant



Debris Removed

- HRSG Unit 2: 11,340 kg
- HRSG Unit 3: 11,450 kg

Output: +11.6 MW

	Before	After	Change
CT #2	n/a	n/a	+ 3.9 MW (+2.44%)
CT #3	n/a	n/a	+ 4.1MW (+2.56%)
ST #4	n/a	n/a	+ 3.6 MW (+1.71%)

Heat Transfer

	Before	After	Change
CT #2	n/a	n/a	-3.6 F
CT #3	n/a	n/a	-19.7 F

GT Back Pressure

	Before	After	Change
CT #2	n/a	n/a	-6.2" [158mm] H2O
CT #3	n/a	n/a	-5.2" [132mm] H2O

*(-6.2 inches and -5.2 inches data from plant)

Heat Rate: (Thermal Energy In / Electric Energy Out)

Before	After	Change
7338 gJ/Kwh	7016 gJ/Kwh	- 322 gJ/Kwh (-4.4%)

*(6955 Btu/kwh to 6650 Btu/kwh data from plant)

FINANCIAL BENEFITS:

Fuel Savings

Impact Fuel Savings	Fuel Savings	Annual Savings Estimate
n/a	n/a	\$ 2,840,000 USD

Increased Output Revenue

Increased Output	Estimated US \$ / MW	First Year Revenue Increase
+ 11.6 MW	\$70.00	\$ 6,820,800 USD

- (350 days x 24 hr/day x 5.4 MW/hour x \$70.00)

Summary

- The plant was very satisfied with the PIC Deep Cleaning service.
- The payback period of the plant was less than two weeks