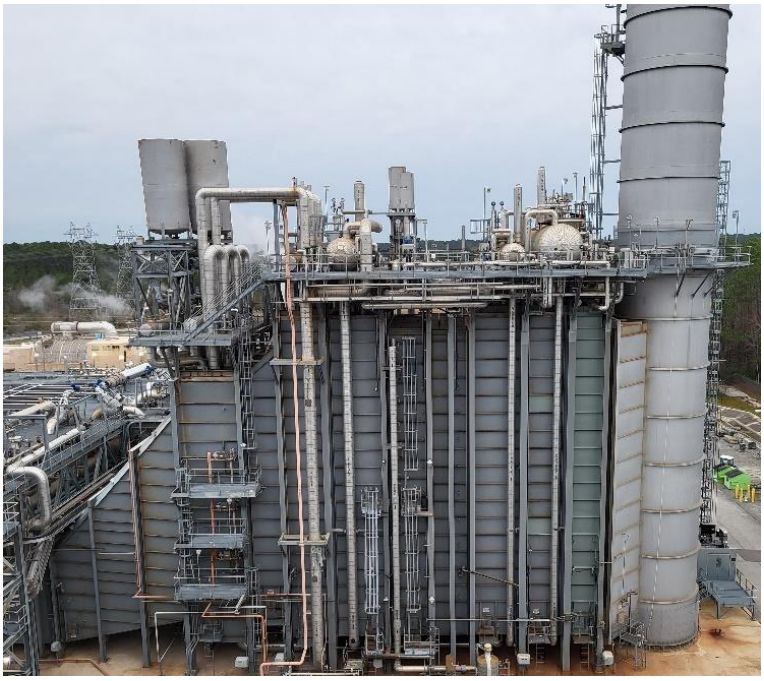
JEA Brandy Branch Combined Cycle Units

NOx Catalyst Replacement Scope

JEA PWO 31286179

May 13, 2025



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Introduction & Background

The Brandy Branch Generating Station includes a 2x1 Combined Cycle power block that consists of two GE frame 7FA model 7341 .05 gas turbines, two Nooter-Eriksen heat recovery boilers, one GE D-11 steam turbine, and BOP equipment.

Units 2 & 3 combustion turbines exhaust their byproduct heat into their associated Heat Recovery Steam Generators (HRSG) for steam production for the Unit 4 steam turbine. Within the HRSG, between the HP and IP reheat sections, is a section dedicated to emissions control. Part of this section contains a Peerless Selective Catalytic Reduction (SCR) catalyst, a honeycomb-like structure where NOx with ammonia grid reacts with the catalyst and effectively reduces NOx emissions to levels acceptable by EPA standards and permits. Cormetech manufactured the ceramic base metal oxide catalyst which uses 19% aqueous ammonia for the reduction reaction.

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A. PERFORMANCE at Design Conditions

Parameter	Units	Value
Max Exhaust Flow	lb / hr	4,300,000
Maximum Duct Burner Fuel flow	scfh	80,000
SCR Operating Temperature	°F	567 - 661
SCR Inlet NOx	ppmvdc	6 - 9
SCR Inlet CO[1]	ppmvdc	3 - 8 normal
Stack CO Limit	ppmvdc	14
Stack NOx Limit	ppmvdc	3.5
Ammonia Slip Limit	ppmvdc	5

Notes:
1. SCR Inlet CO is higher when operating at low loads.

B. SITE CONDITIONS

- Site location: 15701 West Beaver Street, Baldwin, FL 32234
- Equipment: Location Outdoor
- Ambient temperature range 7° to 105°F
- Site Elevation 88 feet

In the spring of 2026, a new sampling grid and AIG tuning valves/instrumentation is expected to be installed. Also planned for the spring 2027 outage is the installation of CECO (Peerless) square tube lances.

C. SCOPE OF WORK

1. Work by Contractor.

A. Design new catalyst.

1. Confirmation of dimensions for installation of new catalyst.
2. Provide Owner with material and installation project costs for the following:
   - Bid Option 1: Low pressure drop design (pleated (preferred) or staggered)
   - Bid Option 2: Low pressure drop design and dual-catalyst

- Appendix A provides the bid form for these options

B. Remove existing catalyst.

1. Outage is tentatively scheduled for March 8, 2027 to April 21, 2027.
2. Removal, disposal, and installation by the contractor shall include the safe and proper use and mobilization of equipment or machinery such as cranes, lifting beams, spreader bars, special slings and cables, forklifts, scaffolding and welders that are needed for the work to be done.
3. Proper skilled and trained laborers and operators will be provided by the contractor.
4. Disposal of existing catalyst. The contractor must also comply with any regulations regarding safe and environmentally-sound disposal of waste materials.
5. Other contractors will be working on the units during the outage. Coordination and cooperation to not hinder any of the required work will be needed.

C. Procure and Install new catalyst.

1. Two samples of each catalyst shall be provided before shipping the catalyst to the job site. One sample will be placed in on-site storage. The other sample shall be tested by the Seller to ensure the catalyst meets specifications. Test results shall be presented to JEA before shipment of the catalyst.
2. Procure new catalyst including shipping and on-site storage.
3. Install new catalyst per OEM recommendations. Develop and confirm quality assurance during the installation.
4. Ensure minimal leakage by verifying all seals. Replace all bolts as required. Replace gasket seal at roof top panel.
5. Each catalyst bed shall be equipped with provisions for periodic catalyst sampling. If removable catalyst sections are used to meet sampling requirements, one complete set of spare catalyst sample blocks shall be provided.
6. Pre-shipping submittals: Performance Correction Curves
    a. NOx/CO conversion versus temperature
    b. Ammonia slip versus temperature.
    c. Ammonia slip as a function of inlet NOx and NH3 injection rate.
    d. SO_2 to SO_3 conversion versus temperature.
    e. Formation of ammonia sulfur compounds versus SO_3 concentration upstream of the AIG and temperature assuming constant NH_3 slip.
    f. Estimated removal efficiencies for Non-Methane and Non-Ethane Hydrocarbons versus temperature.

g. NOx/CO Conversion versus hours of operation.

F. Project Completion

1. Contractor shall conduct AIG tuning and performance testing to demonstrate all guarantees are satisfied. Seller shall supply, at no cost to the Buyer, personnel to witness performance testing of the catalyst, if desired by JEA.

G. Submittals

1. One electronic copy of all documents
   a. AutoCAD and PDF all drawings
2. Two bound manuals of all documents.
   a. Operations and Maintenance Manual including start up procedures.
   b. Recommended spare parts.
   c. Written description of the removal and installation procedure and sampling procedure.
   d. Recommended periodic cleaning procedure
3. Proposed schedule of values and project schedule

H. Manufacturing Requirements

1. All equipment supplied by the Seller shall be manufactured in one complete assembly or in sub-assemblies. All assemblies shall be designed and manufactured to enable the largest pieces possible to be shipped to the plant site.
2. All equipment shall be designed and constructed to minimize field welding. Where field welding is required, all joints shall be prepared for welding before shipment.
3. Preparation for shipment. During in-transit time and while pending assembly, the catalyst components will be subject to outdoor exposure in a wide range of ambient conditions. All items shall be preserved, sealed, and packed adequately to keep moisture, dirt and other contaminants out for a minimum of 6 months of field storage and with a preservation durability of one year preferred.
4. Nameplate. A permanently attached corrosion resistant nameplate shall be affixed at a prominent location on the catalyst housing and shall include the following information as a minimum:
   a. Name of Manufacturer
   b. Equipment Type / Name
   c. Manufacturer Model No.
   d. JEA Purchase Order No.
   e. Design Removal Efficiency

2. Work Performed by JEA

a. Supply of limited, temporary electric power (480v 3phase and 120v) and auxiliary air if needed.
b. Lock out tag out of affected systems.
c. I&C support for any instrumentation that may need to be temporarily removed from the site during removal and installation.
d. Identification of plant laydown area. (Approximate size of laydown requirements should be supplied by contractor)

D. DRAWING REFERENCES:

SCR Catalyst Module	SCR Cat 201A008.pdf
Internal Structure General Arrangement	SCR Cat 541M004.pdf
SCR Assembly Diagram	SCR Assembly 201A122.pdf
Spool Duct Casing Ass'y Diagram	SCR Spool Duct 201A120.pdf
Catalyst Support Structure GA	Cat Support 541M006.pdf
Roof Liner Layout	HRSG Roof Liner Layout 201A063.pdf


Cat Support 541M006.pdf

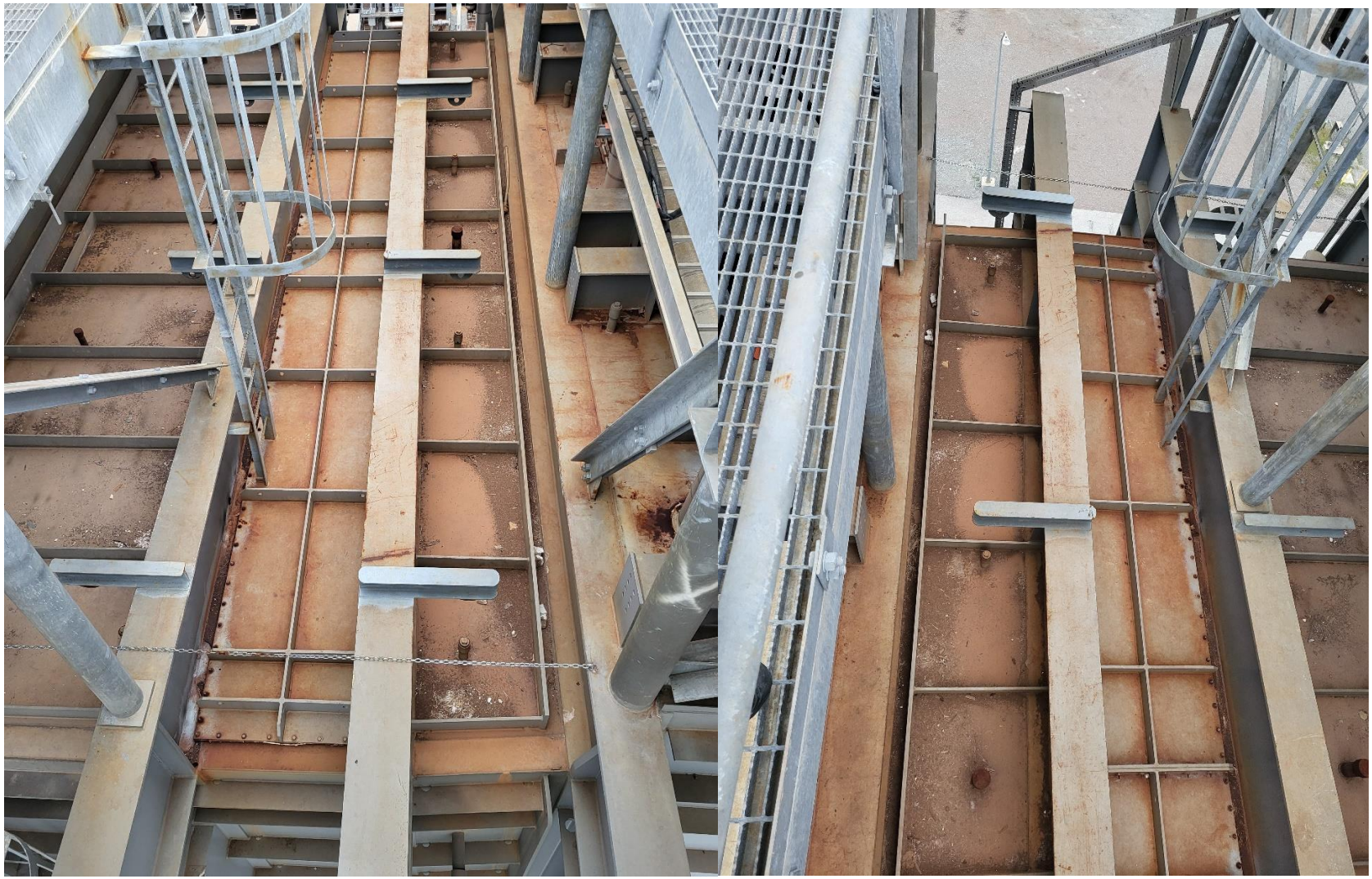

SCR Cat 201A008.pdf


SCR Cat 541M004.pdf


SCR Assembly 201A122.pdf


SCR Spool Duct 201A120.pdf


HRSG Roof Liner Layout 201A063.pdf



Roof access panel. Replace all fasteners on roof access panel


HP FEEDWATER
HP FEEDWATER
IP DOWNCOMER

Appendix A

Catalyst Bid Form: Performance Guarantees

Proposal Description		Low dP	Dual Catalyst Low dP and CO
NOx Conversion Rate[1]	%		
CO Conversion Rate[2]	%		
Ammonia Slip[3]	ppm		
Catalyst Differential Pressure	in H_2O		
Catalyst Activity	%		
Catalyst Activity / Functional Service Life (K_O / K_E)	%		
Catalyst Life, years	years		
Mechanical Service Life of the Catalyst	years		
NH3 Consumption	lb / hr		
Materials Cost	$		
Installation Cost	$		
Total Project Cost	$		

Note – Expected Performance

1. > 90% NOx conversion
2. > 75% CO conversion
3. Ammonia slip < 2 ppm

Appendix A

Requested Catalyst Performance Correction Curves:

After owner selection of option, the following Performance Correction Curves are requested:

1. NOx/CO conversion versus temperature
2. Ammonia slip versus temperature
3. Ammonia slip as a function of inlet NOx and NH3 injection rate
4. SO_2 to SO_3 conversion versus temperature
5. Formation of ammonia sulfur compounds versus SO_3 concentration upstream of the AIG and temperature assuming constant NH3 slip.
6. Estimated removal efficiencies for Non-Methane and Non-Ethane Hydrocarbons versus temperature.
7. NOx/CO Conversion versus hours of operation.
8. One electronic copy of all documents; Two bound manuals of all documents.