AWARDS COMMITTEE
AGENDA

DATE: **Thursday, March 11, 2021**

TIME: **10:00 A.M.**

PLACE: **JEA, Customer Center, Bid Office, 1st Floor, 21 West Church Street, Jacksonville, FL 32202**
OR
WebEx/Teleconference
WebEx Meeting Number (access code): 160 199 4252
WebEx Password: pxP6CqUSt63

Public Comments:

Awards:

1. Approval of the minutes from the last meeting (03/04/2021).

2. **DEFERRED** - Request approval to award a contract increase to Ernst & Young, U.S. LLP for Hurricane Dorian grant consulting services in the amount of $150,000.00, for a new not-to-exceed amount of $325,000.00, subject to the availability of lawfully appropriated funds.

3. Request approval to award a change order to Garney Companies Inc., for the installation of the UV equipment and additional pre-construction services as part of the Southwest Water Reclamation Facility (WRF) Expansion in the amount of $3,206,159.00, for a new not-to-exceed amount of $6,700,300.00, subject to the availability of lawfully appropriated funds.

4. Request approval to award Amendment #7 to General Electric International for repair and upgrades to BBGS CT1 and KGS CT7 in the amount of $22,271,269.00, for the new not-to-exceed amount of $286,718,769.00, subject to the availability of lawfully appropriated funds.

5. 1410256646 – Request approval to award a contract to Armstrong Fence Co. for the construction of the Forest Trail Patrol Road in the amount of $458,480.00, subject to the availability of lawfully appropriated funds.

Informational Items: N/A

Open Discussion: N/A

Public Notice: N/A

General Business: N/A

SPECIAL NOTES: Copies of the above items are available in JEA Procurement, if needed for review. If a person decides to appeal any decision made by the Awards Committee, with respect to any matter considered at this meeting, that person will need a record of the proceedings, and, for such purpose, needs to ensure that a verbatim record of the proceedings is made, which record includes the evidence and testimony upon which the appeal is to be based. If you have a disability that requires reasonable accommodations to participate in the above meeting, please call 665-8625 by 8:30 a.m. the day before the meeting and we will provide reasonable assistance for you.

03-11-2021 Awards Committee

Award #	Type of Award	Business Unit	Estimated/ Budgeted Amount	Amount	Awardee	Term	Summary
1	Minutes	N/A	N/A	N/A	N/A	N/A	Approval of minutes from the 03/04/2021 meeting.
2 - Defer	Defer	Defer	Defer	Defer	Defer	Defer	Defer
3	Contract Amendment	Vu	$3,350,000.00	$3,206,159.00	Garney Companies Inc.	Project Completion (Expected: January 2024)	**Construction Management-at-Risk (CMAR) Services for the Southwest Water Reclamation Facility (WRF) Expansion** Request approval of a contract increase for the installation of previously purchased ultra-violet (UV) treatment equipment at the Southwest WRF.
4	Contract Amendment	Erixton	$22,271,269.00	$22,271,269.00	General Electric International	Term 06/26/2000 through 12/31/2028	**GE Long Term Service Agreement (LTSA) - Amendment 7 – BBGS CT1 and KGS CT7 combustion turbine rotor replacements and upgrades** General Electric International to provide repairs (rotor replacements and upgrades) for Brandy Branch Generating Station unit 1 (BBGS 1) and Kennedy Generating Station unit 7 (KGS 7). As a part of this project, equipment upgrades will be made to improve efficiency and heat rates as identified in the attached proposal. FY21 - $0 FY22 - $8,908,507.60 FY23 - $11,135,634.50 FY24 - $2,227,126.90
5	Invitation for Bid (IFB) 2 Bids	McElroy	$300,000.00	$458,480.00	Armstrong Fence Co.	Project Completion (Estimated Construction Completion: 9/30/2021)	**Buckman Fence Replacement Project** Replace the existing perimeter fence(s) and gate(s) at the Buckman Waste Water Treatment Facility. FY20: $458,480.00
Total Award				$25,935,908.00			

JEA AWARDS COMMITTEE
MARCH 4, 2021 MEETING MINUTES

The JEA procurement Awards Committee met on March 4, 2021, in person with a WebEx option

WebEx Meeting Number (access code): **160 199 4252**
WebEx Password: pxP6CqUSt63

Members in attendance were Jenny McCollum as Chairperson, Laure Whitmer as Budget Representative, Julie Davis as Office of General Counsel Representative; with Joe Orfano, Stephen Datz, Hai Vu, Laura Dutton, and Todd Skinner, as voting Committee Members.

Chair McCollum called the meeting to order at 10:02 a.m., introduced the Awards Committee Members, and confirmed that there was a quorum of the Committee membership present.

Public Comments:
Chair McCollum recognized the public comment speaking period and opened the meeting floor to public comments. No public comments were provided by email, phone or videoconference.

Awards:

1. Approval of the minutes from the last meeting (02/26/2021). Chair McCollum verbally presented the Committee Members the proposed February 26, 2021 minutes contained in the committee packet.

MOTION: Stephen Datz made a motion to approve the February 26, 2021 minutes (Award Item 1). The motion was seconded by Joe Orfano and approved unanimously by the Awards Committee (5-0).

The Committee Members reviewed and discussed the following Awards Items 2-7:

2. Request approval to partially assign the previously awarded Advanced Disposal Services of Jacksonville, LLC for JEA's Recycling, Solid Waste Hauling, and Disposal Services requirements in the amount of $62,000.00 to GFL Solid Waste Southeast, LLC, subject to the availability of lawfully appropriated funds.

MOTION: Hai Vu made a motion to approve Award Item 2 as presented in the committee packet. The motion was seconded by Laura Dutton and approved unanimously by the Awards Committee (5-0).

3. Request approval to award a contract amendment to Williams Industrial Services, Inc. for additional work on the JEA Nassau Regional Water Treatment Plant Wellhead No. 3 and Water Main Improvements Project in the amount of $63,879.69, for a new not-to-exceed amount of $2,048,809.69, subject to the availability of lawfully appropriated funds.

MOTION: Joe Orfano made a motion to approve Award Item 3 with the updates discussed at the meeting. The motion was seconded by Stephen Datz and approved unanimously by the Awards Committee (5-0).

MOTION: Laura Dutton made a motion to approve Award Item 4 as presented in the committee packet. The motion was seconded by Stephen Datz and approved unanimously by the Awards Committee (5-0).

5. 099-20 - Request approval to award contract to Rodriguez Architecture, LLC for Engineering Design for the Fleet Services Operations Building Renovation Design Services in the amount of $169,760.00, subject to lawfully appropriated funds.

   MOTION: Todd Skinner made a motion to approve Award Item 5 as presented in the committee packet. The motion was seconded by Hai Vu and approved unanimously by the Awards Committee (5-0).

6. 1410190446 – Request approval to award a contract to Mechanical Dynamics & Analysis LLC, for steam and combustion turbine maintenance, repair and overhaul services in the amount of $14,000,000.00, subject to the availability of lawfully appropriated funds.

   MOTION: Hai Vu made a motion to approve Award Item 6 as presented in the committee packet. The motion was seconded by Laura Dutton and approved unanimously by the Awards Committee (5-0).

7. Request approval to award a contract amendment to Hazen and Sawyer for additional design and engineering services during construction for the Engineering Services for Nassau Regional Water Reclamation Facility Projects in the amount of $9,630,444.00, for a new not-to-exceed amount of $12,921,851.00, subject to the availability of lawfully appropriated funds.

   MOTION: Hai Vu made a motion to approve Award Item 7 as presented in the committee packet. The motion was seconded by Joe Orfano and approved unanimously by the Awards Committee (5-0).

Informational Item:

No informational items were presented to the Awards Committee.

Ratifications:

Award 3 contained a ratification.

Public Comments:

No additional public comment speaking period was taken.

Adjournment:

Chair McCollum adjourned the meeting at 10:51 a.m.

NOTE: These minutes provide a brief summary only of the Awards Committee meeting. For additional detail regarding the content of these minutes or discussions during the meeting, please review the meeting recording. The recording of this meeting as well as other relevant documents can be found at the link below: https://www.jea.com/About/Procurement/Awards_Meeting_Agendas_and_Minutes/

Approved by the JEA Awards Committee

Date: 03/11/2021 Item# 3

Formal Bid and Award System

Award #3 March 11, 2021

Type of Award Request: CONTRACT AMENDMENT
Requestor Name: Hawk, Thomas C.
Requestor Phone: (904) 665-8829
Project Title: Construction Management-at-Risk (CMAR) Services for the Southwest Water Reclamation Facility (WRF) Expansion
Project Number: 8005555
Project Location: JEA
Funds: Capital
Budget Estimate: $3,350,000.00
Scope of Work:

JEA requests Proposals from interested and qualified Proposers to provide CMAR pre-construction services during design, and construction services for the Southwest WRF Expansion to 16 millions of gallons per day (MGD) project. This project is needed to meet wastewater flow demands in the Southwest services territory.

JEA IFB/RFP/State/City/GSA#: 125-19
CPA# 187261
Purchasing Agent: Kruck, Daniel R.
Is this a Ratification?: NO

RECOMMENDED AWARDEE(S):

Name	Contact Name	Email	Address	Phone	Amount
GARNEY COMPANIES INC.	Dave Hall	dhall@garney.com	133 NW Vivion Road, Kansas City, MO 64118-4554	(407) 877-5912	$3,206,159.00

Amount of Original Award: $704,232.00
Date of Original Award: 12/19/2019
Contract Increase Amount: $3,206,159.00

List of Previous Change Order/Amendments:

CPA #	Amount	Date
187261	$2,789,909.00	08/26/2020

New Not-To-Exceed Amount: $6,700,300.00
Length of Contract/PO Term: Project Completion
Begin Date: 01/03/2020
End Date: Project Completion (Expected: January 2024)
JSEB Requirement: Optional at time of Proposal
Comments on JSEB Requirements:

Most of the JSEB opportunities in the projects scope of work will happen during the final GMP. Each GMP is reviewed to determine an appropriate JSEB goal.

Original Award
N/A

This Contract Increase
N/A

Background/Recommendations:

Originally bid and approved by Awards Committee on 12/19/2019 in the amount of $704,232.00 for pre-construction services to Garney Companies Inc. A contract increase was approved by the Awards Committee on 08/26/2020 for an interim Guaranteed Maximum Price (GMP) of the purchase of the ultra-violet (UV) system. A copy of the previous awards are attached as backup.

Negotiations with Garney Companies Inc. were successfully completed for the installation of the UV disinfection equipment. The negotiated installation cost for the UV equipment of $3,141,330.00 is $133,699.00 less than originally proposed and deemed reasonable. A copy of the installation quote is attached as backup. JEA also requested Garney provide an additional three months of pre-construction services beyond what was agreed upon in the initial award. Attached is the quote for $64,829.00 for the additional pre-construction services, which is deemed reasonable.

JEA negotiated updated hourly rates with Garney, and those updated rates are attached as backup. The updated rates are, on average, 16% less than originally negotiated. This results in a savings of $3,837.60 for the additional pre-construction services. As design progresses for the other aspects of the overall Southwest WRF expansion, additional GMPs will be brought before the Awards Committee.

Date	Description	Amount
12/19/2019	Initial award for pre-construction services	$704,232.00
08/26/2020	Interim GMP for purchase of the UV equipment	$2,789,909.00
03/11/2021	Interim GMP for installation of the UV equipment	$3,141,330.00
03/11/2021	Additional three months of pre-construction services	$64,829.00
	Total Proposed NTE	$6,700,300.00

Request approval to award a change order to Garney Companies Inc., for the installation of the UV equipment and additional pre-construction services as part of the Southwest Water Reclamation Facility (WRF) Expansion in the amount of $3,206,159.00, for a new not-to-exceed amount of $6,700,300.00, subject to the availability of lawfully appropriated funds.

Manager: Collier, Bradley W. - Mgr Project Management
Director: Conner, Sean M. - W/WW Project Engineering & Construction
VP: Vu, Hai X. - VP Water/Wastewater Systems

APPROVALS:

03/11/2021

Chairman, Awards Committee **Date**

3/12/21

Budget Representative **Date**

Approved by the JEA Awards Committee

Date: 08/12/2020 Item# 6

Formal Bid and Award System

Award #6 August 13, 2020

Type of Award Request: CONTRACT INCREASE
Requestor Name: Hawk, Thomas C.
Requestor Phone: (904) 665-8829
Project Title: Construction Management-at-Risk (CMAR) Services for the Southwest Water Reclamation Facility (WRF) Expansion
Project Number: 8005555
Project Location: JEA
Funds: Capital
Budget Estimate: $3,166,057.00
Scope of Work:

JEA requests Proposals from interested and qualified Proposers to provide CMAR pre-construction services during design, and construction services for the Southwest WRF Expansion to 16 millions of gallons per day (MGD) project. This project is needed to meet wastewater flow demands in the Southwest services territory.

JEA IFB/RFP/State/City/GSA#: 125-19
CPA# 187260
Purchasing Agent: Kruck, Daniel R.
Is this a Ratification?: NO

RECOMMENDED AWARDEE(S):

Name	Contact Name	Email	Address	Phone	Amount
GARNEY COMPANIES INC.	Dave Hall	dhall@garney.com	133 NW Vivion Road, Kansas City, MO 64118-4554	(407) 877-5912	$2,789,909.00

Amount of Original Award: $704,232.00
Date of Original Award: 12/19/2019
Contract Increase Amount: $2,789,909.00
New Not-To-Exceed Amount: $3,494,141.00
Length of Contract/PO Term: Project Completion
Begin Date (mm/dd/yyyy): 01/03/2020
End Date (mm/dd/yyyy): Project Completion (Expected: January 2024)
JSEB Requirement: Optional
Comments on JSEB Requirements:

Original Award
N/A

This Contract Increase
N/A

Background/Recommendations:

Originally bid and approved by Awards Committee on 12/19/2019 in the amount of $704,232.00 for pre-construction services to Garney Companies Inc. A copy of the original award is attached as backup.

Negotiations with Garney Companies Inc. were successfully completed for the ultra-violet (UV) disinfection equipment procurement. Design for the UV system is not yet at the 60% design stage, however, due to the long lead time for UV disinfection equipment JEA requested an early guaranteed maximum price (GMP) for the equipment once the equipment was selected. The installation of the UV equipment will be included in a future GMP amendment once the design has progressed. The negotiated price of $2,789,909.00 is approximately 11.9% below the estimate due to negotiations between Garney Companies Inc. and the equipment supplier and deemed reasonable. A copy of the quote is attached as backup. As design progresses for the other aspects of the overall Southwest WRF expansion, additional GMPs will be brought before the Awards Committee.

The contract increase spend details are below:

- FY21: $2,789,909.00

Request approval to award a change order to Garney Companies Inc., for the purchase of the UV equipment as part of the Southwest Water Reclamation Facility (WRF) Expansion in the amount of $2,789,909.00, for a new not-to-exceed amount of $3,494,141.00, subject to the availability of lawfully appropriated funds.

Manager:	Collier, Bradley W. - Mgr Project Management
Director:	Conner, Sean – W/WW Project Engineering & Construction
Chief:	Vu, Hai – Interim GM Water/Wastewater Systems

APPROVALS:

08/13/2020

Chairman, Awards Committee **Date**

8/17/2020

Budget Representative **Date**

Approved by the JEA Awards Committee

Date: 12/19/2019 Item# 3

Formal Bid and Award System

Award #3 December 19, 2019

Type of Award Request:	PROPOSAL (RFP)
Request #:	6669
Requestor Name:	Hawk, Thomas C.
Requestor Phone:	(904) 665-8829
Project Title:	Construction Management-at-Risk (CMAR) Services for the Southwest Water Reclamation Facility (WRF) Expansion - Phase 1
Project Number:	8005555
Project Location:	JEA
Funds:	Capital
Budget Estimate:	$846,990.00 (Phase 1 Estimate)

Scope of Work:

JEA requests Proposals from interested and qualified Proposers to provide CMAR pre-construction services during design, and construction services for the Southwest WRF Expansion to 18 millions of gallons per day (MGD) project. This project is needed to meet wastewater flow demands in the Southwest services territory.

This award positively impacts all of JEA's Measures of Value:

- Customer Value: Improve customer's service by providing additional capacity and reliable operation
- Community Value: Provide additional capacity and redundancy to meet existing and future growth in the service area
- Environmental Value: Provide high level treatment of wastewater to produce a high quality and consistent effluent for discharge to the St. Johns River while meeting the most current resiliency requirements
- Financial Value: Will provide the most energy efficient process equipment and upgrades to improve operations and reduce energy requirements

JEA IFB/RFP/State/City/GSA#:	125-19
Purchasing Agent:	Kruck, Daniel R.
Is this a Ratification?:	NO

RECOMMENDED AWARDEE(S):

Name	Contact Name	Email	Address	Phone	Amount
GARNEY COMPANIES INC.	Dave Hall	dhall @garney.com	133 NW Vivion Road, Kansas City, MO 64118-4554	(407) 877-5912	$704,232.00

Amount for entire term of Contract/PO:	$704,232.00
Award Amount for remainder of this FY:	$704,232.00
Length of Contract/PO Term:	Project Completion
Begin Date (mm/dd/yyyy):	01/03/2020
End Date (mm/dd/yyyy):	Project Completion (Expected: March 2023)
JSEB Requirement:	Optional for Phase 1
Comments on JSEB Requirements:	

No JSEB participation in Phase 1. Contractor will meet JSEB goals during Phase 2.

PROPOSERS:

Name	Amount	Rank
GARNEY COMPANIES INC.	$704,232.00	1
WHARTON-SMITH, INC.	N/A	2
BRASFIELD & GORRIE, LLC	N/A	3
THE HASKELL COMPANY	N/A	4
CLARK CONSTRUCTION GROUP, LLC	N/A	5
PC CONSTRUCTION COMPANY	N/A	6
ULLIMAN SCHUTTE CONSTRUCTION LLC	N/A	7

Background/Recommendations:

Advertised on 07/25/2019. Nine (9) prime companies attended the mandatory pre-proposal meeting held on 05/30/2019. At proposal opening on 08/27/2019, JEA received seven (7) Proposals. The public evaluation meeting was held on 09/25/2019 and JEA deemed Garney Companies Inc. most qualified to perform the work. A copy of the evaluation matrix and negotiated fees are attached as backup.

Negotiations with Garney Companies Inc. were successfully completed for Phase 1 of this project. Phase 1 consists of developing the project schedule, design and constructability reviews, developing work packages, value engineering and developing the Guaranteed Maximum Price (GMP). These preconstruction costs are 1% of the estimated total construction costs and deemed reasonable (typically 0.5% - 3% of total construction costs). If negotiations for the final GMP are not successful, JEA reserves the right not to proceed with construction with this contractor. The contractor reviewed the 10% design estimate and deemed it reasonable for this project.

The project details are below:

- Planning Project Budget: $65,501,000.00
  - Engineering Budget: $5,647,000.00
  - Construction Budget: $56,466,000.00
  - Internal JEA Costs: $3,388,000.00
- Revised Project Budget (10% Design): $77,035,660.00
  - Engineering Budget (CDM Smith): $8,321,810.00
    - Phase 1: $732,210.00
    - Phase 2: $7,589,600.00
  - Construction Budget (Garney Companies): $65,586,178.00
    - **Phase 1: $704,232.00 (this award)**
    - Phase 2: $64,881,946.00
  - Internal JEA Costs: $3,127,672
- Original Project Schedule:
  - Engineering Completion: August 2020
  - Construction Completion: May 2023
- Revised Schedule:
  - Engineering Completion: December 2020
  - Construction Completion: October 2023

Major Changes/Issues

The original construction estimate of $65.5M was derived from the project definition that only accounted for treatment process expansion. Upon project steering committee review, additional scope was added to the project (listed below). The scope addition and subsequent engineering and indirect costs were the cause for the budget increase to $77M. This estimate is the engineer's opinion of probable construction cost at 10% design. Once the CMAR contract is awarded, they will be responsible for providing construction estimates at 30% and 60% design leading up to a GMP.

Additional Southwest WRF Projects

1. New Electrical Building #1 - $588,804: Preliminary design indicated that a new electrical building would be more economical than replacing/upgrading current electrical system
2. Additional Instrumentation and Control - $1,855,922: Preliminary design indicated that it is more economical to replace existing plant controls using a fiber optic loop rather than patch together new controls with existing
3. New Administration Building - $4,867,028: Originally planned for rehabilitation by facilities and transferred to this project per facilities request. It was determined that it would be a larger added value to build new buildings rather than rehab the existing due to space limitations.
4. New Workshop Building - $1,740,478: Originally planned for rehabilitation by facilities and transferred to this project per facilities request. It was determined that it would be a larger added value to build new buildings rather than rehab the existing due to space limitations.

A breakdown of the increases in costs is shown below.

Construction Costs:	$9,052,232
Engineering Costs:	$1,457,409
Total Increases:	$10,509,641

125-19 – Request approval to award a contract to Garney Companies Inc., for pre-construction services for the Southwest Water Reclamation Facility Expansion to 18 MGD project in the amount of $704,232.00, subject to the availability of lawfully appropriated funds.

Manager: Collier, Bradley W. - Mgr Project Management
Director: Conner, Sean M. – Dir W/WW Project Engineering & Construction
VP: Calhoun, Deryle I. - VP/GM Water Wastewater Systems

APPROVALS:

J Beard 12/19/19

Chairman, Awards Committee **Date**

Kristina Quast 12/19/19

Manager, Operating Budgets **Date**

SOUTHWEST WATER RECLAMATION FACILITY

JEA

GMP #1- Purchase UV Equipment

Garney Companies, Inc.

370 E. Crown Point Road
Winter Garden, FL 34787

407.395.7616 Direct
wdooley@garney.com

Cover Letter

Garney Construction (Garney) is pleased to provide the proposal for GMP services. Garney has requested bids for the equipment package included and compiled a guaranteed maximum price for all work associated with the JEA Southwest Ultraviolet Disinfection System Replacement. Accordingly, Garney offers the following Guaranteed Maximum Price (GMP) for the work described by the bid documents, and otherwise described by the Agreement.

Purchase UV Disinfection System For the Guaranteed Maximum Price of $2,789,909.00

Garney has included an Owner's Contingency for GMP-1 in the amount of $100,000.00, which includes allowances for the items listed below.

a. Electrical Allowance $100,000.00

GMP-1 includes cost for performance and payment bonds, insurance, general conditions, construction administration costs, and construction management fee.

Garney will serve as the CMAR, furnishing construction administration and management services and will use the CMAR efforts to perform the Work in accordance with the Contract Documents.

The Work is generally described as furnish UV Disinfection; A more detailed summary of work is described in Section 1.

This proposal is based on a Notice to Proceed date of December 2, 2020.

Should you have any question, comment, or wish to discuss any of the above in greater detail, please feel free to contact us immediately.

PROJECT NAME: JEA SOUTHWEST EXPANSION

GMP-1 WORK		CURRENT BUDGET
G1-010	Purchase UV Disinfection System with Siemens PLC	2,439,600
	SUBTOTAL COSTS	2,439,600

GMP-1 ALLOWANCES, CONTINGENCIES, VE		CURRENT BUDGET
	Electrical Allowance	100,000
INDIRECT COSTS GMP-1		
1.250%	CMAR Bond & Insurance	31,745
8.50%	Construction Fee	218,564
GMP-1 TOTAL		**2,789,909**

PROJECT NAME: JEA SOUTHWEST EXPANSION

GMP.2 - UV SYSTEM INSTALLATION		GMP.2 VALUES
2.1	MOBILIZATION & UV GCS (12 MOS)	880,879
2.2	UV DEMO, CONC, INSTALLATION	1,169,597
2.3	UV ELECTRICAL BID PACKAGE	379,200
2.4	UV I&C / SCADA BID PACKAGE	93,878
	SUBTOTAL DIRECT COSTS	**2,523,554**
	CMAR CONTINGENCY (SEE RISK REGISTER)	15,000
	SUBTOTAL DIRECT COSTS w/ CONTINGENCY	**2,538,554**
	INDIRECT COSTS	
1.25%	CMAR BONDS & INSURANCE	31,732
8.50%	CONSTRUCTION FEE	215,777
GMP.2 TOTAL		**2,786,064**
	UV PERMIT ALLOWANCE	NOT REQ'D PER COJ
	UV TESTING ALLOWANCE	5,000
	UV CONCRETE REPAIR ALLOWANCE	50,000
	JEA RISK ALLOCATION	300,266
TOTAL UV SYSTEM INSTALLATION		**3,141,330**

370 E Crown Point Rd | Winter Garden, FL | 34787
Phone: (407) 877-5903
www.garney.com

August 10, 2020
Transmitted via email to hawktc@jea.com

JEA
21 West Church Street, T-4
Jacksonville, FL 32202

Attn: Thomas C. Hawk, P.E., Project Engineer

Re: Southwest WRF Expansion Project
JEA Southwest 125-19 Change Order Request 01

Mr. Hawk,

Please be advised that Garney is submitting this change request for extended preconstruction services for JEA Project 125-19 Southwest WRF Expansion.

As discussed, the three months of extended General Conditions is due to rescoping the 30% Project Design which has impacted Final 30% Design and GMP-2 anticipated construction start date.

Please do not hesitate to contact me if you have any further questions or need further information.

Sincerely,
GARNEY COMPANIES, INC.

Wes Dooley
Project Manager
wdooley@garney.com

0585 JEA SOUTHWEST WRF EXPANSION PROJECT

COR-001 PRECONSTRUCTION EXTENSION REQUEST

Comments	Description	Quantity	Unit	Total MH	MH/U	Labor		Materials		Subcontract		Equipment		Other		Total
						Unit	Total	Unit	Total	Unit	Total	Unit	Total	Unit	Total	Cost
	PRECONSTRUCTION STAFF															
	30% DESIGN REVIEW ACTIVITIES															-
	SR PROJECT MANAGER	-	MOS	-	1.00	143.30	0		0		0		0		0	-
	SR SUPERINTENDENT	-	MOS	-	1.00	139.78	0		0		0		0		0	-
	PROJECT MANAGER	3.0	MOS	520.0	173.33	116.02	60,329		0		0	450.00	1,350	1,050.00	3,150	64,829
	ASST PROJECT MANAGER	-	MOS	-	1.00	93.42	0		0		0		0		0	-
	SUPERINTENDENT	-	MOS	-	1.00	117.02	0		0		0		0		0	-
	ASST SUPERINTENDENT	-	MOS	-	1.00	88.93	0		0		0		0		0	-
	PROJECT ENGINEER	-	MOS	-	1.00	78.93	0		0		0		0		0	-
	FIELD ENGINEER	-	MOS	-	1.00	79.94	0		0		0		0		0	-
																-
	SUBTOTAL			**520**			**60,329**		**-**		**-**		**1,350**		**3,150**	**64,829**
	PROJECT FEE @ 8.5%	-	%				-		-		-		-		-	-
	BOND						-		-		-		-		-	-
	TOTAL PRECONSTRUCTION			**520**			**60,329**		**-**		**-**		**1,350**		**3,150**	**64,829**

JEA SOUTHWEST WRF EXPANSION
GARNEY CONSTRUCTION PROJECT NO 0585
CMAR RATES

SALARY LABOR

Project Classification	Hourly Rate
Sr. Project Manager	$ 143.30
Project Manager	$ 116.02
Asst Project Manager	$ 93.42
Project Engineer	$ 78.93
Sr. Superintendent	$ 139.78
Superintendent	$ 117.02
Assist. Superintendent	$ 88.93
Field Engineer	$ 79.94
Clerk / Secretary (Jobsite)	$ 38.70

CRAFT LABOR

Project Classification	Hourly Rate	Hourly OT Rate
Foreman (Job Foreman)	$ 68.16	$ 89.40
Carpenter	$ 45.26	$ 60.00
Concrete Finisher	$ 48.37	$ 64.50
Pipe Fitter	$ 41.59	$ 55.20
Laborer	$ 37.41	$ 57.00
Ironworker	$ 54.82	$ 71.60
Crane Operator	$ 64.96	$ 84.80
Equipment Operator	$ 49.93	$ 65.60

Approved by the JEA Awards Committee

Date: 03/11/2021 Item# 4

Formal Bid and Award System

Award #4 March 11, 2021

Type of Award Request: CONTRACT AMENDMENT
Requestor Name: Gillean, Keith
Requestor Phone: (904) 665-6332
Project Title: GE Long Term Service Agreement (LTSA) - Amendment 7 – BBGS CT1 and KGS CT7 combustion turbine rotor replacements and upgrades
Project Number: 069-07 - KGS CT7, 066-42 BBGS CT1
Project Location: JEA
Funds: Capital
Budget Estimate: $22,271,269.00
Scope of Work:

This request covers Amendment #7 which has been negotiated with General Electric International to provide repairs (rotor replacements and upgrades) for Brandy Branch Generating Station Unit 1 (BBGS 1) and Kennedy Generating Station Unit 7 (KGS 7). As a part of this project, equipment upgrades will be made to improve efficiency and heat rates as identified in the attached proposal. The terms and conditions of contract 19084 will be govern the agreement and upgrade project.

JEA IFB/RFP/State/City/GSA#: CPA 19084
Purchasing Agent: Lovgren, Rodney Dennis
Is this a Ratification?: NO
RECOMMENDED AWARDEE(S):

Name	Contact Name	Address	Phone	Amount
GENERAL ELECTRIC INTERNATIONAL	Creston Dempsey	4200 Wildwood Pkwy. Atlanta GA 30339	(770) 480 4009	$22,271,269.00

Amount of Original Award: $45,700,000.00
Date of Original Award: 06/26/2000
Change Order Amount: $22,271,269.00
List of Previous Change Order/Amendments:

CPA #	Amount	Date
19084	$54,200,000.00	12/30/2003
19084	$60,000,000.00	12/28/2009
19084	$30,100,000.00	12/31/2014
19084	$74,447,500.00	12/21/2017

New Not-To-Exceed Amount: $286,718,769.00
Begin Date (mm/dd/yyyy): 06/26/2000
End Date (mm/dd/yyyy): 12/31/2028

JSEB Requirement: N/A

Background/Recommendations:

Since 06/26/2000, JEA has had a Long Term Parts and Service Agreement (LTSA) for the GE Combustion Turbines located at Brandy Branch Generating Station, Kennedy Generating Station and Greenland Energy Center. Subsequent to the initial agreement, six (6) amendments have been approved for the GE LTSA bringing the contract total indebtedness to $264,447,500.00. The latest amendment associated award that were approved by the awards committee are attached as back-up.

The Kennedy CT7 unit is a peaking gas turbine that was placed in service in 2000. It is a starts based unit which means after 900 fired starts the unit is required to undergo major maintenance to overhaul (referred to as a Hot Gas Path or HGP Inspection). Historically this unit has only had 50 – 100 starts a year making the time between outages in the 10 – 12 year range. At the retirement of SJRPP, the simple cycle units (Kennedy 7 & 8, Brandy Branch 1, Greenland 1&2) all saw an increase in number of starts per year as they were called on for load to replace what was formerly supplied by the Power Park. The increase in starts has moved the original outage dates for all units up in time such that CT7 is now scheduled for an outage in the fall of next year or even earlier depending on how many more starts it has. The increase in starts moved the GEC units up by 5 years for outages. This has severely compressed planning for outage work.

CT7 and BB1 both have a compressor design referred to the flat slot bottom which results in cracking of compressor wheels over time and is aggravated by starts on the unit. CT7 and BB1 are both being limited by the OEM on the remaining number of starts the solution of which is to replace the compressor wheels. This can be resolved either by sending the gas turbines back to the factory for repair (~3 – 4 month process) or replacing them with another unit (no time delay during outages – just an exchange). JEA has selected the replacement option.

The designs for the compressors for CT7 and BB1 are referred to as “unflared” rotors. In the time between delivery of BB1 and the remaining units we own, GE upgraded the design to a “flared” rotor which refers to the size of the inlet to the compressor – more air means more megawatts so with a straightforward design change GE could increase the unit output. The remainder of the JEA fleet are flared units and as such, JEA is electing to convert CT7 and BB1 to flared units for standardization across the fleet as well as added output.

JEA discussed with the OEM – GE and several other companies different options including 1) exchanges of JEA units with other rotors that had been upgraded, 2) exchange with a like kind unflared rotor, and 3) exchange with a flared rotor, as well as several other options.

JEA has elected to initiate this repair and upgrade as a change order with the OEM to the existing LTSA for the follow reasons:

1.) GE has experience in performing this type of upgrade project, whereas other companies either have not completed a flared unit conversion or do not have access to components.
2.) Buying the equipment from GE and using another company to perform the installation would present more risks in project execution and warranty coverage.
3.) Using the existing LTSA will allow application of the same terms and conditions applied to all units.
4.) The subject units are currently covered in the LTSA for the inspection cycles.

JEA has negotiated pricing for BBGS CT1 and KGS CT7 for rotor repairs and various upgrades as follows:

New unit rotor cycle time is 18-24 months due to current material shortages.

- Combined Units (BBGS and KGS) equipment Price - $21,653,715.00
- BBGS CT 1 – Installation price at Major Outage - $308,777.00
- KGS CT 1 – Installation price at Major Outage - $308,777.00

Based on JEA evaluation of the purchase of direct replacement refurbished rotors to used and new equipment, and when comparing installation price to that of existing contract and other recent repair contract pricing the pricing is deemed to be reasonable.

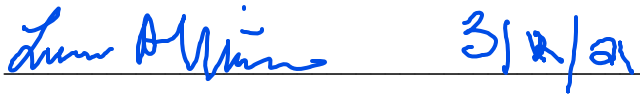
Request approval to award Amendment #7 to General Electric International for repair and upgrades to BBGS CT1 and KGS CT7 in the amount of $22,271,269.00, for the new not-to-exceed amount of $286,718,769.00, subject to the availability of lawfully appropriated funds.

Manager: Akrayi, Jamila R. - Mgr Project Manage
Director: Limbaugh, Margaret Z. - Dir Energy Project
Sr. Direct: Acs, Gabor - Sr Dir Engineering & Projects
VP: Erixton, Ricky – VP Electric Systems

APPROVALS:

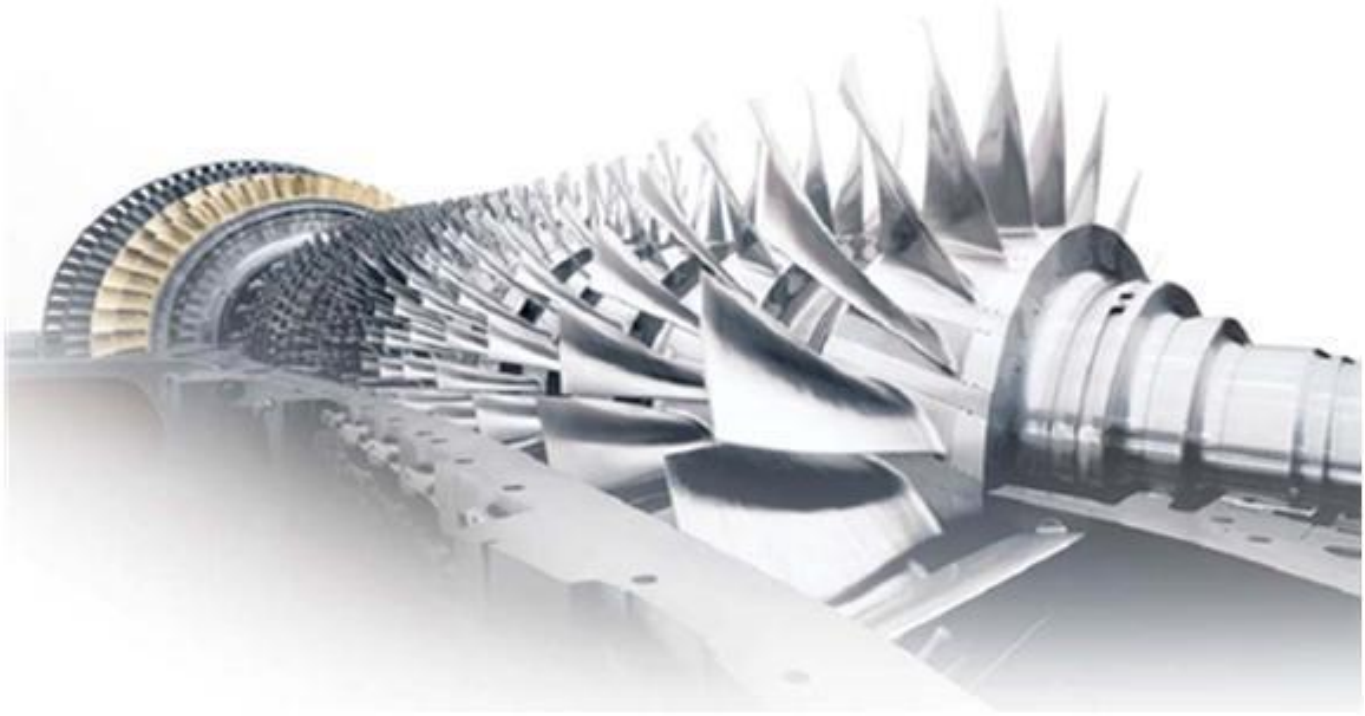
03/11/2021

Chairman, Awards Committee **Date**



Budget Representative **Date**

Customer	**Jacksonville Electric Authority**
Customer Site	Brandy Branch, J Dillon Kennedy Generating Station
Unit Serial #	297378, 297188
For	**7FA.03 Unit Rotor Replacement Options**



General Electric International, Inc.
Proposal: 1543332 Rev. 3
Proposal Date: February 12th , 2021
Account Manager: Creston Dempsey

Executive Summary

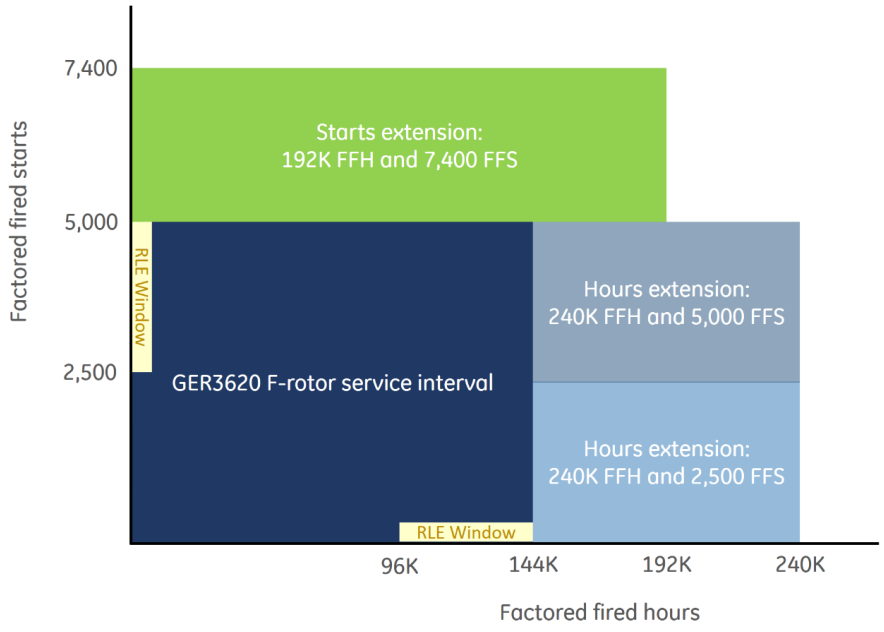
GE Gas Power - Power Services, hereafter referred to as GE, is pleased to submit this proposal to JEA, hereafter referred to as JEA, required to provide rotor replacement options for Brandy Branch GT serial number 297378 and J Dillon Kennedy Generating Station GT serial number 297188.

Given that it has not been defined the sequence in which these units will receive the replacement rotor, this technical proposal has been configurated to cover both scenarios. That said, this proposal includes the following two mutually-exclusive main options:

1. Flared unit rotor spool along with the necessary flared-enhanced compressor upgrade, which includes the enhanced compressor package 3. Furthermore, the following upgrades can be chosen along with this option:
    a. Shimless S9 thru S13 stator vanes
    b. Enhanced aft stator modification, which would result in flared enhanced compressor package 5
    c. Shrouded S17 stator vanes and EGVs

Furthermore, both options above also treat the implementation of a starts-based rotor life extension (and flared conversion for option 2) on the rotor coming out from the first gas turbine (which would receive either a brand-new or a refurbished unit rotor spool). Once upgraded and life extended, that rotor would be used as seed rotor for the second gas turbine.

The proposed rotor life extension solution is an inspection and rebuild program that targets the repair and replacement of individual components —after a full disassembly and inspection protocol— to extend the life of a heavy-duty gas turbine (HDGT) rotor by specified hours and starts beyond the published rotor life limits per GER 3620.



Customer Value

Benefits

The benefits resulting from the installation of a new unit rotor spool along with the flared-enhanced compressor upgrade are:

- Increased output
- Increased efficiency (i.e. – improved heat rate)
- Improved damage tolerance / robustness
- Reduced inspection requirements (e.g. - R0 erosion checks, stator vane, inspections)
- Increased reliability / availability.

Additionally, the benefit of the high-output stage 0 upgrade, which is quoted as optional herein, is increased output (as shown in Performance Effects section), while maintaining the features of the standard enhanced compressor hardware for improved reliability/availability.

The Rotor Life Extension solution is a cost-effective way to improve long-term reliability while continuing to realize operational value, when other options (such as purchasing a refurbished or new rotor) may not make economic sense. This program, based on OEM's field experience and accumulated knowledge, creates a customized solution for gas turbine rotor assets that allows for extended operation of one or more additional maintenance intervals for minimal capital cost at OEM-accepted risk levels.

Please refer to Appendix for more details on the improvements incorporated to current-production rotors.

Performance Effects

flared-enhanced compressor upgrade will result in an important output increase and heat rate reduction.

Flared upgrade GT performance impact	
Output	Heat rate
+ 2.71%	– 0.72%

Additionally, the performance effects of the high-output stage 0 (included as an option for the flared upgrade) are listed below, having as baseline the enhanced compressor package 3 at 86-degree IGV angle.

High-Output GT output increase	
84-degree IGV angle	88-degree IGV angle
+ 1.00%	+ 1.50%

ALL the above estimated generic figures assume ISO conditions (standard sea level pressure of 14.7 psi, 59 °F, and 60% relative humidity), new and clean condition, and natural gas fuel.

Maintenance Effects

The compressor upgrade treated herein has no impact by itself on the maintenance practices; therefore, the information outlined in GE publication GER-35620N applies. However, the following table lists the maintenance effects of the flared-enhanced compressor hardware on compressor-related Technical Information Letters (TILs).

TIL number	TIL title	Affected parts	Requirements for pre-enhanced parts	Requirements for enhanced parts
1603	R0 EROSION AND WATER INGESTION RECOMMENDATIONS	R0 blades	Leading edge (LE) mold inspection according to the formula in the TIL	R0 LE molds are not required for enhanced R0s
1638	F-CLASS R0/R1 PLATFORM ULTRASONIC TESTING	R0 and R1 blades	R0 and R1 ultrasonic (UT) inspections	UT Inspections are not required for enhanced R0s or enhanced R1s
1509-R3	F-CLASS FRONT-END (R0, S0, AND R1) COMPRESSOR INSPECTIONS	R0 and R1 blades, S0 vanes	R0 and R1 tip inspections, S0 trailing edge inspections, R0 root inspections	Only annual borescope inspections are required for compressors with enhanced R0, S0, and R1 airfoils.
1562-R1	HEAVY-DUTY GAS TURBINE SHIM MIGRATION AND LOSS	Stator Vanes	Shim migration inspection	The enhanced compressor stator vanes (Stages 0-8, 14-16) do not require shims. However, GE recommends shim pinning for the remaining stator vanes stages.
1769	STATOR ROCKING INSPECTION	S14-S16 vanes on FA.02 and FA.03 units only	Aft stator rocking borescope inspections (BIs)	Aft stator BIs are not required for enhanced S14-S16 stator vanes.

Notes:

I. The recommended inspections for current-production turbine rotor wheels are reduced with regards to the wheels in the existing rotors, as outlined in TILs 1945 and 1937

II. Borescope Inspections are completely removed upon implementation of the enhanced big-foot stator vanes. On the other hand, although annual inspections per TIL 1769 are removed upon implementation of enhanced little-foot stator vanes, a re-inspection interval of 64,000 hours is recommended for the following two scenarios:

   a. Implementation on gas turbines equipped with compressor rotor that incorporates random clocking for stages 14 thru 16

   b. Implementation on gas turbines equipped with compressor rotor that incorporates optimized clocking for stages 14 thru 16, and where the post-installation rocking is greater than 30 mils.

Additional Equipment Considerations

The compatibility and performance of the proposed enhancements is conditioned upon the assumption that all parts and control settings in and relating to the covered Gas Turbine/Generator units are consistent with the most current GE Authorized specifications, standards and settings, including without limitation implementation of all TILs. GE makes no warranty or guarantee, whether express, implied or otherwise, including any implied warranties of merchantability or fitness for purpose, regarding the compatibility or performance of enhancements in units where non-GE parts and/or repair services have been installed or utilized or the unit has not been updated to reflect the most current specifications, standards and settings. In such events, additional parts and/or services may be required and are not included in this proposal.

Site Information

In order to properly accommodate the engineering of this proposed modification, the following items must be provided from site:

- PEECC space availability for the addition of a controls auxiliary panel (If required)
- Confirmation of part numbers and serial numbers of current compressor and turbine rotor sections, as well as the pedigree (factored fired hours and factored fired starts)
- HMI operating Software (Windows Version)
- All HMI Screens
- Current device summary diagram
- As-running controls specifications
- Current connection diagram

Section I: Scope

Scope of Supply

Option 1: Replacement unit rotor spool upgrading to FLARED-ENHANCED compressor configuration

1.1 Installation of flared-enhanced unit rotor spool into the first gas turbine

This option treats the installation of a flared-enhanced unit rotor spool, which requires the upgrade of the target gas turbine to flared compressor configuration

Casings and related items

- Flared inlet casing (including the lube-oil feed pipe spool)
- No. 1 bearing housing (integral to inlet casing)
- Flared mid compressor casing (MCC)
- Turbine base to inlet casing vertical bolting
- Inlet casing to MCC vertical bolting
- MCC to CDC vertical bolting
- No.1 bearing hardware (including TIL 1582-R2)
- No.1 bearing instrumentation hardware to fit the new bearing cap. *Only required if the existing hardware does not fit the new casing or if gets damaged during removal.*
- Replacement thrust shims (forward and aft)
- Removal of discourager seal from the exhaust frame

Rotor and related items

- Brand-new or refurbished flared fully-enhanced unit rotor spool (with enhanced standard or enhanced high-output R0 compressor blades)

Stator and related items

- Flared-enhanced inlet guide vanes (IGVs and installation hardware)
- Flared-enhanced stator vanes for stages S0 thru S5 and installation hardware such as stator keys and S5 load dams (with either enhanced standard or enhanced high-output S0 compressor vanes)

Accessories and related items

- IGV actuator with a new stroke to meet the new open & closed position requirements of the new flared-enhanced inlet guide vanes. IGV stop blocks need to be modified to accommodate new range of travel. IGV actuator replacement may require additional piping modification of the hydraulic, trip, and supply circuits.
- On-line water wash system upgrade to Gen-IIAO (aka Gen-III)
- Compressor bleed valves (CBVs) modification/replacement to meet TIL 1416 option 3 that is a requirement for the STARSS software [ONLY required for GT 297378]

Control software and related items

- After evaluation of the system, at a minimum the control software will be updated to incorporate the following. Evaluation may result in need to additional I/O and/or the upgrade to Mark VIe when the current system is Mark VI or Mark V.
    - Software modifications to upload the Optimum Start, also known as Strategic Anti-Rotating Stall Schedule (STARSS)
    - STARSS software update for high-output stage 0 [ONLY if such configuration is chosen]
    - Software modifications per TIL 1416 option 3 [ONLY required for GT 297378]
    - Control curve modification
    - Compressor operating limit line (OLL) change

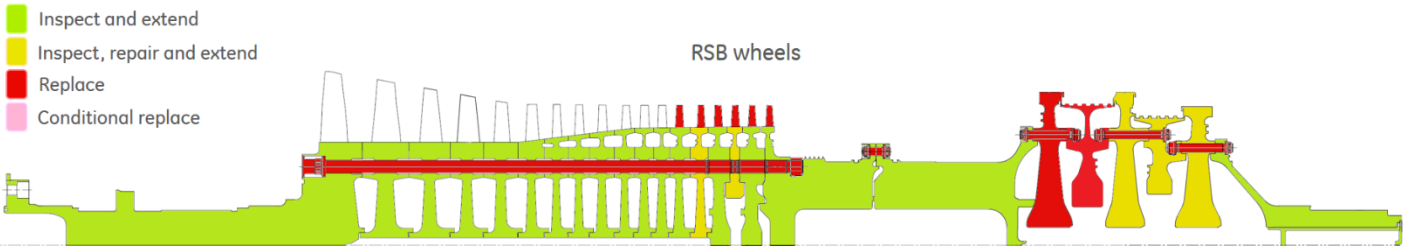
Optional

- No.1 bearing liner
- Thrust bearing (both active and inactive bearings)
- Remaining stator vanes, as desired
    - Enhanced S6 thru S8 compressor stator vanes
    - Shimless S9 thru S13 compressor stator vanes
    - Enhanced S14 thru S16 compressor stator vanes (aka enhanced aft stator modification). Either little foot or big foot
    - Upgrade to shrouded S17 thru EGV compressor stator vanes

1.2 Implementation of rotor life extension (RLE) on the rotor coming out from the first gas turbine

This option treats the implementation of starts-based extension to 7,400 TOTAL factored fired starts (limited to 192,000 TOTAL factored fired hours), along with full compressor reblade that includes the upgrade to flared fully-enhanced configuration.

Rotor and related items



Compressor Section:

- Mandatory replacement: R12 thru R17 blades, CW12 thru CAS, compressor rotor bolting
- Mandatory repair: None.

  However, **IF** the new wheels do not incorporate the enhanced geometry, CW13 forward rabbet fillet modification and CW15 recessed fillet modification are mandatory repairs
- Available conditional repair *(as needed)*: None

Turbine Section

- Mandatory replacement: TW1, TW2 and stage 1 thru 3 subassembly bolting
- Mandatory replacement: 1-2SP.
- Mandatory repair: TW3 bolt-hole modification, 2-3SP forward bolt-hole modification, and 1-2SP spacer nut-groove modification
- Available conditional repair *(as needed)*: TW3 aft rabbet fillet modification

Unit Rotor

- Mandatory replacement: unit rotor marriage hardware

Additionally, this option includes the upgrade to flared-enhanced for the front stages, and enhanced for the middle stages of the compressor section, which that are not covered by the RLE scope:

- Flared enhanced compressor blades for stage R0 (either standard or high-output design)
- Flared enhanced compressor blades for stages R1 thru R5
- Enhanced compressor blades for stage s R6 thru R8
- Replacement-in-kind compressor blades for stages R9 thru R11

The following hardware has been included as contingency just in case of, during rebuild activities, the inspections reveal the need for retiring one or more of these components from service.

- Compressor forward stub shaft (FSS) [mandatory for GT 297188]

- Stage 1 compressor wheel (CW1) [mandatory for GT 297188]
- Stage 2 compressor wheel (CW2) [mandatory for GT 297188]
- Stage 3 turbine wheel (TW3)
- Turbine aft plug and plate
- Turbine aft shaft journal sleeve
- Distance-piece patch ring

1.3 Installation of life-extended (RLE'd) flared-enhanced unit rotor spool into the second gas turbine

This option treats the installation of the flared-enhanced unit rotor spool that was removed from first unit and then rebuilt and life-extended. Bear in mind that its installation requires the upgrade of the target gas turbine to flared compressor configuration

Casings and related items

- Flared inlet casing (including the lube-oil feed pipe spool)
- No. 1 bearing housing (integral to inlet casing)
- Flared mid compressor casing (MCC)
- Turbine base to inlet casing vertical bolting
- Inlet casing to MCC vertical bolting
- MCC to CDC vertical bolting
- No.1 bearing hardware (including TIL 1582-R2)
- No.1 bearing instrumentation hardware to fit the new bearing cap. *Only required if the existing hardware does not fit the new casing or if gets damaged during removal.*
- Replacement thrust shims (forward and aft)
- Removal of discourager seal from the exhaust frame

Rotor and related items

- Brand-new or refurbished flared fully-enhanced unit rotor spool (with enhanced standard or enhanced high-output R0 compressor blades)

Stator and related items

- Flared-enhanced inlet guide vanes (IGVs and installation hardware)
- Flared-enhanced stator vanes for stages S0 thru S5 and installation hardware such as stator keys and S5 load dams (with either enhanced standard or enhanced high-output S0 compressor vanes)

Accessories and related items

- IGV actuator with a new stroke to meet the new open & closed position requirements of the new flared-enhanced inlet guide vanes. IGV stop blocks need to be modified to accommodate new range of travel. IGV actuator replacement may require additional piping modification of the hydraulic, trip, and supply circuits.
- On-line water wash system upgrade to Gen-IIAO (aka Gen-III)
- Compressor bleed valves (CBVs) modification/replacement to meet TIL 1416 option 3 that is a requirement for the STARSS software [ONLY required for GT 297378]

Control software and related items

- After evaluation of the system, at a minimum the control software will be updated to incorporate the following. Evaluation may result in need to additional I/O and/or the upgrade to Mark VIe when the current system is Mark VI or Mark V.
    - Software modifications to upload the Optimum Start, also known as Strategic Anti-Rotating Stall Schedule (STARSS)
    - STARSS software update for high-output stage 0 [ONLY if such configuration is chosen]
    - Software modifications per TIL 1416 option 3 [ONLY required for GT 297378]
    - Control curve modification
    - Compressor operating limit line (OLL) change

Optional

- No.1 bearing liner
- Thrust bearing (both active and inactive bearings)
- Remaining stator vanes, as desired
    - Enhanced S6 thru S8 compressor stator vanes
    - Shimless S9 thru S13 compressor stator vanes
    - Enhanced S14 thru S16 compressor stator vanes (aka enhanced aft stator modification). Either little foot or big foot
    - Upgrade to shrouded S17 thru EGV compressor stator vanes

Customer Visits and Witness Points in GE Manufacturing Facilities

GE requests that any visit to our manufacturing facilities be coordinated through your local GE's Sales representative or project manager. They will coordinate with our factory personnel so as to provide the best timing, to ensure witnessing can be arranged without delaying the work and provide knowledgeable personnel support to answer questions.

Section II: Commercial Summary

Items Proposed

In the table below, GE offers the pricing for the engineering and hardware as described in this proposal. The following Items are for one gas turbine.

Kennedy

Kennedy: Flared-Enhanced UR Spool (with 3SAR) and Flared Upgrade with Enhanced-Standard Stage 0

Item	Description
1	New Flared-Enhanced Unit Rotor Spool (with 3SAR)
2	Flared Upgrade with Enhanced-Standard Stage 0 (Mandatory with Above) • Flared inlet casing • Flared mid-compressor casing • Base to inlet, inlet to MCC, MCC to CDC vertical bolting • No.1 bearing lift-oil hose • No.1 bearing hardware • Thrust bearing shims • No.1 bearing instrumentation hardware • Flared-enhanced inlet guide vanes (IGVs) and installation hardware • Flared-enhanced S0 thru S5 compressor stator vanes (including standard S0s and robu • New IGV actuator • Upgrade to Gen-IIAO on-line water wash system • STARSS software • STARSS software update (ONLY if HO stage 0 is chosen) • Control curve modification • Compressor operation limit line (OLL) modification
3	Price Adder for Enhanced High-Output Stage 0
4	Enhanced S6 thru S8 compressor stator vane
5	Shimless S9 thru S13 compressor stator vanes
6	Enhanced little-foot S14 thru S16 compressor stator vanes (enhanced aft stator modification)
7	Upgrade to shrouded S17 compressor stator vanes
8	No.1 bearing liner
9	Thrust bearing

Brandy Branch

Brandy Branch: Starts-based Rotor Life Extension with Full Reblade as FLARED-Enhanced (Kennedy 7 rotor to be installed into Brandy Branch 1)

Item	Description
10	Starts-based rotor life extension with full reblade as FLARED-enhanced ▪ This item provides all the hardware necessary to perform Rotor Life Extension to the rotor that will be removed from the first gas turbine, extending its life to 7,400 factored fired starts (limited to 192,000 factored fired starts). ▪ Also, this option covers the full reblade of the compressor section as flared-enhanced.
11	Flared Upgrade with Enhanced-Standard Stage 0 (Mandatory with Above) • Flared inlet casing • Flared mid-compressor casing • Base to inlet, inlet to MCC, MCC to CDC vertical bolting • No.1 bearing lift-oil hose • No.1 bearing hardware • Thrust bearing shims • No.1 bearing instrumentation hardware • Flared-enhanced inlet guide vanes (IGVs) and installation hardware • Flared-enhanced S0 thru S5 compressor stator vanes (including standard S0s and robust S5s) • New IGV actuator • Upgrade to Gen-IIAO on-line water wash system • STARSS software • Control curve modification • Compressor operation limit line (OLL) modification • TIL 1416 option 3 (modification of existing CBVs with limit switch)
12	Price Adder for Enhanced High-Output Stage 0
13	Enhanced S6 thru S8 compressor stator vane
14	Shimless S9 thru S13 compressor stator vanes
15	Enhanced little-foot S14 thru S16 compressor stator vanes (enhanced aft stator modification)
16	No.1 bearing liner
17	Thrust bearing

Item	Description	Price (USD)
1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	Package price for above hardware scope (Total)	$21,653,715

Installation Price to be Performed at Major Outage

Installation

Item	Description	Price per Unit(USD)
19	Installation Cost (per Unit)	$308,777

Pricing Basis

1) This proposal is valid for 48 days.
2) Package price reflects a discount that requires all items to be purchased for discount to apply.
3) New unit rotor cycle time is 18-24 months due to current material shortages.
4) A converted proposal for RLE must be in place at least 14 months prior to the rotor's anticipated arrival at the GE service shop.
5) Rotor is sold on an exchange basis. GE will take property of last removed rotor.
6) Rotor is subject to prior sale. If rotor is sold, pricing will be based on available inventory.
7) This proposal does not include testing for verification of the emissions.
8) This proposal does include incremental installation services at the Major.
9) This proposal is based on the assumptions of the turbine configuration as documented by the application engineer in the appendix. If the applications engineer's assumptions are incorrect, then this proposal is invalid.
10) The price is in USD and does not include applicable sales, excise, value added, use or similar taxes.

Terms and Conditions

Pursuant to the terms and conditions of the Long Term Parts & Long Term Service Contract between JEA and General Electric International, Inc. signed on June 26, 2000 (the "Agreement") and amended thereafter.

Accordingly, except as expressly set forth herein, this Proposal is subject to the terms and conditions of the Agreement and such terms and conditions shall apply without limitation, as if fully set forth herein. Unless otherwise defined herein, all capitalized terms used in this Proposal shall have the same meaning given to them in the Agreement.

Any additional or different terms and conditions set forth in any proposal or communication by or from JEA are expressly objected to and will not be binding upon Contractor unless specifically agreed in writing by an authorized agent of Contractor.

Prices quoted exclude tax or other regulatory fees.

COVID-19 VIRUS: The parties acknowledge that the COVID-19 epidemic and government actions in response to it have affected and will continue to affect Seller's ability to deliver goods and services around the world (the "COVID-19 Impact"). In the event that the COVID-19 Impact affects Seller's ability to deliver on time or at the bid price, , Seller shall be entitled to an equitable adjustment in schedule and price as appropriate, subject to Seller's obligation to work in good faith with Buyer to mitigate the impact on schedule and/or cost.

Invoicing

1. Invoicing will be as follows:
    a. Below is hardware invoice schedule (services billing will be due upon completion of the outage)

Sign Deal by 3/31/2021	% Payment
October 1, 2021	15%
June 2022 Ship Rotor (Kennedy)	25%
December 2022 Work Complete	10%
October 1, 2022	15%
March 2023 Ship Rotor (BB)	25%
December 2023 Work Complete	10%

2. Payment is due 30 days from date of invoice.
3. Payment will be in U.S. Dollars upon receipt of Sellers invoice without any setoff (including, without limitation, setoff under other contracts with Seller or with General Electric Company or its affiliates).

Invoicing Methods

Unless mutually agreed otherwise, GE shall submit invoices to customer by e-mail, and if customer so requests then GE shall also provide to customer a paper invoice by regular mail. As an alternative, GE may submit paper invoices by overnight express mail to customer's street address. Customer shall be deemed to have received each invoice as of the date of customer's receipt of the e-mail or overnight express mail, as applicable. Unless mutually agreed otherwise, customer shall make payments to GE by electronic wire transfer. GE's wire transfer information is provided below.

Deutsche Bank Trust (Wire Transfers)
Swift Code: BKTRUS33
ABA 021001033
Acct# 50272119
Acct Name: General Electric International, Inc.

Section III: Proposal Basis

General Assumptions and Clarifications

This Proposal is based on, and is only valid for, the last known turbine configuration as documented below by the application engineer. Based on research of the unit records and recent Field Design Memo's (FDM's), the following configuration tables are provided for documentation of basis of the proposal. If any part of the information provided below is incorrect, please notify your GE representative. Application Engineering will evaluate the new information and the proposal will be validated or revised as required.

Original Manufacturing Information

Serial Number(s)	297378	297188
Design Memo(s)	GR0491	GR-0434
Material List(s)	ML-7A1PFA79-1	ML-7A1PFA50-1
Manufacturer	GE Greenville	GE Greenville
Ship Year	2000	1999

Site Information

Operation Cycle	Simple Cycle	Simple Cycle
Operation Schedule	Peaker/Cyclic 500-1500 hrs/yr with daily starts	Peaker/Cyclic 500-1500 hrs/yr with daily starts
Performance Basis		
▪ Altitude	83 Feet	27 Feet
▪ Minimum Ambient Temperature	7 °F	20 °F
▪ Design Ambient Temperature	59 °F	59 °F
▪ Maximum Ambient Temperature	105 °F	95 °F
▪ Relative Humidity	60%	60%

Present Configuration

Inlet/ Exhaust		
Inlet Pressure Drop	3.04 in H_2O	3.04 in H_2O
Inlet Conditioning	None	None
IBH System	Yes	Yes
Exhaust Pressure Drop	5.5 in H_2O	5.5 in H_2O
Combustor		
System	Dry Low NOx 2.6e	Dry Low NOx 2.6e
Fuels	Dual Fuel	Dual Fuel
Diluent Injection / Purpose	Water injection for NOx abatement	Water injection for NOx abatement
Control		
Generation	Mark VI / TMR [being migrated to Mark VIe]	Mark VI / TMR

Unit Rotor (MLI 1302)		
Assembly Drawing Number	116E3303G003	117E3120G001
Compressor Rotor (MLI 1303)		
Assembly Drawing Number	116E2822G005, stage R0 modified per 106T1400G0003	117E3033G001
Configuration		
▪ Flow Path Design at the Front End	Unflared	Unflared
▪ Flow Path Design at the Back End	Conical	Conical
▪ R0 Blade Design	Enhanced	Original (non-enhanced)
▪ Staking Insert Modification	Not implemented	Not implemented
▪ R1 thru R5 Blade Design	Original (non-enhanced)	Original (non-enhanced)
▪ R6 thru R8 Blade Design	Original (non-enhanced)	Original (non-enhanced)
▪ CW12 thru CAS Dovetail Design	Flat slot bottom (FSB)	Flat slot bottom (FSB)
▪ R14 thru R17 Wheels Design	Robust back end (RBE)	Robust back end (RBE)
▪ Comments	None	FSS, CW1 and CW2 have instrumentation features
Turbine Rotor (MLI 1305)		
Assembly Drawing Number	116E2563G001	116E2562G001
Configuration		
▪ Generation	Gen-IV	Gen-IV
▪ Stage 1 wheel air-cooling slot design	Square	Square
▪ Stage 2 wheel air-cooling slot design	Square	Square
▪ Stage 1-2 spacer design	D-nut	12-point
▪ Stage 2-3 spacer design	D-nut	12-point
▪ Turbine aft shaft design	Original	Original
▪ Comments	None	Early Gen-IV configuration
Compressor Stator (MLI 1301)		
Arrangement Drawing Number	116E2376G003, stage S0 thru S4 modified per 100T4149G003	116E2376G006
Configuration		
▪ Flow Path Design at the Front End	Unflared	Unflared
▪ Flow Path Design at the Back End	Conical	Conical
▪ NUVS for S0 & S1	Yes, on S0	No
▪ Stages S0 thru S4 Design	Enhanced	Original (non-enhanced)
▪ Stage S5 Design	Original (non-enhanced)	Original (non-enhanced)
▪ Stages S6 thru S8 Design	Original (non-enhanced)	Original (non-enhanced)
▪ Stages S14 thru S16 Design	Original (non-enhanced)	Original (non-enhanced)
▪ Stage S17 Design	Unshrouded	Unshrouded
▪ Stator Shim Pinning Modification	Not implemented	Not implemented
Inlet Guide Vanes Part Number	969E0156P002	969E0156P002
▪ IGV Type	Unflared cambered	Unflared cambered

Compressor Discharge Casing (MLI 0805)		
CDC Assembly Part Number	117E3039G001	116E2445G001
Inner Barrel Part Number	115E6192G001	115E6192G001
▪ Design	7FA.03 original (for unshrouded S17)	7FA.03 original (for unshrouded S17)
▪ Counterbore Plugs Installed	Yes	Yes
OnLine Water Wash System		
Turbine & Compressor Piping Schematic Diagram (MLI 0442)	352B4823	352B4187
Compressor Wash Piping (MLI 0953)	116E2091G001 and 115E6575G001	116E2091G001 and 115E6575G001
Comments	Gen-I system	Gen-I system
Compressor Bleed Valves (MLI 1022)		
Drawing Number	372A1013P001 and 372A1013P002	372A1013P001 and 372A1013P002, modified per limit switch kit 372A1013P005
Manufacturer	AC Controls	AC Controls
Description	Valves with single limit switch configuration	Valves with double limit switch configuration
Comments	TIL 1416 option 3 has not been already implemented	TIL 1416 option 3 has been already implemented

Previous Requisitions

GT serial number 297378

FDM	Title
F3988G2	Remote DLN tuning (RDLNT)
F4625G3	OFE 2.0
F5484G1	ITH bolting
F5798G1	OpFlex Wide Wobbe solution for LNG
F5910G3	Wide Wobbe software update and gas chromatograph integration
F6345G1	Enhanced spread monitor (ESM) 2100 software
F6345G10	HMI upgrade and Historian
F7299G1	OpFlex enhanced transient stability (ETS)
F7299G8	Unflared enhanced compressor package 3
F7299G11	Mark VI to Mark VIe migration (phase III), Gen-II OnLWW upgrade, OFlex Cold Day Performance, TIL 1416 option 3, 96FG-1 transmitter, Open EPIC, Alarm Help on HMI, Exciter and LCI DFE Upgrades [not implemented]

GT serial number 297188

FDM	Title
F5563G1	OpFlex: advanced fuel schedule (AFS), turndown, variable peak
F5563G2	Combustion dynamics monitoring with remote DLN tuning (CDM w/RDLNT)
F5910G1	OpFlex wide wobbe
F5910G2	Wide wobbe software update, gas chromatograph connection
F6345G2	ESM 2100
F6345G3	Control system modification to integrate new unit EX2100 DFE and LS2100 DFE w/EDP motor operated switch
F6766G4	OpFlex ready fast start with air purge

Section IV: Appendix

New Unit Rotor Spool

A brand-new unit rotor spool is comprised of a fully-bladed compressor rotor married to an unbucketed turbine rotor, also known as turbine rotor spool. As with all F-class designs, the design lifetime of a new unit rotor is 144,000 factored fired hours (FFH) or 5,000 factored fired starts (FFS), whichever comes first.

Compressor Rotor Section

The current production compressor rotor incorporates the following features:

- Dovetail slots of forward stub shaft (CW0) incorporate shot peening and undercut feature to improve the fretting tolerance.
- Dovetail slots of compressor wheel 1 (CW1) incorporate shot peening.
- Enhanced R0 blades. Blades with completely new airfoil design that were improved with:
    - Airfoil shot peening. The full airfoil surface is mechanically peened to achieve improved tolerance to erosion, corrosion, and foreign object damage.
    - Laser shock peening. The leading edge root is treated with laser shock peening to provide high resistance to erosion, corrosion, and foreign object damage.
    - Dovetail undercut. Performed on both sides of the dovetail, this feature is intended to minimize the fretting wear by mitigating stress at the edge of contact and moving the fretting area away from high stresses.
    - Graphite coating on dovetail. Coating is applied on both sides of the dovetail to reduce the fretting wear.
    - Squealer tip. Feature intended to increase the rub tolerance.
- Enhanced R1 thru R3 blades. These blades have the same airfoil design as original design; however, they were improved with:
    - Full airfoil shot peening
    - Dovetail undercut
    - Graphite coating on dovetail
- Enhanced R4 and R5 blades. These blades have the same airfoil design as original design; however, they were improved with:
    - Full airfoil shot peening
    - Dovetail undercut
- Enhanced R6 thru R8 blades. These blades have the same airfoil design as original design; however, they were improved with:
    - Full airfoil shot peening
- R12 thru R17 blades with round slot bottom (RSB) design on the dovetail, which greatly reduce the stress on the dovetail slot.
- Optimized clocking on stages 14 thru 16 blade & wheel assemblies. Clocking feature on the compressor rotor refers to the blade pattern that results for stages R14 thru R16 once the compressor rotor has been stacked/assembled. The current-production rotors are built with an optimum clocking in order to improve the stator reliability by eliminating the S14 thru S16 vane rocking phenomena.

- Robust back end (RBE) wheels for stages 14 thru 17 that eliminated issues associated with early F-class compressor rotors such as vibrational shifts due to transient thermal dynamics, nut groove stress cracking, bolt failure, and unit rotor marriage joint axial movement.

Since the current-production flared compressor rotors are built with enhanced R0 blades, the installation of a unit rotor with these enhanced R0 blades requires the implementation of at least enhanced compressor package 2. *Please refer to FS5V for more information about the enhanced compressor packages.*

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Turbine Rotor Section

The current-production Gen-V turbine rotor incorporates the following features:

- Shot peening from birth in all components, which greatly reduces the possibility of wheel web indications.
- Optimized (enhanced) air-cooling slot design on the stage 1 and 2 wheels, which greatly reduces the chances of stress cracking in the corners of the cooling slots
- New balance groove design on stage 1, 2, and 3 wheels, as well as stage 1-2 and 2-3 spacers. The redesigned groove does not require wheel staking for positioning the balance weights
- The stage 1 thru 3 wheels and stage 1-2 and 2-3 spacers incorporate three-step-aged (3SA) design, which provides the entire turbine rotor an increased space temperature capability
- Redesigned lock-wire tabs on stage 1, 2, and 3 wheels.
- Smooth blend of all the sharp edges on the dovetail and lock wire tabs.

Furthermore, the current-production Gen-V turbine have returned to aft shafts made from CrMoV. These aft shafts have a thicker outer diameter at the mating flange with the Stage 3 wheel, which may require a modification or replacement of a portion of the exhaust frame:

If the unit has a single-wall cone exhaust frame:

1) The exhaust frame must be modified to replace the single-wall cone design with the latest double-wall cone design. The double-wall cone design provides superior wheelspace temperature management and all Gen 4 turbine rotors have been designed for optimum performance and life in conjunction with the double-wall cone exhaust frame. *Please refer to FS5B for more information about double-wall cone upgrade.*

   AND

2) The existing exhaust frame discourager seal must be removed. The discourager seal is a holdover from earlier 7F-series exhaust frames, and GE Energy Design Engineering has determined that the seal is not required when a Gen 4 turbine rotor is installed in a unit.

If the unit has a double-wall cone exhaust frame: Only the existing exhaust frame discourager seal must be removed.

Unflared to flared compressor upgrade

Detailed Technical Description

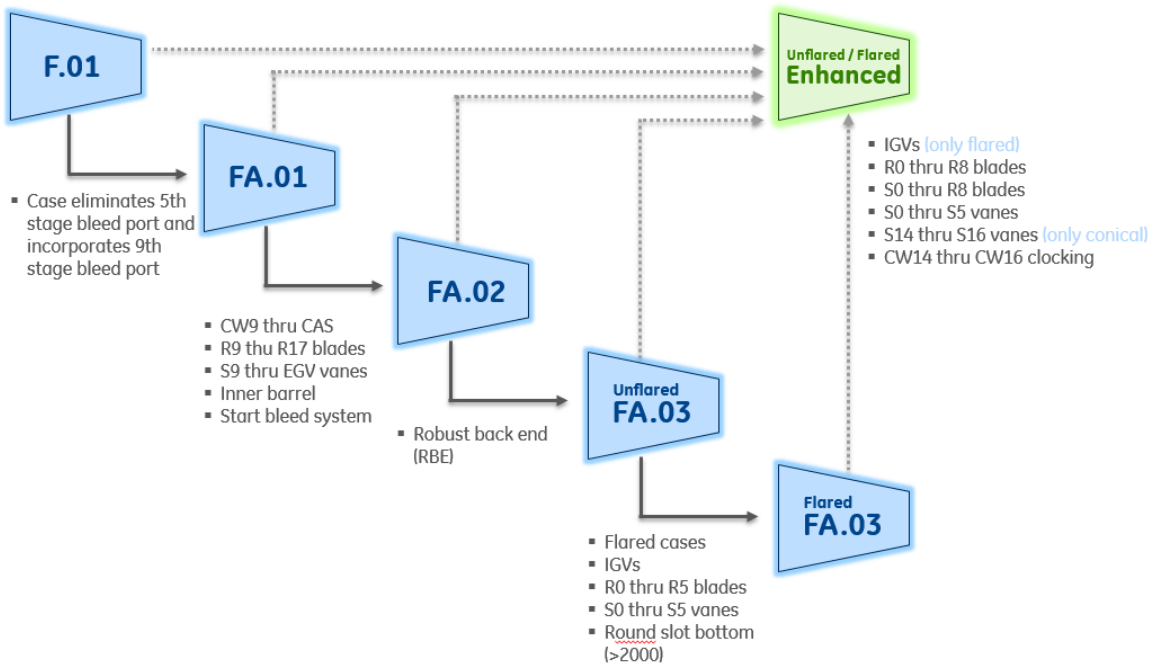
The F-Class compressor rotor has been evolving since the first 7F.01 gas turbine was introduced in 1987. The 9F.01 gas turbine, which was designed using aerodynamic scaling from the 7F.01, was introduced later in 1989.

The 7F.01 compressor was developed from 7E compressor by first scaling diameters, then increasing the annulus area an additional amount to achieve desired air flow and lastly adding a 0-stage. The F.01 compressor incorporated unflared flow path at the front end (first six stages) and cylindrical flow path at the back end (last eight stages), and extraction ports at 5th and 13th stages. Later, in 1991, FA.01 design was introduced that maintained the unflared / cylindrical flow path, but eliminated the 5th stage extraction port toward 9th and 13th extractions.

In 1997, the compressor flow path was redesigned on the back end, upgrading it from cylindrical to conical (stage 10 thru 17) configuration. Furthermore, the high-pressure package seal (HPPS) was upgraded from labyrinth seal to honeycomb seal for better sealing.

Then in 1999, the compressor rotor received the robust-back-end configuration for stage 14 thru 17 wheels to improve the reliability by eliminating undesirable effects on the compressor rotor such as non-repeatable transient vibration shifts, nut groove stress cracking, and bolt failure. *Please refer to TAG FS5O for more detail on RBE upgrade.*

As part of better design and aiming to improve the performance, the front end of the compressor evolved to flared configuration in 2000. This involved widening the first five stages to an slightly larger diameter (adding 0.35 inches to R0 radius for 7F-Series and 0.42 inches to R0 radius for the 9F-Series, tapering to 0.0 inches at stage 5). The mid-compressor and front stage stator vanes were redesigned accordingly, as well as the inlet casing and the inlet guide vanes, which incorporated the uncambered design instead of the cambered used in unflared configuration.



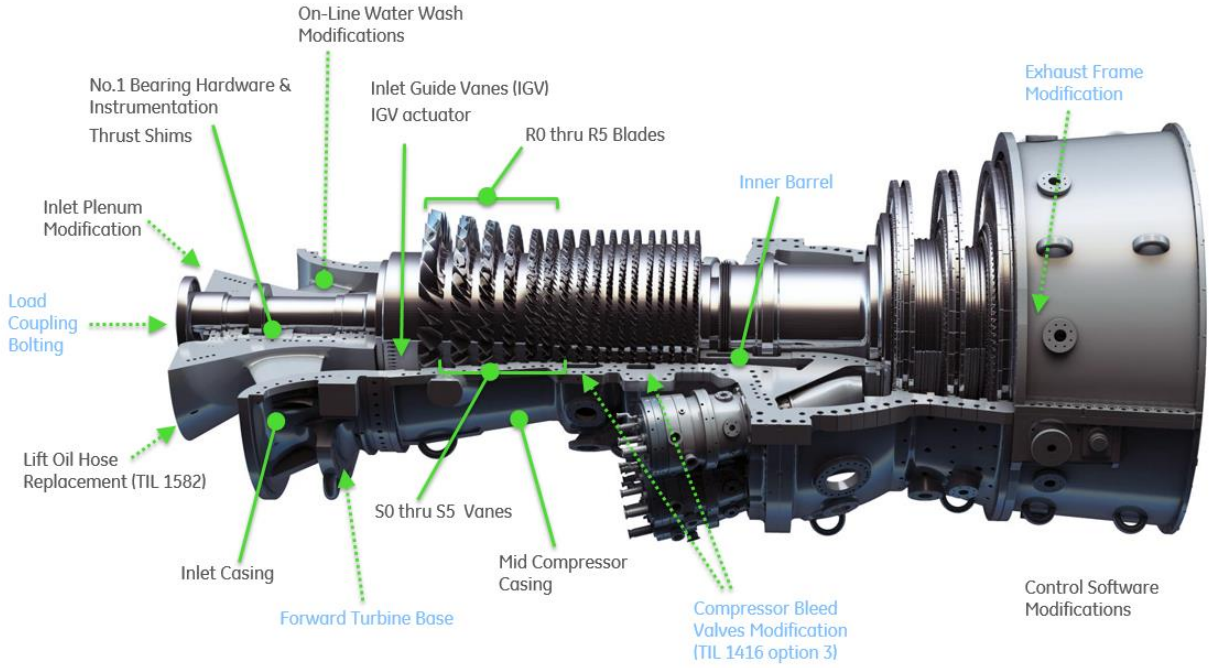
F-Class Compressor Evolution

Finally in 2009, based upon available fleet experience, some compressor enhancements were developed for both flared & unflared configurations to respond to all known fleet events and to improve the operating stress margins of certain components, hence

improving the reliability of the compressor section. *Please refer to TAG FS5V for more detail on flared enhanced compressor packages.*

That said, the compressor upgrade to flared configuration consists on modifying the front end of a compressor with unflared/conical flow path (FA.02 or unflared FA.03) to allow more airflow into the compressor section, which results in an important performance improvement.

Since current production flared compressor hardware incorporates the enhanced design, the upgrade to flared configuration will include at least the enhanced compressor package 3 configuration, which would be implemented along with the remaining modifications that are necessary for the flared upgrade, as detailed in Scope of Supply section and listed in the image below. Consider that items in blue font will be necessary depending on the existing gas turbine configuration.



Flared Upgrade Scope

Flared enhanced compressor packages

Offer Summary

The enhancement of the F-class flared compressor system is achieved through upgrades to various components within the compressor system. The affected components include the inlet guide vanes (IGV), forward and mid-stage rotating blades, forward and mid-stage stator vanes, and some of the aft stage stator vanes. The specific design changes utilize state-of-the-art engineering, modeling, laboratory testing and field-testing. These components are offered in a packaged approach to accommodate both system dependencies and customer outage capabilities.

Scope of Supply

The following will be supplied in each of the listed packages. Items denoted with an asterisk (*) are not quoted in the technical proposal, but are instead quoted by FieldCore (for field work items) or GE Energy Parts & Repair Services (for service shop work items). **All components that are part of the listed packages will be sold on an exchange basis only.**

Package 2:

- Software modification to change the IGV start-up angle to 24°
- Modification of the IGV stop blocks *
- Replacement or modification* of IGV actuator
- Redesigned R0 blades with graphite coating on the dovetail
- R0 staking ("biscuit") modification* [optional but suggested if not already installed]
- Uncambered IGVs (applies only to early flared FA.03 units with cambered IGVs)

Package 2+:

- Software modification to change the IGV start-up angle to 24°
- Modification of the IGV stop blocks *
- Replacement or modification* of IGV actuator
- Redesigned R0 blades with graphite coating on the dovetail
- R0 staking ("biscuit") modification* [optional but suggested if not already installed]
- Redesigned S0-S4 vanes (S0 and S1 retain the NUVS configuration)
- S5 vanes and S5 casing pins, also known as “load dams” [optional]
- MCC modification* for drilling provisions for the S5 pins
- S6-S8 vanes with full airfoil shot peening [optional]
- Uncambered IGVs (applies only to early flared FA.03 units with cambered IGVs)

Package 3:

- Software modifications to upload the Optimum Start (also known as Strategic Anti-Rotating Stall Schedule, or STARSS) software
- Modification of the IGV stop blocks*
- Replacement or modification* of IGV actuator
- Redesigned IGVs (including assembly hardware)
- Redesigned R0 blades with graphite coating on the dovetail
- R0 staking ("biscuit") modification* [optional but suggested if not already installed]
- Redesigned S0-S5 vanes (S0 and S1 retain the NUVS configuration)
- S5 casing pins, also known as “load dams”

- MCC modification* for drilling provisions for the S5 pins
- S6-S8 vanes with full airfoil shot peening [optional]

Package 4:

- Software modifications to upload the Optimum Start (also known as Strategic Anti-Rotating Stall Schedule, or STARSS) software
- Modification of the IGV stop blocks *
- Replacement or modification* of IGV actuator
- Redesigned IGVs (including assembly hardware)
- Redesigned R0 blades with graphite coating on the dovetail
- R0 staking ("biscuit") modification* [optional but suggested if not already installed]
- Redesigned S0-S5 blades (S0 and S1 retain the NUVS design)
- S5 casing pins, also known as “load dams”
- MCC modification* for drilling provisions for the S5 pins
- S6-S8 vanes with full airfoil shot peening [optional]
- Redesigned S14-S16 vanes with shot peening. There are two options:
    - Vanes with larger bases and hook fits that require CDC machining (bit-foot design)
    - Vanes with original bases and retaining rings that do not require CDC machining (little-foot design) – 7F-Series ONLY
- CDC S14-S16 stator grooves modification* if implementing big-foot vanes only
- CDC patch ring (if a previous patch ring in S14-S16 requires replacement)

Package 5:

- Software modifications to upload the Optimum Start (also known as Strategic Anti-Rotating Stall Schedule, or STARSS) software
- Modification of the IGV stop blocks *
- Replacement or modification* of IGV actuator
- Redesigned IGVs (including assembly hardware)
- Redesigned R0 blades with graphite coating on the dovetail
- R0 staking ("biscuit") modification* [optional but suggested if not already installed]
- Redesigned S0-S5 blades (S0 and S1 retain the NUVS configuration)
- S5 casing pins, also known as “load dams”
- MCC modification* for drilling provisions for the S5 pins
- S6-S8 vanes with full airfoil shot peening [optional]
- Redesigned S14-S16 vanes with shot peening. There are two options:
    - Vanes with larger bases and hook fits that require CDC machining (bit-foot design)
    - Vanes with original bases and retaining rings that do not require CDC machining (little-foot design) – 7F-Series ONLY
- CDC S14-S16 stator grooves modification* if implementing big-foot vanes only
- CDC patch ring (if a previous patch ring S14-S16 requires replacement)
- Controlled rotor clocking upon reassembly* ("Controlled" clocking is defined as the optimal clocking using the existing stage 14-16 compressor rotor wheels)
- New R1-R5 blades with shot peening, dovetail undercut, and graphite coating on the dovetails (R1-R3 only)
- Fully shot-peened R6-R8 blades (optional)

Performance Effect

The enhanced-standard compressor upgrade will not affect measurable output or heat rate. However, the high-output stage 0 is available for 7F-Series when implementing packages 3 and higher as an alternative to deliver an increase in output.

Detailed Technical Description

The enhanced design consists of new IGVs, R0-R8 compressor rotor blades, S0-S8 and S14-S16 compressor stator vanes, control software changes, and modifications to the mid compressor case (MCC), compressor discharge case (CDC), IGV actuator, and IGV stop blocks.

The improvements associated to the enhanced compressor design are detailed below:

- Through aeromechanical enhancements of the IGV, R0, S1, and S3 components, degradation effects have been minimized and relevant drivers and responses have been substantially reduced.
- Features such as dovetail undercuts on R0-R5 blades and dovetail coatings on R0-R3 blades have been added, making the blades more tolerant to fretting. Certain airfoils have been retuned to move natural frequencies for vibratory margin, and tip features (squealer tip) have been added on critical stage airfoils to improve rub characteristics.
- Material treatments - and in the case of the stage S0 thru S4 stator rings, material changes - have been applied to augment durability and longevity. Furthermore, the arrangement has been adjusted to eliminate the use of stator shims.
- The S5 stator vanes receive casing pins (called "load dams") inserted through the mid compressor casing that will intersect with the vane bases and interrupt the circumferential aero loading in the S5 arrangement, preventing displacement of the vanes. Similarly to the S0 thru S4 vane arrangements, the S5 was adjusted to eliminate the use of stator shims.

  Due to the S5 vanes redesign, the mid compressor casing requires to be modified to drill the provisions for the S5 load dams.
- For the S14 thru S16 vanes, geometric changes were incorporated to the vane bases improve loading and durability and prevent rocking. The new design incorporates squealer tips to increase the rub tolerance of the vane, the bases are machined to the same contour of the compressor discharge casing, and similarly to the front vane arrangements the S14 thru S16 arrangements were adjusted to eliminate the use of stator shims. There are two designs available: big-foot and little foot.

  Big-foot design. The bases are axially longer and radially wider (big-foot design) to provide improved contact surfaces. Because of the larger hook-fit base of the enhanced big-foot stator vanes, the stator grooves in the compressor discharge casing (CDC) need to be machined to accommodate the larger-based S14 thru S16 vanes.

  Little-foot design. new design that uses the exact same redesigned airfoils as the big-foot stator vanes; however, contrary to the big-foot design, the little-foot vanes retain the base footprint of the original-design vanes (non-enhanced) to eliminate the need to enlarge the stator grooves on the compressor discharge casing (CDC). Additionally, the base incorporates provisions to install a retaining ring that is intended to provide additional support to adjacent stator vanes while maintaining their damp and damage tolerance.
- Software modifications:
  - Packages 2 and 2+ incorporate a software/hardware modification to change the IGV angle at start-up to 24 degrees, which lowers the stall window speed during start-up and thereby reduces stresses on the R0 blades.
  - Packages 3 thru 5 include a software/hardware modification called Optimum Start (also known as Strategic Anti-Rotating Stall Schedule, or STARSS) that manipulates the IGV angle and compressor bleed valves during start-up to shorten the time at stall and reduce the excitation amplitudes of certain airfoils.

  Given that software modification for all packages manipulates the IGVs, the stop blocks need to be modified, and the IGV actuator needs to be either replaced or modified. Further details regarding STARSS and the IGV angle start-up modifications are included below.

The following graphics summarize the aspects and approved packages for the enhanced compressor.

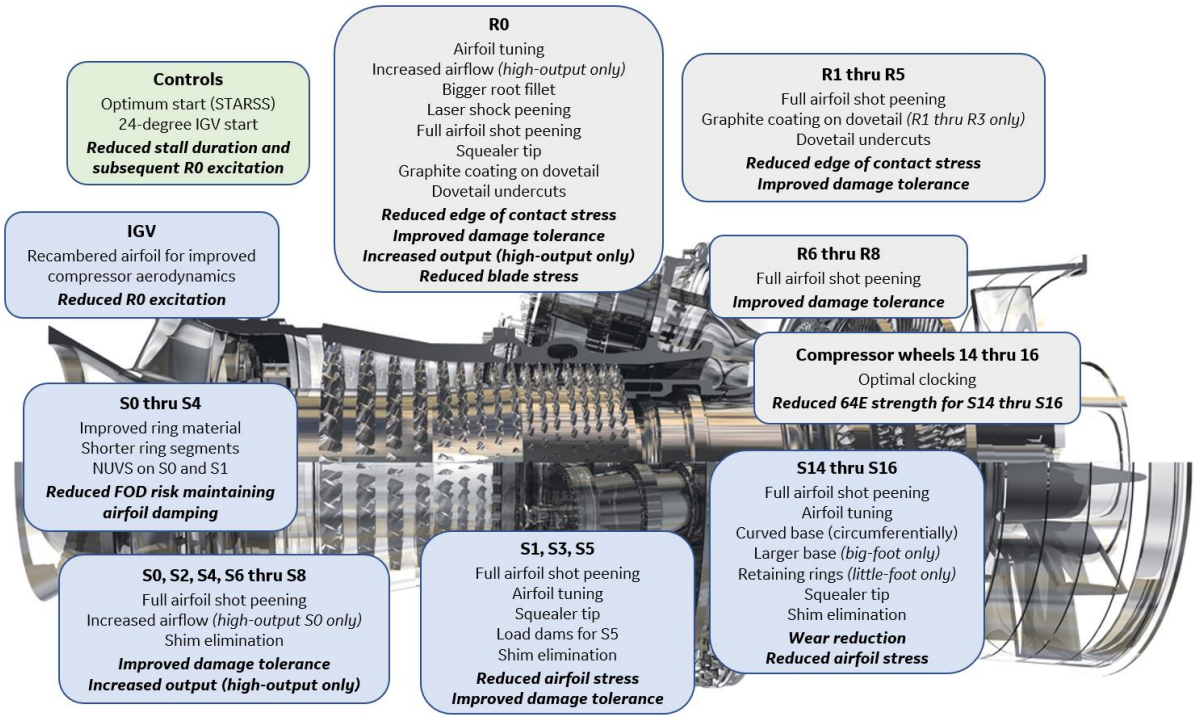


Figure 1: F-Class flared enhanced compressor - Technical Details

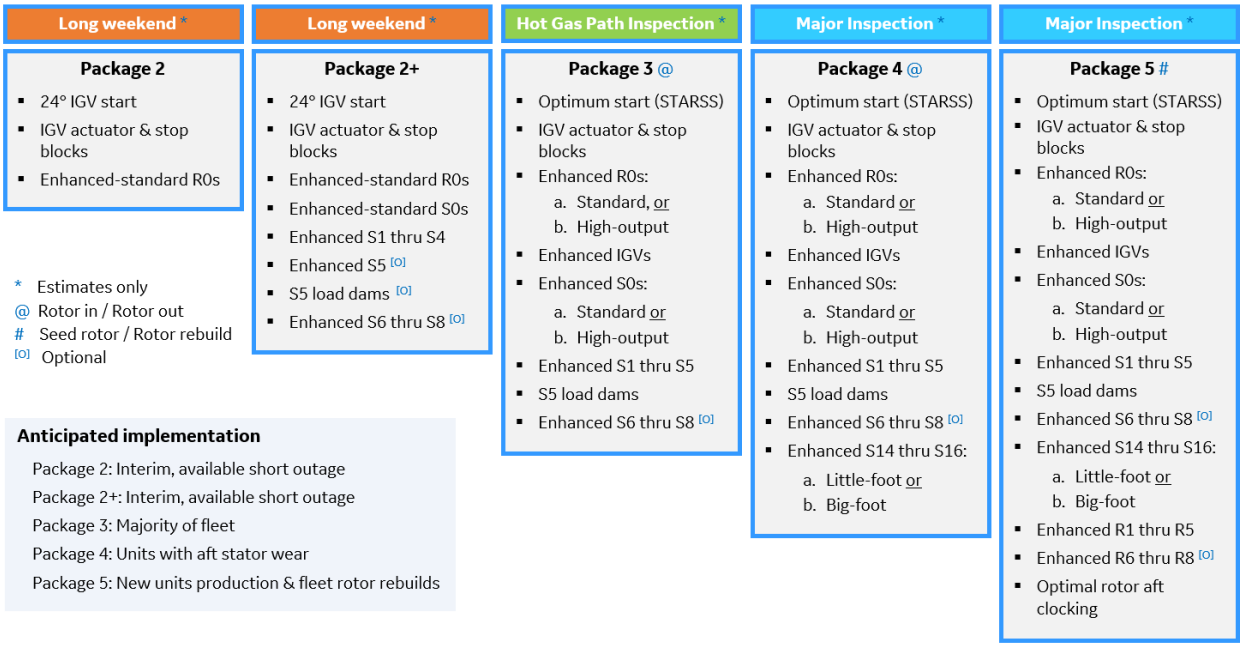


Figure 2: F-Class flared enhanced compressor – Field introduction packages

Strategic Anti-Rotating Stall Schedule (STARSS)

Through a combination of lower IGV angle and Compressor Bleed Valve (CBV) manipulation, STARSS reduces startup and shutdown compressor aeromechanical forces, particularly on R0 and R4 compressor rotor blades, by shortening the time at stall and reducing the excitation amplitudes.

Detailed Technical Description

During part speed operation at approximately 75% speed, the front end of the compressor enters a rotating stall condition. This rotating stall can produce undesirable forces on front-end rotor and stator blades. During unit startup, Strategic Anti-Rotating Stall Schedule (STARSS) uses a combination of lower IGV angle and CBV manipulation to initially delay the onset of the rotating stall and then rapidly transition though it. This reduces blade stress both by reducing stall duration and by shifting stall frequency further from the blade frequency.

This same reduction can be achieved during the GT shutdown (deceleration) by use of IGV actuation only.

The following two items MUST be implemented in order to install STARSS:

1. **TIL 1416-3 (Compressor Bleed Valve Reliability Upgrades) - Option 3**

   The TIL document can be accessed through the following link in ServiceNow Portal:

   https://gepowerpac.service-now.com/u_til_list_desc.do?sys_id=25734be18c7f5980ccefd900188af3e9

   In regards to adding the new limit switches, the customer has two options - either add the new "valve closed" limit switches and necessary wiring to the existing compressor bleed valves (CBVs), or purchase the new stainless steel (SS) CBVs. Please see FS5X below for details on the new SS CBVs. **Given the significant trip reduction potential offered by the SS CBVs, GE highly recommends this option.**

2. **TIL 1348-2 (MS7FA+e Start Times for Units Equipped with DLN 2.6 Combustion)**

   The TIL document can be accessed through the following link in ServiceNow Portal:

   https://gepowerpac.service-now.com/u_til_list_desc.do?sys_id=bc734be18c7f5980ccefd900188af36b

This modification is requested and implemented via a Power Answer Center (PAC) case; no new ICN is necessary. **Note that this TIL applies only to 7FA.03 units with DLN 2.6 combustion systems. 7FB.01, 9FB.01, and flared 9FA.03 units do not use this combustion system.**

24-Degree IGV Angle Start-Up Modification

This modification reduces the IGV angle at start-up to 24 degrees to reduce adverse aerodynamic conditions on the R0 blades.

Detailed Technical Description

The IGV angle reduction at start-up to 24 degrees lowers the stall window speed, which changes the aerodynamic characteristics within the compressor to lessen adverse harmonic vibrational effects on the R0 blades during start-up. The elimination of these vibrational effects reduces the cyclic stress on the R0 blades over their lifetime, greatly reducing the chances of fatigue failure and subsequent compressor damage.

The 24-degree IGV angle start-up modification consists of new control software and physical IGV assembly changes. Specifically, the stop blocks will be machined and the IGV actuator will be replaced or modified. Replacement and modification options depend upon the Original Equipment Manufacturer (OEM) of the currently installed IGV, the frame size, and whether or not the unit is single-shaft or multi-shaft. Please discuss your options with your GE Energy commercial representatives.

High-output stage 0

Detailed Technical Description

As part of better design and aiming to improve the performance of our flared 7FA-Series fleet, the high-output stage 0 compressor upgrade arises to add capability to the proven reliability of the enhanced compressor design, delivering 1% output improvement at ISO conditions, as well as at high inlet temperatures up to 95F.

This packaged solution is comprised of both compressor hardware and control software modifications, as detailed below:

High-output (HO) R0 blades. Blades with completely new airfoil design that leverages the aeromechanic design features from the standard enhanced hardware, such as:

- Airfoil shot peening. The full airfoil surface is mechanically peened to achieve improved tolerance to erosion, corrosion, and foreign object damage.
- Laser shock peening. The leading-edge root is treated with laser shock peening to provide high resistance to erosion, corrosion, and foreign object damage.
- Dovetail undercut. Performed on both sides of the dovetail, this feature is intended to minimize the fretting wear by mitigating stress at the edge of contact and moving the fretting area away from high stresses.
- Graphite coating on dovetail. Coating is applied on both sides of the dovetail to reduce the fretting wear.
- Squealer tip. Feature intended to increase the rub tolerance.

But incorporates:

- Improved aerodynamic shape for increased airflow at the same IGV angle

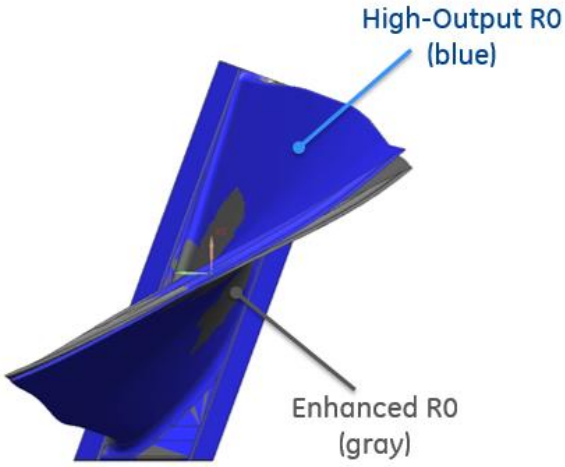
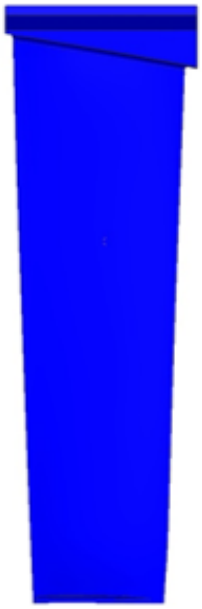


Figure 1: Enhanced and high-output R0 blades overlay

High-output (HO) S0 vanes. Vanes with completely new airfoil design that leverages the aeromechanic design features from the standard enhanced hardware, such as:

- Airfoil shot peening
- Shorter ring segments to ease installation and removal
- Stainless-steel ring segments to reduce corrosion and loss of damping
- Non-uniform vane spacing (NUVS) arrangement



But incorporates:

- Improved aerodynamic shape for increased airflow at the same IGV angle
- Squealer tip

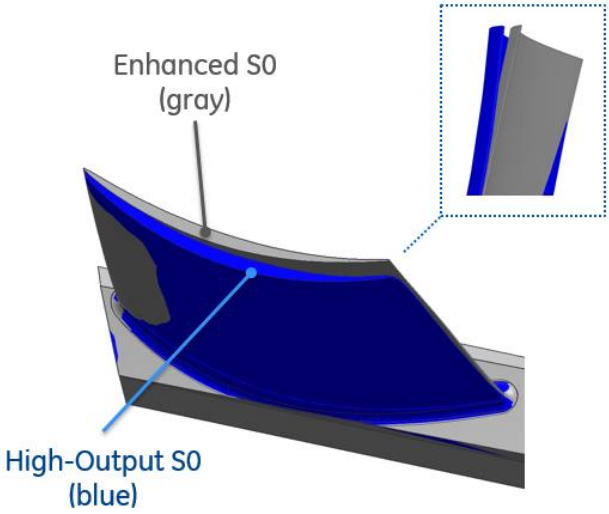


Figure 2: Enhanced and high-output S0 vanes overlay

Control software update. The STARSS software package of the standard enhanced compressor cannot be used with high-output stage 0 upgrade (and vice versa); therefore, the following updates are required for the implementation of the proposed upgrade.

- IGV schedule update
- STARSS start maneuvers update
- New compressor maps and operating limit line (OLL)
- Updated Min IGV and Aero Max IGV
- New code to close the compressor bleed valves during the off-line water wash

Enhanced little-foot aft stator vanes

Detailed Technical Description

The enhanced compressor packaged solutions have been extremely effective in reducing unplanned outage risk across the F-Class compressors. Since its release in 2009, the packages 4 and 5 offered enhanced aft stator vanes (referred as to “big foot”, which still provide the most robust risk mitigation available. However, nowadays a new alternative, referred as to little foot, is offered for gas turbines experiencing minor aft stator rocking.

The proposed enhanced little-foot aft stator modification combines the risk reduction of the big-foot airfoil design with the simple installation of the original base design, eliminating the need for a boring bar to machine the stator grooves on the compressor discharge casing (CDC).

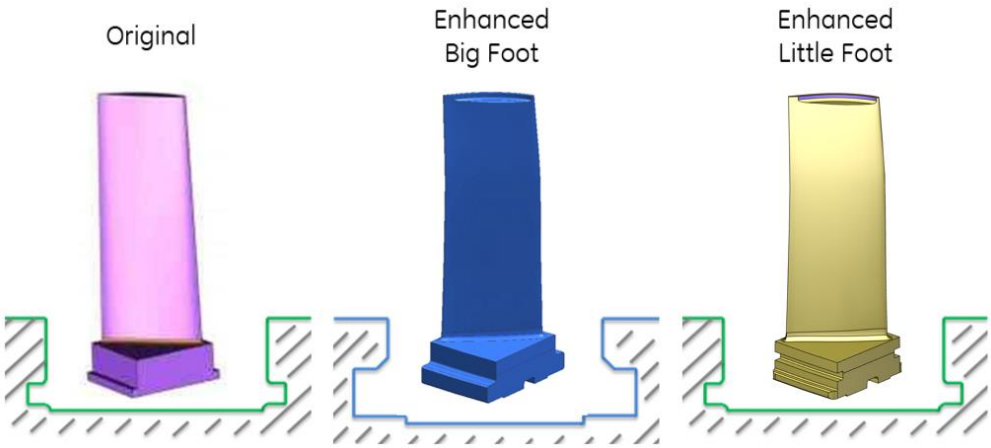


Figure 1: Comparison of stator vane and hook fit geometry (not to scale)

The enhanced little-foot stator vanes for stages S14 thru S16 are a new design that use the exact same redesigned airfoils as the big-foot stator vanes, as well as curved rails to match the contour of the casing and improve the surface contact with the stator groove and hence decrease the wear rate. However, contrary to the big-foot design, the little-foot vanes retain the base footprint of the original-design vanes (non-enhanced) to eliminate the need to enlarge the stator grooves on the compressor discharge casing (CDC).

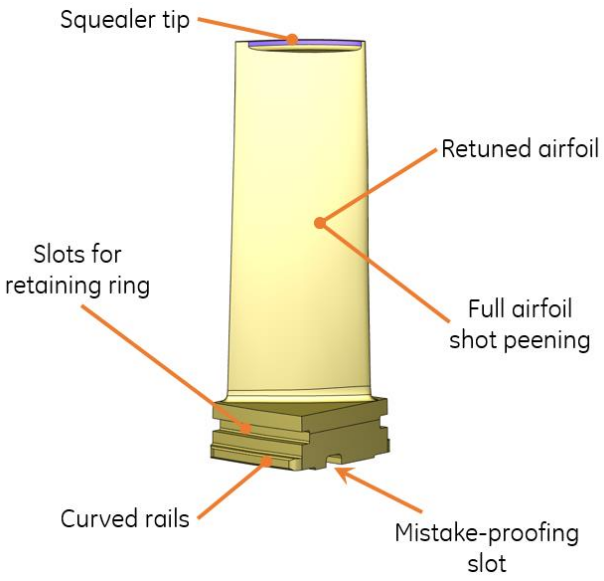


Figure 2: Features of the enhanced little-foot vanes

The new enhanced little-foot stator vanes also incorporate provisions to install a retaining ring that is intended to provide additional support to adjacent stator vanes while maintaining their damp and damage tolerance. The use of the retaining ring is recommended only in those cases where the casing grooves present significant hook-fit wear (greater than 30 mils rocking after weld repair).

The following table provides a comparison between the features of the available enhanced aft stator designs.

Feature	Enhanced Big Foot	Enhanced Little Foot
Retuned vanes to reduce rocking stimulus	Yes	Yes (same as Big Foot)
Squealer tips for rubbing tolerance	Yes	Yes
Full airfoil shot peening for improved tolerance to erosion, corrosion & FOD	Yes	Yes
Curved rails to increase contact area	Yes	Yes
Mistake proofing slot to prevent installation errors	Yes	Yes
Casing machining necessary for installation	Yes	No
Local welding on casing to repair rocking damage	No	Yes
Retaining ring to provide additional support if hook fit is worn	No	Yes
Reduced axial gaps to mitigate stato twisting phenomenon	No	Yes
Full-life solution for non-optimal clocked rotor	Yes	No (MI to MI solution)
Full-life solution for optimal clocked rotor	Yes	Yes

Table 1: Enhanced vanes comparison

Rotor Life Extension (RLE) Program

Detailed Technical Description

All heavy-duty gas turbine (HDGT) unit rotors, regardless of frame size and design, have published life limitations, given in terms of both hours and starts. These limits are established at the beginning of the product lifecycle during the development and testing phases and are based upon the expected behavior of the components over time in approved operating modes across various ambient conditions. GE Power sets these limits via a deterministic method to avoid premature component failures due to known aging factors.

Figure 2: 7FA.04 unit rotor assembly

As part of the RLE program, the majority of the components receive various targeted, detailed inspections on the most critical areas to look for any indications of advanced aging; some receive repairs to key areas of the component. Unless an issue is found that precludes continued use, these components are approved for return to service. For many frame sizes, certain key components – namely, those that undergo the highest thermomechanical stresses over their lifetimes – need to be replaced.

The RLE program utilizes GE's wealth of past experience in the construction, operation, and maintenance of heavy-duty gas turbines. Therefore, specific advantages of GE RLE program, which differentiate it from the 3rd parties, include:

- Proprietary knowledge of GE HDGT rotor component design and manufacturing data
- Advanced analysis
    - Part-specific probability of failure distribution predictions
    - Variable re-use/repair/replacement options
    - Fleet operational sensitivities
    - Component specific material records
    - Advanced 2D and 3D feature specific analysis validated to fleet operation
- Experienced service centers
- Inspection and Life Extension Services (I&LES) experience
- Part-specific repair definition and processes

- Refurbished and new parts
- Recognition of GE expertise and quality by the insurance industry

Through its unique position as the original equipment manufacturer (OEM), GE has identified the key variables to be considered and addressed in extending the service life of a HDGT rotor. These variables fall into three general categories: Material History, Subcomponent Condition, and Operational Variables. A partial list of specific variables in each category is provided below:

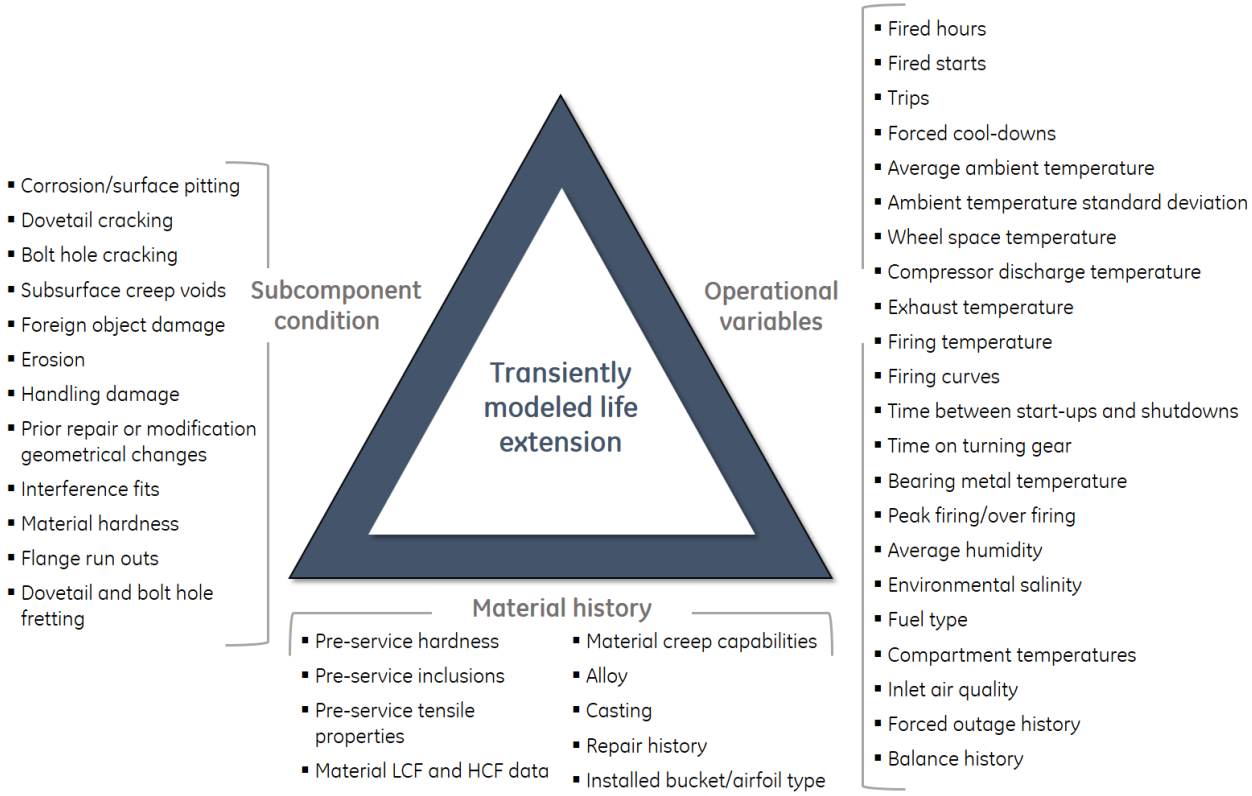


Figure 3: Rotor Life Extension key variables

GE, as the OEM, retains exclusive in-depth knowledge of most of these variables, and has used this knowledge to create a series of targeted, detailed inspections that concentrate on the most critical features of each component.

The following inspection methods are used as part of the Rotor Life Extension (RLE) process:

1) Ultrasonic (UT) testing
2) Eddy Current Inspection (ECI)
3) Magnetic Particle Inspection (MPI)
4) Fluorescent Penetrant Inspection (FPI)
5) Hardness testing
6) Visual inspection

These inspection methods are used on key areas – such as the bolt holes, bores, dovetail slots, rabbets, and balance weight grooves – of the compressor and turbine rotor components.

Moreover, GE uses proprietary modeling techniques to process these inspection results, creating an overall picture of rotor health and capability far beyond anything that can be gained through third party part inspections or engineering studies.

Notes:

1. The RLE program is based on the expected material conditions of the components as determined by decades of HDGT design and construction, analyses of fleet operational data, and inspection of rotor components in our service shops as part of the rotor maintenance program. Therefore, the parts contained in each RLE option will be the only ones replaced for the average rotor inspection and rebuild. However, there is always the possibility that – for a given rotor – data analysis and/or inspections will reveal the need to replace additional parts. Please refer to Section I of this proposal for a discussion of any parts that, due to data analysis, have been included that are above and beyond the standard scope of the RLE program. Any additional necessary parts identified during the RLE teardown and inspection processes will be brought to the customer's attention immediately.
2. Because of the long lead time for most capital rotor parts (e.g. – wheels, spacer discs, etc.), a converted proposal for RLE must be in place **at least 14 months** prior to the rotor's anticipated arrival at the GE service shop. (For rotor designs which do not require capital parts as part of the standard RLE scope, a shorter cycle time from order conversion to rotor arrival may be allowable. Please consult with your GE commercial representative(s) regarding this possibility.)
3. The RLE program is based upon the assumption that a rotor will continue to be operated in substantially the same manner post-RLE as it was pre-RLE. If this will not be the case, please notify your GE commercial representative(s) so rotor engineers can assess the effects of the planned operational profile change on future rotor life.
4. Rotors can receive a life extension at any time during the last Major Inspection (MI) interval. For hours-based rotors, this is between 96,000 and 144,000 hours; for starts-based rotors, this is between 2,500 and 5,000 starts. **Note that GE does not recommend operating a rotor past its expected life (144,000 hours and 5,000 starts) without performing RLE**; therefore, any rotor operated past its original life limits without performing RLE carries both a higher safety risk (as detailed in TIL 1576), as well as a higher risk of necessary additional scope for RLE.
5. Hours and Starts limits herein always refer to Factored Fired Hours (FFH) and Factored Fired Starts (FFS) as defined in GER3620.
6. Neither reblade of the front compressor stages (R0 thru R11) nor replacement of turbine blades (aka buckets) are contemplated in the RLE scope.
7. Reused hardware remains subject to applicable TIL requirements. Visual inspection is required in-situ at the next MI interval

Gen-IIAO on-line water wash system

Detailed Technical Description

Water washing of the compressor is necessary to minimize the fouling that results from the deposition of airborne contaminants onto the compressor flow airfoils that in turn leads to a decline in aerodynamic efficiency and, thus, the gas turbine performance. However, the on-line water washing, which is the water washing performed when the turbine is firing, inherently injects water droplets into the compressor at a high relative velocity, thereby creating a source of R0 blades leading edge erosion.

Figure 1: R0 leading edge erosion

The erosion levels on the R0 blades should be monitored at regular intervals through an inspection that should include both mold impressions and fluorescent penetrant inspection (FPI). The disposition from such inspection could be a reduced interval for subsequent inspection or even the discontinuance of further wet inlet operation (including OnLWW, Fogger, SPRITS and Evaporative Cooler) until the R0 blades can be blend repaired.

Technical Information Letter (TIL) 1323 advises customers to perform a modification to the original on-line water wash system (GEN I) in order to reduce the volume of water impinging on the R0 blades leading edge root location, which is the area susceptible to cracking as result of the erosion. Note that, although the implementation of such modification improves the erosion rates, the same inspection intervals are still required.

GE has now designed and validated a new on-line water wash system (Gen II) that imparts minimal erosion at the R0 blade root.

The primary change consists in moving the nozzles downstream from the existing nozzle location on the bellmouth; therefore, nine new on-line nozzles are installed and the existing on-line nozzles in the casing are capped. Furthermore, given that longer or more frequent washes could result in a greater rate of erosion (which would require more frequent repairs) the upgrade OnLWW system limits daily washes through control system permissives.

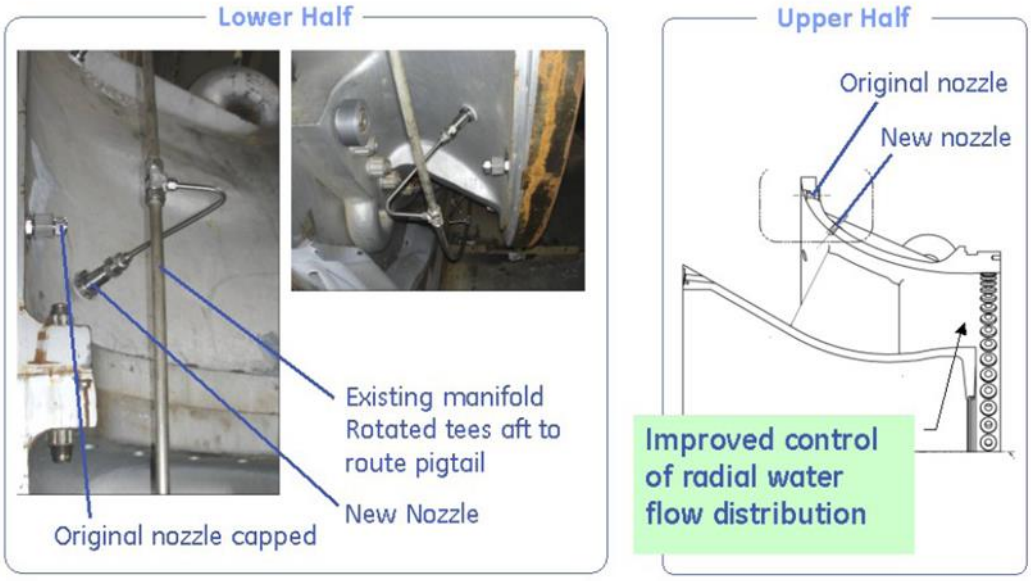


Figure 2: New nozzles location

As result of the OnLWW system redesign, the R0 blades inspection will not be required for up to 1000 cumulative hours of stand-alone water washing; which means that the upgraded OnLWW system (Gen II) allows for daily water washing (15 or 30 minutes per day) with no R0 erosion maintenance necessary until the scheduled Major Inspection (MI) interval.

TIL 1603 - which supersedes prior TILs 1303, 1389, 1400 and 1401 - provides consolidated recommendations regarding monitoring the R0 erosion levels and repairing or mitigating such erosion. This TIL recommends for sites utilizing a combination of water-introducing systems, the mold impressions and the FPI should be performed when cumulative wet inlet operation time reaches 100 hours as defined by the formula in Figure 3. Note that the below interval recommendations do not apply to units with P-Cut R0 blades.

	System	Usage Guidelines	Stand-Alond Mold Inspection Interval	Combined Operation Mold Inspection Inverval
A	Original OLWW (Gen-1) and TIL 1323 applied	5 min/day	25-30 OLWW hours or annually	Accumulated Wet Conditioning time: $4*A + B/10 + C_{[1]} + D_{[1]}/5 + E_{[2]} = 100$ hours [1] May be adjusted based on initial inspections. [2] Not applicable once no carry-over verified.
B	Upgrade OLWW (Gen-2)	15 min/day (30 min max)	1000 OLWW hours or Mis	
C	Non-GE Fogging	Not Applicable	100 Fogging hours [1]	
D	GE Fogging/SPRITS	Per GE specifications	500 Fogging hours [1]	
E	Evaporative Cooling	TILs 1285 and 1399	Initial commissioning: 100-300 Evaporative Cooler hours. Repeated if carry-over observed.	

Figure 3: Standard R0 inspection guidelines for wet inlet conditioning

MLI's Affected

The following subsection lists the MLIs affected with the proposed modification and provides more detailed information about the changes required.

MLI 0442

In the online supply line downstream of the VA16-3 control valve, a new pressure regulator and local pressure gage is installed to control the water supply pressure to the aft manifold. The forward manifold is disconnected and capped off in compliance with TIL 1323.

MLI 557T

A new pressure transducer that is wired to the controller is to be installed to monitor the water supply pressure to the aft manifold. The pressure tap for the pressure measurement is to be near the local pressure gage. A new device name will be assigned for the transducer.

MLI 0812

New holes are machined in the inlet bellmouth for installing the nine new on-line water wash nozzles that are supplied with this proposal.

The drawing provided under this MLI, contains the dimensions for machining the holes in the inlet casing for the new nozzle location using the existing nozzle hole as the reference. A total of 9 holes are machined in the outer bellmouth using a fixture designed by GE On-site Machining.

MLI 0953

All the required changes in the water wash piping system are defined under this MLI. Such changes are listed below:

- New pressure regulator and local pressure gage in supply line to aft manifold
- New pressure transducer wired to controller
- New pigtails between the existing aft manifold and new nozzles
- New nozzles with alignment pin on flow path side and mounting hardware
- Installation of nozzle plugs in the "old" on-line water wash nozzles
- Forward manifold capped off

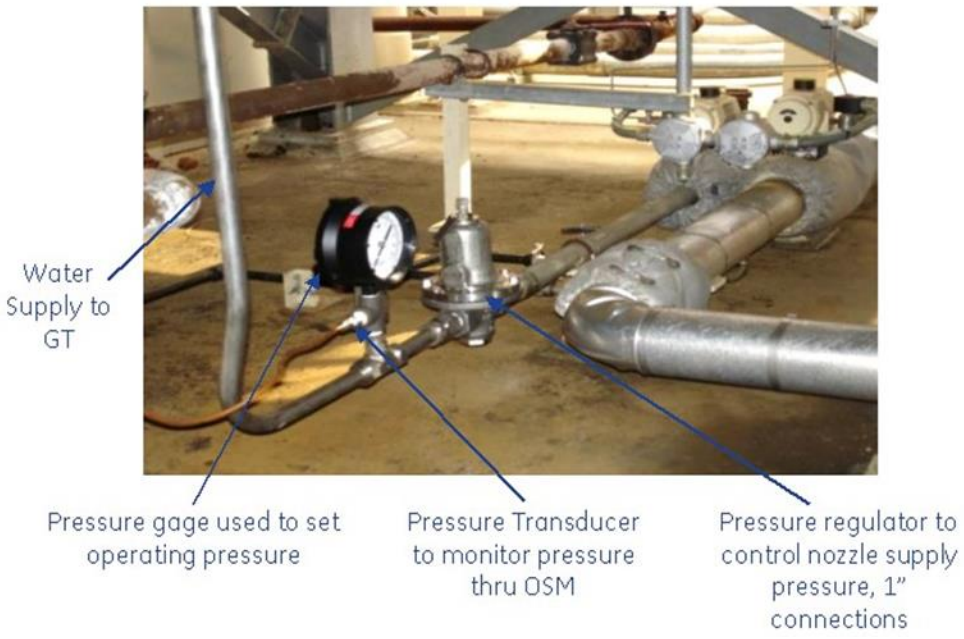


Figure 4: External changes to the water wash system

A010, A210

Control logic has been developed to ensure that the machine is washed at conditions that minimize the risk of R0 blades root erosion. The control modifications scope includes:

- Providing a new logic that will compare on-line water wash manifold supply pressure measured with a newly installed transducer 96WW-3 to display an alarm and trip the water wash system off-line.
- Adding a new on-line wash permissive, where minimum IGV setting must be greater than 70 degrees.
- Limiting the time of on-line water wash to 15 minutes at a time.

Adding a maximum of 30 minutes limit for total wash time within a time period of 24 fired hours.

Control Curve Modification

Customer Request and Offer Summary

The GE heavy duty industrial gas turbine was designed to operate on static base and part load exhaust temperature control curves, which are commonly used in many gas turbines. Exhaust temperature control curves are built to maintain a desired firing temperature based on the thermodynamic cycle and are typically not adjusted. The inputs into the thermodynamic cycle are commonly assumed and include hardware characteristics, ambient conditions (barometric pressure, relative humidity, etc.) as well as machine characteristics (such inlet and exhaust system pressure drop, etc.).

Periodically, it becomes necessary to revise the control curve. Typically this occurs when new hardware, particularly uprate hardware, is installed in the unit or significant changes are made to the machine characteristics. The exhaust temperature control curve is revised to maintain the firing temperature profile across the operating range. If the original control curves are not updated as the assumed characteristics change, the firing temperature profile, and corresponding performance, will not be optimum.

GE gas turbines typically use a one-piece, three-piece, or six-piece control curve. The number of pieces, or segments, will depend on the turbine type, the control system, and how the turbine is to be tuned. When a unit receives a revised control curve it will typically be the same number of segments that the machine had initially. In addition, if a unit has several control curves (base/peak/part/) each curve will be updated to the latest configuration.

If a unit currently operates with steam or water injection, or has any other operational parameters dependent on the control curve, these schedules and parameters will be updated on a unit by unit basis.

Scope of Supply

GE Performance Engineering will develop and document the revised exhaust temperature control curves that correspond to the new machine characteristics. This effort may include one or all of the following curves as required: base load, peak load or part load. The exhaust temperature control curve information is then used by GE Controls Engineering to convert the curves into a control specification. The control specification is provided in documentation to the customer.

Benefits

Operating on the correct control curve is critical to maintaining the specified firing temperature across the operating range.

The control curve benefits are contingent upon several factors. Predictions are based on known configuration and operating data. Deviations from the assumptions can result in variations in predicted to actual performance.

Performance Effects

Revision to the control curve can maintain operational reliability. Changes to hardware, changes to diluent injection, or changes to emissions levels can have a negative impact to reliability when implemented without a review of control system. Revision to the control curve may be necessary under those circumstances to maintain the reliability of the gas turbine.

Site Information

For execution of the requisition, the following site information is required:

- Hot Gas Path hardware configuration of the gas turbine.
- Ambient / plant characteristics that impact the gas turbine including, but not limited to (if conditions have changed from original design, i.e. – unit relocation):
    - Maximum / Minimum ambient temperature
    - Barometric pressure
    - Relative humidity
    - Inlet system pressure drop
    - Exhaust system pressure drop

Controls software (Unit 1 directory for Mark V systems, M6B files for Mark VI systems and TCW files for Mark Ve and VIe control systems)

TTKX Coefficient Modification

Detailed Technical Description

Control curves drive the fuel flow and firing temperature for a specific exhaust temperature based on the compressor pressure ratio. The exhaust temperature value used for that control calculation, TTXM, represents the average temperature reading from around the circumference of the gas turbine. It also reflects the mean temperature for an exhaust flow that has a radial temperature profile, meaning that temperatures vary with radial position. Exhaust temperature is measured by thermocouples placed directly in the gas turbine exhaust stream, downstream of the last stage buckets. Figure 1 shows exhaust temperature thermocouples installed in a gas turbine exhaust plenum.

Figure 1. View of exhaust temperature probes, as seen when looking upstream into the exhaust.

Exhaust temperature rake data taken during Op Flex deployment demonstrated that, for units with 12k extended interval combustion system (EICS) and 24k EICS, the radial profile of the exhaust flow had changed from what was observed on 7FA.03 units with 8k and 12k standard combustion systems. The exhaust temperature profile shift is due to a modified transition piece (TP) design to integral mount. The new TPs are used on all 12k EICS and 24k EICS.

Rake testing was also performed on 9FA.03 units to determine a modified TTKX profile for DLN 2.0+ and DLN 2.6+ units.

Most 7FA.03 turbines now have TTKXCOEF values that vary as a function of pressure ratio. Previously, a two-value model was used with different values of TTKXCOEF for part load and base load operation; TTKXCOEF is divided into TTKXCOEF_1 and TTKXCOEF_2. The control system defaults to TTKXCOEF_1 during startup, shutdown, and part load. Once the turbine reaches base load, the control system transfers to TTKXCOEF_2. For units that have a single TTKX coefficient, a controls modification is available that will create a pressure ratio dependent TTKX function.

Performance Testing

The site is required to have DLN Tuning in order to monitor the emissions.

Note: After the TTKX adjustment, some units may experience base load NOx > 9.0 ppm or dynamics > 2.0 psi, peak to peak. A DLN tuning is required were GE will monitor NOx and dynamics during the TTKX adjustment in order to evaluate any changes that will drive the unit over a limit. The re-tune, which can be done via the standard DLN tuning process, is expected to be less involved than a normal maintenance tune. Integrated tuning will not be required.

DLN Tuning Required

DLN Tuning is required after the TTKX Coefficient is changed. In order to schedule a tuning event, the CPM can set this up as per site available schedule.

Approved by the JEA Awards Committee
Date 12/21/17 Item # 2

Formal Bid and Award System

Award #2 December 21, 2017

Type of Award Request: CHANGE ORDER
Request #: 4115
Requestor Name: Guevarra, Larry
Requestor Phone: (904) 665-6332
Project Title: GE Long Term Service Agreement (LTSA) - Amendment 6
Project Number: various
Project Location: JEA
Funds: Capital

Scope of Work:

This request covers Amendment 6 that has been negotiated with General Electric to include revisions to the Terms & Conditions of the service agreement as well as incorporate upgraded hardware and software modifications scheduled for Brandy Branch Units 2 & 3 in the Spring of 2019. The Advanced Gas Path with Tech Package upgrade will provide the two (2) units with increased output, efficiency, and extended intervals between maintenance outages. Also, the amendment includes GE performing an additional HGPI with Generator Major inspection for Brandy Branch Unit 1 in 2025. A total of eleven (11) hot gas path inspections are scheduled to be performed prior to the new contract end date of 12/31/2028.

JEA IFB/RFP/State/City/GSA#: CPA 19084
Purchasing Agent: Lovgren, Rodney Dennis
Is this a Ratification?: NO

RECOMMENDED AWARDEE(S):

Name	Contact Name	Address	Phone	Amount
GENERAL ELECTRIC INTERNATIONAL	Sabrina Quillian	4200 Wildwood Pkwy. Atlanta GA 30339	(904) 665-6642	$74,447,500.00

Amount of Original Award: $45,700,000.00
Date of Original Award: 06/26/2000
Change Order Amount: $74,447,500.00

List of Previous Change Order/Amendments:

CPA #	Amount	Date
19084	$54,200,000.00	12/30/2003
19084	$60,000,000.00	12/28/2009
19084	$30,100,000.00	12/31/2014

New Not-To-Exceed Amount: $264,447,500.00
Begin Date (mm/dd/yyyy): 06/26/2000
End Date (mm/dd/yyyy): 12/31/2028

JSEB Requirement: N/A

Background/Recommendations:

Since 06/26/2000, JEA has had a Long Term Parts and Service Agreement (LTSA) for the GE Combustion Turbines located at Brandy Branch Generating Station, Kennedy Generating Station and Greenland Energy Center. Subsequent to the initial agreement, five (5) amendments have been approved for the GE LTSA bringing the contract total indebtedness to $190,000,000.00. The latest amendment approved by the awards committee is attached as back-up.

JEA has renegotiated certain Terms & Conditions, added new pricing for the advanced Gas Path (AGP) technology upgrades for Brandy Branch Units 2 & 3, added an additional HGPI for BB CT 1 and made revisions to the maintenance outage schedule. The cost breakdown is as follows:

$45,500,000.00	AGP Upgrades BB CT 2 & 3
$25,000,000.00	Upgrade .05 Spare Parts for BB CT 2 & 3
($5,000,000.00)	Credit for Upgrade .05 Spare Parts - BB CT 2 & 3
$ 4,130,000.00	HGPI cost increase - post upgrade (4 x $1,032,500) - BB CT 2 & 3 only
$ 4,817,500.00	One (1) additional HGPI for BB CT 1 in Spring 2025
$74,447,500.00	Total for Amendment 6

Amendment 6 is attached for full disclosure of the details of the restated LTSA and GE Advanced Gas Path + Tech Package Proposal # 1079518 R5 dated 12/08/2017. Additionally a more detailed Project Analysis document is attached as backup.

Request approval to award Amendment 6 to General Electric International for the General Electric Long Term Parts and Service Agreement in the amount of $74,447,500.00, for the new not-to-exceed amount of $264,447,500.00, subject to the availability of lawfully appropriated funds.

Manager: Limbaugh, Margaret Z. - Manager, Project Management
Director: Pineda, Joseph R. - Dir Electric Production Eng & Outage Svcs
VP: Brost, Mike J. - VP/GM Electric Systems

APPROVALS:

12-21-17

Chairman, Awards Committee **Date**

12/21/17

Manager, Capital Budget Planning **Date**

Formal Bid and Award System

Award #15 December 18, 2014

Type of Award Request: CONTRACT AMENDMENT AND RESTATEMENT

Request #:

Requestor Name: Stroupe, Randy

Requestor Phone: 904-665-6337

Project Title: Long Term Parts & Long Term Service Contract for Combustion Turbine Outage Maintenance

Project Number:

Project Location: JEA

Funds: Capital

Award Estimate:

Description of Request:
This award is needed to help fund a Contract Amendment and Restatement of JEA's existing contract with General Electric International, Inc. (GEII), to support additional work related to thirteen (13) planned Outages as defined by the work schedule and work scope in the contract. This agreement calls for a $4,500,000.00 initial renegotiation payment, and a fixed cost of $4,700,000.00, plus a 2.5% annual escalation beginning January 1, 2017, for parts and services for each of the thirteen (13) Outages which are scheduled to occur from 2016 through 2025. Pricing terms have also been established for unplanned maintenance and extra work, if needed. Pricing terms of this contract compare very favorably to the pricing terms in our existing contract with GEII and to the non OEM market for comparable services and is projected to significantly reduce JEA's costs for these services. Per the contract terms, JEA is under no obligation to perform or pay for any of the scheduled Outages in the event these Outages become unnecessary due to changes in JEA's business climate. The Price and Payment Terms of the contract are attached for reference.

Requisition Number:

JEA IFB/RFP/State/City/GSA#:

Purchasing Agent:

Is this a ratification?: NO

If yes, explain:

RECOMMENDED AWARDEE(S):

Name	Address	Phone	Amount
GENERAL ELECTRIC INTERNATIONAL, INC.	4200 WILDWOOD PARKWAY, 4-11A-09 ATLANTA, GA 30339	904-665-6642	$30,100,000.00

C/O
19084

(122,955,133.76)
Total

Amount of Original Award:	$45,700,000.00
Date of Original Award:	6/26/2000
Change Order Amount:	$30,100,000.00

List of Previous Change Order/Amendments:

12/30/2003	**$54,200,000.00**
12/28/2009	**$60,000,000.00**

New Not-To-Exceed Amount:	$190,000,000.00

Background/Recommendations:

JEA entered into a long term parts and long term services agreement with GEII on June 26, 2000 for Combustion Turbine Outage maintenance parts and services support in a not to exceed amount of $45,700,000.00. Subsequent to the initial award, Four (4) contract amendments were made raising the total contract amount to $159,900,000.00. This award will increase the not to exceed amount of the contract by $30,100,000 for a new not to exceed amount of $190,000,000.00, and is needed to help fund the additional work as described in the Description of Request section of this Award Item.

Request approval to award a Contract Amendment in the amount of $30,100,000.00 for the additional work related to thirteen (13) planned Outages as defined by the work schedule and work scope in the attached contract, for a new not to exceed amount of $190,000,000.00, subject to the availability of lawfully appropriated funds.

Manager:	
Director:	Stroupe, Randy - Director Electric Production
VP:	Brost, Mike – VP/GM Electric Systems

APPROVALS:

12-18-14

Chairman, Awards Committee **Date**

12-18-14

VP/GM Electric Systems **Date**

Brandy Branch Combined Cycle Upgrades – BAFO

Proposal

GE has proposed several modifications to the Brandy Branch Combined Cycle (BBCC Upgrades), including:

- **The Advanced Gas Path (AGP) with Tech Package**
- **The DLN 2.6+ Combustion System**.
- **Advanced Compressor**
- **3SA (Step-Aged) Turbine Rotor**

The benefits of these upgrades are as follows:

- Increased efficiency (i.e. – improved heat rate)
- Ability to perform wet compression
- Significant hot day performance improvement
- Significantly improved heat rate & output across ambient temperature range in both combined and simple cycles
- Allows for higher firing temperatures resulting in additional gas turbine output and reduced gas turbine heat rate while providing 32k hour combustion inspection intervals
- Improved air-cooling slot design resulting in reduction of likelihood of rotor stress cracking

Bottom Line
Improved CC Heat Rate
+83 MW Summer Capacity at CC HR
Costs
Up Front Cost (inc. Spares) - **$65.5M**
$5M Credit for existing Spares – included
Total w/ Engineering, Contingency - **$74M**
Fuel and Variable Savings - $10M/yr
Capacity Savings - >$3.6M/yr
Total Savings - **$14M/yr**
Simple pay back Investment in 5.4 yrs
With Debt Service (3%) pay back in 6.3 yrs

Cost

The cost for the BBCC Upgrades and the accompanying LTSA is shown below:

Description	LTSA Amendment #6 ($2017)	FY Timing
Brandy Branch 2 and 3 upgrade (existing Agreement Outage Payment shall apply for install – not included in total)	$45,500,000	2019
Mark VI to VIE upgrade	included	2019
Brandy Branch Initial Spare Parts (ISP) (2 sets)	$25,000,000	2020
Credit for existing spares –2 x $2,500,000	($5,000,000)	2020
Subtotal GE Purchase	$65,500,000	2019/2020
Site Engineering and Contingency (not paid to GE)	$8,500,000	2019
FY 2019 Total	*$54,000,000*	
FY 2020 Total	*$20,000,000*	
Total Up Front Cost	**$74,000,000**	2019/2020
Brandy Branch Hot Gas Path Inspection (per event / per GT) Brandy Branch Major Inspection (per event / per GT)	$5,850,000 $5,850,000	Post 2020
Incremental LTSA cost (part of GE LTSA) HGPI cost increase - post upgrade (4 x $1,032,500) (BB CT 2 & 3 only) Additional HGPI for BB CT 1	 $ 4,130,000 $ 4,817,500	 Post 2020 Post 2020
GE Total Contract Value (Upgrade + Incremental LTSA)	**$74,447,500**	

Benefit

The net impact to the unit of the BBCC Upgrades is to add 57 MW of capacity in the winter, 83 MW in the summer, with heat rate improvement of 1.8 percent, and about a 50% reduction in the ability to duct fire. With the BBCC Upgrades in place, the JEA electric system operates with approximately **$10M** variable savings per year (not including debt service). Additionally, this modification adds 83 MW (summer rating) of capacity at an improved combined cycle heat rate. This additional capacity reduces our need to purchase capacity and energy through PPAs. Using our pricing on the Southern Power Wansley transaction (which was below market), the value of this capacity is at least $3.58/kW-mo, or $3.6M/yr for 83 MW. The total estimated annual savings is approximately **$14M/yr**.

Brandy Branch Combined Cycle Upgrades – BAFO

Summary

The GE Upgrade package (AGP, DLN 2.6+, Compressor and Rotor upgrade) costs approximately $75M (including engineering and site work). With average savings of $14M/yr, the initial investment is repaid within 6 years.

Other

The addition of 83 MW of generation in the service territory will boost system reliability and power quality. The value of these benefits is not quantified. Upgrading BBCC to AGP will commit us to GE for parts and maintenance for the foreseeable future. There are no third party suppliers for AGP components. Parts and spares for the combined cycle will no longer be compatible with the CT fleet. The ability to negotiate with third party suppliers resulted in approximately $70M savings over 10 years on the current LTSA. Additionally, we will exchange two rotors (2016 replacement cost of $17M) that still have 100K to 160K hours of life remaining. The value for these rotors has been captured by GE in their offer. Further potential issues to be addressed include the loss of some VAR control at higher load; possible HRSG maintenance costs (some issues have been reported); and how rerating the generators will impact equipment life.

Heat Rate Comparison

	BGS 2X1		BGS Post Upgrade - estimate		FHA.02 1X1	
	MW	HR BTU/KW-hr HHV	MW	HR BTU/KW-hr HHV	MW	HR BTU/KW-hr HHV
Winter	567	6,518	625*	6,500*	538	6,346
ISO	528	6,651	618*	6,538*	501	6,476
Summer	469	6,930	552*	6,813*	445	6,748

*estimated

GE
Power Services

19 December 2017

Mr. Parvez Shafiq

Sales Contract Performance Manager

General Electric International, Inc. (GEII)

Power Services-Contractual Services

4200 Wildwood Parkway

Atlanta, GA 30339

JEA

Brandy Branch (End-user/Plant)

15701 Beaver St West

Jacksonville, FL 32234

Subject: Mark VI to Mark VIe Migration

Proposal No: DM1796450 REV.1

Serial No: GT Unit1, GT Unit2, GT Unit3, ST Unit4, Gas Turbine BOP (BOP Unit1, BOP Unit2, BOP Unit3), Steam Turbine BOP (EEB1-0 and 1), HRSG Unit2, HRSG Unit3, Switchgear BOP (BOP-0) and Cooling Tower BOP (SN 297378, 297379, 297380 and 270T630)

Reference: Verbal Request

For the attention of: Joe Pineda

General Electric International, Inc. (GEII) (Seller) is pleased to submit the following Fixed Price Proposal to Jacksonville Electric Authority for the hardware, software, engineering, and site services required to support the above-referenced project.

We look forward to the opportunity to discuss the proposed solution. Should you have any questions or require any additional information please do not hesitate to contact us.

Yours sincerely,

Mr. Parvez Shafiq

General Electric International, Inc. (GEII)

Sales Contract Performance Manager

Mr. Todd McCormick

GE Energy Control Solutions, LLC

Sales Manager

4 Installation Services

4.1 Mark VI to Mark VIe Full Migration Installation and Commissioning

The Seller will provide the installation services required to upgrade existing Mark VI to Mark VIe with a full migration. The Seller will provide Controls Field Engineer(s) to technically perform the conversion of the Mark VI hardware to Mark VIe for each unit control type. As this is a card change in the existing panel no craft labor or materials have been included for this work as Seller's personnel will perform all work required. Any/all work outside of the controls cabinet will be the responsibility of the Buyer/End-User.

As the I/O has not been disturbed, no loop checks are included as part of this upgrade. The Seller has included a fixed quantity of onsite time to perform the installation. These fixed quantities are based on the Seller's experience for similar installations on similar equipment and recognize the Buyer/End-User outage schedule.

4.1.1 Mark VI to Mark VIe Full Migration

The Seller Controls Field Engineer(s) will perform the following tasks:

a) Pre-Outage
   i. Initial site survey/kick off meeting
   ii. Safety orientation
   iii. Locate, uncrate, and identify equipment
   iv. Stage parts and work area

b) Outage
   i. Safety/LOTO
   ii. Remove UCVx and VCMI boards
   iii. Remove VPRO assembly and TPRO board
   iv. Install new controller assembly in same footprint as VPRO
   v. Install three (3) new PPRO packs /TPRO Board in same location as TPRO board
   vi. Plug new PPRO pack into new TPRO Terminal board
   vii. Plug Power plugs from VPRO and use on new assembly
   viii. Move Network connections from switch to PPRO, and power distribution
   ix. Remove Standard Mark VI I/O Boards
   x. Install new Standard Mark VIe I/O boards and packs
   xi. Install thermocouple dual module adapter
   xii. Remove or Tuck old Mark VI cables out of the way
   xiii. Verify all cables and connections are correctly in place.
   xiv. Update HMI's as required
   xv. Final inspection

c) Checkout & commissioning

i. Power-up Mark VIe Control.

ii. Install Mark VIe Control unit application software and HMI operator graphics package

iii. Perform Mark VIe Control System Checkout (per GE standards) and perform Turbine Start-Up & Commissioning Tests (per GE standards).

iv. Start up and commissioning effort

d) Demobilize

i. Clean up and final drawing markups

ii. Final Report

4.1.2 Service Schedule

The Seller Services Schedule is based on the following trips, time onsite and working schedule:

Gas Turbine Site Services Schedule – Per Unit

The Seller's Services Schedule is based on the following trips, time onsite and working schedule:

Per Unit Task	Working Schedule	Duration
Pre-outage	10 hrs./day, 6 days/wk., single shift	1 day
Outage Installation	10 hrs./day, 6 days/wk., single shift	10 days
HMIs upgrade	10 hrs./day, 6 days/wk., single shift	1 day
Commissioning & Start-up	10 hrs./day, 6 days/wk., single shift	2 days

Steam Turbine Site Services Schedule

The Seller's Services Schedule is based on the following trips, time onsite and working schedule:

Per Unit Task	Working Schedule	Duration
Pre-outage	10 hrs./day, 6 days/wk., single shift	1 day
Outage Installation	10 hrs./day, 6 days/wk., single shift	10 days
HMIs upgrade	10 hrs./day, 6 days/wk., single shift	1 day
Commissioning & Start-up	10 hrs./day, 6 days/wk., single shift	2 days

Heat Recovery Steam Generator (HRSG) Site Services Schedule – Per Unit

The Seller's Services Schedule is based on the following trips, time onsite and working schedule:

Per Unit Task	Working Schedule	Duration
Pre-outage	10 hrs./day, 6 days/wk., single shift	1 day
Outage Installation	10 hrs./day, 6 days/wk., single shift	14 days
HMIs upgrade	10 hrs./day, 6 days/wk., single shift	1 day
Commissioning & Start-up	10 hrs./day, 6 days/wk., single shift	2 days

Balance of Plant (BOP1, 2, 3 and Cooling Tower) Site Services Schedule – Per unit

The Seller's Services Schedule is based on the following trips, time onsite and working schedule:

Per Unit Task	Working Schedule	Duration
Pre-outage	10 hrs./day, 6 days/wk., single shift	1 day
Outage Installation	10 hrs./day, 6 days/wk., single shift	10 days
HMIs upgrade	10 hrs./day, 6 days/wk., single shift	1 day
Commissioning & Start-up	10 hrs./day, 6 days/wk., single shift	1 day

Steam Balance of Plant Site Services Schedule

The Seller's Services Schedule is based on the following trips, time onsite and working schedule:

Per Unit Task	Working Schedule	Duration
Pre-outage	10 hrs./day, 6 days/wk., single shift	1 day
Outage Installation	10 hrs./day, 6 days/wk., single shift	14 days
HMIs upgrade	10 hrs./day, 6 days/wk., single shift	1 day
Commissioning & Start-up	10 hrs./day, 6 days/wk., single shift	2 days

NOTE:

1. **Additional T&L costs will be added for optional incremental adders.**
2. **Electricians to be supplied by Buyer.**

4.2 Site Project Manager

The Seller will provide a Site Project Manager ("SPM") to oversee and manage all onsite work associated with the installation, commissioning and testing of the Seller supplied equipment, including the following;

a) Oversee and manage all onsite activities included as part of the Seller's site services Workscope.
b) Manage the onsite work per the scope and schedule in the contract/purchase order.
c) Implement and execute to the OneGE EHS safety plan and its requirements.
d) Integrate the assigned service work with the Buyer representatives to assist in meeting scheduled completion, startup, and operation dates.
e) Participate in onsite job progress meetings with Seller and Buyer/End-User.
f) Plan, organize and direct other Seller personnel for the installation, start-up and testing/commissioning of the Seller supplied equipment.
g) Be onsite for a portion or the entire outage depending the specific nature of the job.

4.3 Site Services Schedule Limitation

The Seller's Services Schedule is based on the following trips, time onsite and working schedule:

a) All work to be performed in **2019**. Work beyond will incur an escalation charge of 4%/year.
b) GE Holidays, standby time or second/night shift work are not included.
c) The Seller's onsite time includes up to a maximum of two (2) hours of site access/safety orientation training for the Seller's personnel. This training i) does not include additional mobilizations, ii) is

assumed to occur on the plant site and iii) immediately upon arrival/initial mobilization (No special offsite training requirements). Site safety/access training outside these guidelines will be billed to the Buyer/End-User, as a change order, per the Seller's Standard Services Rate Schedule (Critical Services Rates) in affect at the time of the work.

d) Assumes work scope can be accomplished in an uninterrupted and sequential fashion according to the schedule above.

e) The Seller has included a fixed quantity of onsite time (and trip/s to site) to perform the site services work. These fixed quantities are based on the Seller's experience for similar work scope/installations on similar equipment and recognizes the Buyer/End-User's outage schedule. The Buyer/End-User shall be responsible for properly staffing the installation & commissioning such that the activities below fit within the Seller's site services schedule.

f) Additional trips or onsite time not specifically identified i) in the Schedule, ii) in this proposal document or iii) not agreed to between the parties, prior to providing the additional services, will be billed to the Buyer/End-User, as a change order to the contract/purchase order, per the Seller's Standard Services Rate Schedule (Critical Services Rates) in affect at the time of the work.

4.4 Site Services Division of Responsibility

The DOR represents the responsibilities for projects where the Seller is providing only GE field engineer/s to support the installation the Seller supplied equipment.

4.4.1 Legend: GE / JEA

Item	Description	Responsibility	Comments
a)	Field Engineers and material shall be supplied in sufficient quantity and capability such that the installation and startup of the Seller supplied equipment scope can be completed within the schedule identified herein.	GE	
b)	Provide all required installation tools and materials for the MKVIe migrations	GE	
c)	Provide any specialized test equipment, if required for the MKVIe migrations	GE	
d)	Schedule and manage allotted hours for best utilization in overall project schedule. Additional hours or wait time will be considered extra work	GE/JEA	
e)	Provide qualified personnel for instrument calibration, and to assist Seller's personnel in checkout and commissioning of the new equipment	JEA	
f)	Provide qualified personnel and proper test equipment for the setup and commissioning of any specialty protective relays and/or equipment (such as Multilin, SEL, Beckwith, etc.), if supplied	JEA	

Item	Description	Responsibility	Comments
g)	Provide qualified operators for duration of start-up commissioning	JEA	
h)	Checkout of the communications to a DCS or other site devices will include only basic assurance that separate modes are functional. Complete point-to-point testing can be provided at additional cost. Operational control will be tested and commissioned only from the Seller HMI's	GE	
i)	Includes installation of base scope only. Installation and commissioning of options and/or additional hardware, software, functionality, TILs, etc. (unless specified) will be evaluated for a change in scope, and the field services price will be adjusted accordingly	GE	
a)	Lock Out Tag Out ("LOTO") of all equipment related to Sellers work, prior mobilization	JEA/GE	
b)	Health, Safety, Emergency Response & Security Procedures	JEA/GE	
c)	Regulatory Requirements and permits (Air, welding, work, etc.)	JEA	
d)	Temporary Utilities (electric, light, air, water)	JEA	
e)	Provide Seller's personnel with: Office space, telephone access, internet access, sanitary facilities, drinking water, parking etc.	GE	
f)	First Aid facilities	JEA/GE	

5 Proposal Basis

This section lists those items which are provided by the Buyer or End-user and not part of the Seller's scope of supply. It also lists the Seller's assumptions, comments to Buyer's requirements, and the breakdown of Buyer/End-user responsibilities.

5.1 General Assumptions and Clarifications

Below represents the Seller's Clarifications, Assumptions and Exceptions related to the Seller supplied equipment and services;

a) Seller believes that this proposal/quote meets the intent of the Buyer's request and will be the document of reference in any resulting contract.

b) Seller assumes multiple units onsite (included in this proposal) are similar except for the Unit number designators and tag names as they relate to the Seller supplied equipment (Hardware, Software), engineering, documentation, and control logic functionality. IE: Pricing for unique hardware, software or engineering is not included, when the scope of work is applied to multiple units onsite, which are assumed to be similar.

c) Unless otherwise specifically identified herein, this proposal assumes that none of the Seller's equipment (and related engineering) being supplied under this contract (or related contract) will be installed in, or have its wiring routed through, a classified hazardous area (Ex: Nuclear, Safety Related, ATEX, Class I, Div2 or Class 1 Div1 area).

d) Unless specifically identified in this proposal, the Seller is not supplying any cables (copper, Ethernet, or fiber optic), networking equipment, field devices, instrumentation, cabinets, housings, solenoids, actuation devices, or installation materials.

e) It is assumed that any existing equipment, including but not limited to cabling, wiring, sensors, field devices, terminal boards, communication networks, etc., that are not being replaced as part of this Workscope are in a good working order and calibrated to OEM specifications. Replacement of non-functioning, calibration, or faulty equipment is not included in the scope of this document, unless otherwise specified. If a site survey and Seller's engineering results in the need for additional equipment, cabling, and field devices, this will result in a contract change order where pricing and delivery cycle relief will be afforded to the Seller

f) All machine components are in satisfactory condition and will operate with the new controls. This includes, but is not limited to, the existing metering, generator protection/control, lubrication, cooling, gas, fuel, steam, and hydraulics systems.

g) If a RFQ or technical specification is presented by the Buyer/End-User during the project's execution (contract term), that were not initially brought to the attention of the Seller during the proposal development stage, and said specifications/requirements subsequently increase the cost of the project for the Seller, this will be treated as a Contract Change Order and billed accordingly.

h) Seller reserves the right to substitute suitable and equivalent third-party hardware in place of those proposed, should such items become obsolete prior to final delivery of those products. If during the warranty period, a third-party hardware item becomes defective and requires replacement, such item may be replaced by a substitute item if the third-party item has been obsoleted. Buyer shall receive notification of substitution prior to shipment of the items.

6 Commercial

The workscope/scope of supply identified in this document is subject to the following terms and conditions, and by reference are incorporated herein.

6.1 Base Scope Pricing (Included with .05 Upgrade)

Item	Qty	Description	Price
1.	1 lot	**Mark VI to Mark VIe Full Migration: Upgrades Equipment, Engineering, and Site Services as detailed in Sections 2 and 4** • GT Unit 1 • GT Unit 2 • GT Unit 3 • ST Unit 4 • GT BOP Unit 1 • GT BOP Unit 2 • GT BOP Unit 3 • ST BOP (EEB1-0) • HRSG Unit 2 • HRSG Unit 3 • Switchgear BOP (BOP-0) • Cooling Tower BOP • HMI Count (11 + 1 Spare)	**Included with .05 Upgrade**
2.	1 Lot	**One (1) Day Software Acceptance Test (SWAT) and site MKVIe Panels & Aux I/O Cabinets System as defined in section 2.5 & 3.3**	**Included with .05 Upgrade**

6.2 Optional Scope Pricing

Item	Qty.	Description	Price
1.	1 Lot	**Network Switch Upgrade as defined in section 3.1**	**$ 184,391**
2.	1 Lot	**Spare/Replacement Parts as defined in section 3.2**	**$ 82,213**
3.	1 Lot	**Auxiliary Mark VIe I/O Cabinet as defined in section 3.3**	**$54,387**
4.	1 Lot	**On-Site Training as defined in section 3.5**	**$ 49,595**

6.2.1 Pricing Limitations and Considerations

a) Unless otherwise indicated, the prices quoted herein are valid for the delivery of equipment in **2019** and performance of services in **2019** Delivery of equipment or performance of services in years subsequent to these shall be subject to a price escalation fee equal to 4% per year of the contract price for the undelivered equipment or un-performed services

b) This proposal will remain valid for 30 days from the date indicated in the cover page and may be modified or withdrawn at any time by the Seller prior to receipt of Buyer's acceptance.

c) Prices quoted are based on the Assumptions and Clarifications as described in the Proposal Basis Section and performed according to the Terms and Conditions referenced or provided herein.

d) Seller reserves the right to review and re-quote this job if there is a discrepancy between this proposal and the purchase order. If Seller receives a specification between the issuance date of this proposal and receipt of the purchase order, Seller reserves the right to re-evaluate this proposal.

e) The Seller will evaluate changes to the specification, drawings, services or existing equipment. The will evaluate if these changes constitute a change in the quoted workscope or schedule. Seller will quote the changes and a change order must be received before work is to proceed.
f) The pricing breakouts outlined in this proposal are for accounting purposes only and are not to be considered as standalone prices.
g) The prices quoted herein exclude taxes or other regulatory fees
h) The prices quoted herein exclude duties
i) Unless as specified herein, travel and lodging/living ("T&L") expenses are included.

6.3 Schedule

6.3.1 Equipment (Hardware & Software) Schedule

The After Receipt of Order ("ARO") date will be the date that the Seller ***acknowledges*** the Purchase Order, not the initial date that the Seller receives that PO.

The estimated timescale from acknowledgement of PO/contract to the completion of the workscope or Delivery of the equipment is **22-24 weeks** and is based on current factory loading and lead times offered by Seller and other vendors, if any.

a) Equipment Schedule Limitations

Delivery dates can vary depending on factory workload and should be confirmed before issue of order. Delays in receiving vital information from the Buyer/Enduser or delays in receiving "review" drawings back from the Buyer/Enduser will impact the ARO delivery dates. These delays may result in a day for day slip in the deliver schedule or a complete shift the delivery dates indicated herein.

When detailed drawings representing the Buyer's current (as-running), installed equipment cannot be made available to the Seller, it is critical that the Seller has sufficient time and physical access to the Buyer's equipment while in a Lock-out/Tag-out condition. This will allow the Seller to take measurements, design, manufacture, and **Field Fit** these portions of the total scope of supply. Some examples of this may include fuel valve/actuator/solenoid mounting plates, blanking plates, speed probe brackets, etc.

Seller's proposed schedule with milestone dates will be presented at the Project Kick-Off Meeting. This project schedule will illustrate the various activities from purchase order/contract receipt, through design, manufacture, testing, shipment and site services (if in workscope).

The overall price and cycle quoted herein requires full cooperation between the Seller and the Buyer/Endsuer, and adherence to key milestones dates specified as part of a project implementation plan. The specific milestone dates will normally be set during the Project kick-off meeting and will normally include, but may not be limited to, the following key project control points.

a) Project Kick-Off Meeting (Buyer and Seller)
b) Site survey and/or supply of applicable site data (Buyer and Seller)
    i. Site data (Buyer)
    ii. Drawings and documentation (Buyer)
    iii. Logistics Data (Buyer and Seller)
c) Drawing submittals (Seller)
d) Design review and approval (Buyer)
e) Design freeze (Buyer and Seller)
f) Factory acceptance test/Buyer witness test (Buyer and Seller)

g) Supply of documentation for shipment (Buyer)
h) Support commissioning, start-up, site acceptance testing & handoff (Buyer and Seller)
i) Delivery of documentation (Seller)

Unless otherwise agreed upon in advance, the work shall be executed in an uninterrupted and sequential fashion. If the work is interrupted by or for the convenience of the Buyer, or cannot be performed according to the schedule, The Seller has the right to submit a change order for incremental charges (for example multiple site trips or additional design review cycles, etc). The Buyer shall be provided drawings of sufficient quality and thoroughness early in the project and be given one review cycle, to submit comments and request changes. The review cycle is typically 3 weeks long, but depends on the project schedule and will be reviewed and agreed upon at the Kick Off Meeting. After the review cycle the design will be considered frozen and the cost and schedule impact of requested changes will increase

6.4 Delivery, Title Transfer and Risk of Loss

Seller shall deliver Products to Buyer **FCA** Seller's facility, place of manufacture or warehouse (Incoterms 2010). Title to Products shipped from the U.S. shall pass to Buyer upon delivery with risk of loss transferring to Buyer upon title passage.

6.5 Payment Terms for optional scope

Our proposal is based upon the following invoicing schedule and payment terms

a) Payment terms: Net 30 days
b) Pricing is in United States Dollars (USD)
c) Invoicing schedule:

Invoicing Milestone	Invoice Amount
GE Acknowledgement of PO	20%
Submittal of Eng. Designs	15%
Delivery (Per Contract Delivery Term)	45%
Services - Mobilization	10%
Services - De-Mobilization	10%
Total	100.00%

6.6 Purchase order address details

This proposal/quotation is contingent on the full disclosure of the End User location, before the acceptance of any Purchase Order. Seller will issue Acknowledgement to Buyer Purchase order with in seven(7) business days from receipt of 'acceptable' Purchase order. The execution period of this contract starts from Seller's Order Acknowledgement date.

Upon the Buyer's decision to submit a purchase order, please address the Purchase order to the following Seller's Legal Entity/s:

6.6.1 Legal Entity

General Electric International, Inc.

4200 Wildwood Parkway

Atlanta, GA 30339

Attn: Mr. Parvez Shafiq

6.7 Terms and Conditions

This quotation is an offer to sell between Buyer & Seller, and subject to the terms and conditions listed below, and by reference are incorporated herein. To the extent there are conflicts or inconsistencies between this set of Terms and Conditions and the preceding information provided in this document, the preceding information shall prevail.

a) Long Term Parts & Long Term Service Contract between JEA and General Electric International, Inc.

b) Baker Hughes a GE Company – Software License Addendum Rev. B July 2017

c) The Seller will generally consider the following precedence for any quotation, Contract or set of Terms & Conditions documents in resolving any conflict, error, or discrepancy:

   i. Mutually executed Change Orders or Amendment

   ii. Seller's terms and conditions

   iii. Seller's quotation document

   iv. Buyer Specification/bid document

   v. Buyer's purchase order

11i Supplier	11i Supplier Site	11i Amount Agreed	11i Amount Released	11i Remaining	Number	Amount Agreed
GENERAL ELECTRIC INTERNATIONAL	ATLANTA	$159,900,000.00	$67,340,146.13	$92,559,853.87	TRUE	TRUE

		R-11 CPA Tracking			
Original Award	6/26/2000	$ 45,700,000.00			
C/O 1	12/30/2003	$ 54,200,000.00			
New Award Amount		**$ 99,900,000.00**			Total Spend reconlliation
C/O 2	12/28/2009	$ 60,000,000.00	**spent in R-11**	**R-12 CPA Tracking**	
New Award Amount		**$ 159,900,000.00**	$ 65,995,146.13	**$ 93,904,853.87**	$ 65,995,146.13
C/O 3	12/31/2014			$ 30,100,000.00	
New Award Amount				**$ 124,004,853.87**	
C/O 4	12/21/2017			$ 74,447,500.00	
New Award Amount				**$ 198,452,353.87**	$ 198,452,353.87
	PO's that should have been against CPA, however, were not issued against correct site		116637	$530,000.00	$530,000.00
			107740	$50,000	$50,000.00
			103405	$381,362.31	$381,362.31
			103405	$88,357.80	$88,357.80
New Award Amount	correct CPA amount after C/O 4 (12/21/2017)			$ 197,402,633.76	$ 265,497,220.11
			Amendment 7 NTE	$ 22,271,269.00	287,768,489.11
			Sum not linked on Contract	$1,049,720.11	$ 286,718,769.00	sum if non-linked PO's are removed

069-07 - KGS CT7 066-42 BBGS CT1	$22,271,269.00

Project Number	Project Dates	% Payment	FY21 10/01/2020 - 09/30/2021	FY22 10/01/2021 - 09/30/2022	FY23 10/01/2022 - 09/30/2023	FY24 10/01/2023 - 09/30/2024
ARO Payment	10/1/2021	15%		$3,340,690.35		
Rotor to KGS	6/1/2022	25%		$5,567,817.25		
KGS 7 work comp.	12/1/2022	10%			$2,227,126.90	
ARO Payment	10/1/2022	15%			$3,340,690.35	
Rotor to BBGS	3/1/2023	25%			$5,567,817.25	
BBGS1 work comp	12/1/2023	10%				$2,227,126.90
Totals	**$ 22,271,269.00**	**100%**		**$8,908,507.60**	**$11,135,634.50**	**$2,227,126.90**

Amount Released Same?	R12 Number	R12 Supplier	R12 Supplier Site	R12 Amount Agreed	R12 Amount Released	R12 Remaining	NEW AMOUNT AGREED
FALSE	19084	GENERAL ELECTRIC INTERNATIONAL	ATLANTA	$159,900,000.00	$1,345,000.00	$92,559,853.87	**$93,904,853.87**

FY25 10/01/2024 - 09/30/2025	FY26 10/01/2025 - 09/30/2026	FY27 10/01/2026 - 09/30/2027	FY28 10/01/2027 - 09/30/2028	FY29 10/01/2028 - 09/30/2029	FY30 10/01/2029 - 09/30/2030	FY31 10/01/2030 - 09/30/2031	FY28 10/01/2031 - 09/30/2032

Certification of Standard, Proprietary or Original Equipment Manufacturer Item

For Purchase Requisition No. _____

3-112 Procurement of Standard, Proprietary and Original Equipment Manufacturer Items.

A contract may be awarded for Supplies or Services with limited or no competition when the Supplies or Services:

(a) have been selected as a JEA standard in the course of a standards program or through the action of a standards committee (standard); or

(b) must be a certain type, brand, make or manufacture (proprietary); or

(c) must be obtained from the original equipment manufacturer , manufacturer's representative or a distributor authorized by the original equipment manufacturer because of the criticality of the item or compatibility within the JEA system (original equipment manufacturer).

Category

The procurement item is (check the appropriate description):

_____ Standard _____ Proprietary __X__ Original Equipment Manufacturer

Certification

I the undersigned certify that GE is the OEM for the KCT7 and BCT1 7FA combustion turbines. After discussing rotor replacement options with multiple companies, to the best of our knowledge we have found that GE is the only company that has both the parts and demonstrated experience to upgrade the rotors in these units from unflared to flared.

_____ 3-9-2021

Signature of appointed employee initiating the purchase request Date

This Certification shall be attached the purchase requisition when routed for approval. Approval of the purchase requisition shall constitute affirmation of this Certification.

Approved by the JEA Awards Committee

Date: 03/11/2021 Item# 5

Formal Bid and Award System

Award #5 March 11, 2021

Type of Award Request: INVITATION FOR BID (IFB)
Requestor Name: Steve Lafambroise – Physical Security Specialist
Requestor Phone: 904-510-5400
Project Title: Buckman Fence Replacement Project
Project Number: 8006810
Project Location: JEA
Funds: Capital
Budget Estimate: $300,000.00
Scope of Work:

JEA is soliciting Bids from contractors (hereinafter referred to as "Company") for construction services for the Buckman Water Reclamation Facility fence construction project.

The intent of this project is to replace the existing perimeter fence(s) and gate(s) at the Buckman Waste Water Treatment Facility. Landscaping or clearing provided by others is outside of this scope. The contractor is required to provide individual, itemized, quotation for each identified section on the attached drawing. Each identified section is required to have a total project cost. JEA will review the proposal in its entirety and determine if specific or all locations are to be replaced under this project.

JEA IFB/RFP/State/City/GSA#: 1410256646
Documents Contract & Purchase Order
Purchasing Agent: Lovgren, Rodney
Is this a Ratification?: NO

RECOMMENDED AWARDEE(S):

Name	Contact Name	Email	Address	Phone	Amount
ARMSTRONG FENCE CO.	Dave Williamson	dwilliamson@armstrong-fence.com	3226 Talleyrand Ave. Jacksonville, FL 32206	(904)627-9068	$458,480.00

Amount for entire term of Contract/PO: $458,480.00
Award Amount for remainder of this FY: $458,480.00
Length of Contract/PO Term: Project Completion
Begin Date (mm/dd/yyyy): 03/31/2021 (Construction Start)
End Date (mm/dd/yyyy): 09/30/2021 (Estimated Construction Completion)
JSEB Requirement: Goal – 10%

The Goodley Group of NE Florida (10%) of the Subtotal Bid Price ($41,680.00), does not include SWA.

BIDDERS:

Name	Total Bid Amount	Comment
VIGNEAUX CORPORATION	$350,059.75	Withdrew Bid
ARMSTRONG FENCE CO.	$458,480.00	

Background/Recommendations:

Advertised on 12/29/2020. Two (2) prime companies attended the optional webex prebid. Two (2) prime companies completed the mandatory site visit. JEA held a second prebid and mandatory site visit to which two (2) additional companies attended. At the first Bid Due Date (2/09/2021), JEA received two (2) bids and elected to not open, JEA contacted all bidders, held a third prebid & site visit, prior to the Bid Due Date (2/23/2021) one of the original Bidders withdrew their bid and one (1) new company submitted a Bid, resulting in two (2) Bids. JEA elected to open the two (2) Bids. Post Bid Opening Vigneaux Corporation withdrew their Bid, which JEA approved. JEA determined Armstrong Fence Co. to be the lowest priced Responsive and Responsible Bidder. A copy of the Bid Form is attached as backup.

The work was bid on lump sum basis, the Bid Price and includes a 10% SWA of $41,680.00.

The Bid Subtotals of lines 1 & 2 (original Buckman footprint) are approximately 4% less when compared to the same scope budget estimate and is deemed reasonable. The original budget estimate did not include line 3 or SWA.

1410256646 – Request approval to award a contract to Armstrong Fence Co. for the construction of the Buckman Fence Replacement Project in the amount of $458,480.00, subject to the availability of lawfully appropriated funds.

Manager: Summers, Matt K. - Mgr Physical Security
Director: Edwards, Brandon L. - Dir Security
VP: McElroy, Alan D. – VP Supply Chain & Operations Support

APPROVALS:

03/11/2021

Chairman, Awards Committee **Date**

3/12/21

Budget Representative **Date**

1410256646 Addendum 2 – Bid Form
Buckman WRF Fencing Replacement Construction Project
Submit the Response an electronic pdf in accordance with the procedures in the solicitation

Company Name: ARMSTRONG FENCE Co.

Company's Address: 3226 Talleyrand Ave Jacksonville FL. 32206

Phone Number: 904-627-9068 FAX No: _____ Email Address: DWilliamson@Armstrong-Fence.com

BID SECURITY REQUIREMENTS
- ☐ None required
- ☒ Certified Check or Bond Five Percent (5%)

TERM OF CONTRACT
- ☐ One Time Purchase
- ☐ Term - Five (5) Years w/Two (2) – 1Yr Renewals
- ☒ Other, Specify - Project Completion

SAMPLE REQUIREMENTS
- ☒ None required
- ☐ Samples required prior to Bid Opening
- ☐ Samples may be required subsequent to Bid Opening

SECTION 255.05, FLORIDA STATUTES CONTRACT BOND
- ☐ None required
- ☒ Bond required 100% of Bid Award

QUANTITIES
- ☐ Quantities indicated are exacting
- ☒ Quantities indicated reflect the approximate quantities to be purchased Throughout the Contract period and are subject to fluctuation in accordance with actual requirements.

INSURANCE REQUIREMENTS

Insurance required

PAYMENT DISCOUNTS
- ☑ 1% 20, net 30
- ☐ 2% 10, net 30
- ☐ Other ____
- ☐ None Offered

#	ENTER YOUR BID FOR THE FOLLOWING DESCRIBED ARTICLES OR SERVICES:	TOTAL BID PRICE
1	Subtotal for Fencing Section A - Replacement Construction Project	$ 219,965.-
2	Subtotal for Fencing Section B - Replacement Construction Project	$ 70,960.-
3	Subtotal for Fencing Section C - Replacement Construction Project	$ 125,875.-
4	Subtotal of the Bid Lines 1 through 3	$ 416,800.-
5	Supplemental Work Authorization (10% of Line 4)	$ 41,680.-
6	Total Bid Price (Sum of Lines 4 & 5)	$ 458,480.-

☒ **I have read and understood the Sunshine Law/Public Records clauses contained within this solicitation. I understand that in the absence of a redacted copy my proposal will be disclosed to the public "as-is".**

Bidder Certification: By submitting this Bid, the Bidder certifies that it has read and reviewed all of the documents pertaining to this Solicitation, that the person signing below is an authorized representative of the Bidding Company, that the Company is legally authorized to do business in the State of Florida, and that the Company maintains in active status an appropriate contractor's license for the work (if applicable). The Bidder also certifies that it complies with all sections (including but not limited to Conflict Of Interest and Ethics) of this Solicitation.

We have received addenda 1 through 3

Handwritten Signature of Authorized Officer of Company or Agent — Date: 2/23/2021

Dan Mizer President
Printed Name and Title

Acknowledge receipt of this addendum on the Response Form

MINIMUM QUALIFICATIONS

THE MINIMUM QUALIFICATIONS SHALL BE SUBMITTED ON THIS FORM. IN ORDER TO BE CONSIDERED A QUALIFIED BIDDER BY JEA YOU MUST MEET THE MINIMUM QUALIFICATIONS LISTED BELOW, AND BE ABLE TO PROVIDE ALL THE SERVICES LISTED IN THIS SOLICITATION.

THE BIDDER MUST COMPLETE THE BIDDER INFORMATION SECTION BELOW AND PROVIDE ANY OTHER INFORMATION OR REFERENCE REQUESTED. THE BIDDER MUST ALSO PROVIDE ANY ATTACHMENTS REQUESTED WITH THIS MINIMUM QUALIFICATIONS FORM. BIDDER SHALL SUBMIT AN ELECTRONIC COPY IN ACCORDANCE WITH THE SOLICITATION REQUIREMENTS

BIDDER INFORMATION

COMPANY NAME: Armstrong Fence Co

BUSINESS ADDRESS: 3226 Talleyrand Ave

CITY, STATE, ZIP CODE: Jax. FL 32206

TELEPHONE: 904-627-9068

FAX: 904-356-2334

E-MAIL: DWilliamson@Armstrong-Fence.com

PRINT NAME OF AUTHORIZED REPRESENTATIVE: David Williamson

SIGNATURE OF AUTHORIZED REPRESENTATIVE:

NAME AND TITLE OF AUTHORIZED REPRESENTATIVE: David Williamson - Automation & Security Mgr.

- A valid State of Florida General Contractors License (enter number on Bid Form located in Appendix B)
- Bidder shall have successfully completed two (2) similar projects, within the last five (5) years as of the Bid Due Date. A similar project is a commercial or industrial fencing installation project which includes electric gate operators greater than $200,000 in value in the State of Florida. If the Bidder has completed a JEA construction project, the Bidder shall submit at least one JEA project to meet the minimum qualifications.

Reference 1 of 1

Reference Name MATT SUMMERS

Reference Phone Number 904-665-4798

Reference E-Mail Address SUMMMK@JEA.COM

Contract Duration/Amount 2019 $216,063.60

Description of Project JEA - ARLINGTON WTP
Fence & GATES Replacement AROUND ENTIRE SITE

CONSTRUCTION AND DEMOLITION DEBRIS DISPOSAL

(See Subsection ____ - Instructions to Bidders)

Construction and demolition debris at the worksite will be disposed of at All American Roll Off / OTIS Rd Landfill 1700 OTIS Road JAX FL 32220;

This location is subject to Certificate of Necessity No. _____, and is designated by Public Works Department Permit No. _____.

(Signature)

Security & Automation MGR.

(Title)

LIST OF SUBCONTRACTORS

JEA Solicitation Number 1410256646 requires certain major Subcontractors be listed on this form, unless the work will be self-performed by the Company.

The undersigned understands that failure to submit the required Subcontractor information on this form will result in bid rejection, and the Company agrees to employ the Subcontractors specified below: (Use additional sheets as necessary)
Note: This list of Subcontractors shall not be modified subsequent to bid opening, without a showing of good cause and the written consent of JEA.

Type of Work	Corporate Name of Subcontractor	Subcontractor Primary Contact Person & Telephone Number	Subcontractor's License Number (if applicable)	Percentage of Work or Dollar Amount

NONE

Signed: _____

Company: Armstrong Fence Co

Address: 3226 Talleyrand Ave Jax FL 32206

Date: 2/9/21

LIST OF JSEB SUBCONTRACTORS

The following JSEB Subcontractors will be utilized in fulfilling the terms and conditions of a Project Authorization arising from award of JEA - 14102,5646 I (We) the undersigned understand that failure to submit said information will result in bid rejection. I (We) will employ the JSEB Subcontractors specified below: (Use additional sheets as necessary)

Class of Work (Category)	*Name of JSEB Contractor (Indicate below)	Percentage of Total Job or Dollar Amount
Removal of existing fence and clearing.	The Goodley Group of NE Florida	100%

Signed _____

Company Armstrong Fence Co.

Address 3226 Talleyrand Ave

Date: 3/4/2021

Note: This list shall not be modified subsequent to bid opening without a showing of good cause and the written consent of the JEA.