Meeting Purpose and Agenda

PURPOSE: Review the Task 7B Heater Installation Bid Package, the STEP Project & Team and the Bidding Guidelines, Due Date and Answer any Questions on the Bid Package.

AGENDA: Review the key agenda items noted below.

1. Introductions (GTI: Mark Stevens)
2. Project Background and Overview (GTI: Brian Lariviere)
3. Bidding Process Schedule (GTI: Mark Stevens)
4. Bid Package Review of Content (SCI: Tavin Dille)
5. Brief Review of GTI Commercial Terms and Conditions (GTI: Phil Holland)
6. Review of Safety, Host Site Requirements, Site Walk Through Date, Other Contractors on Site, etc. (SwRI: Eric Thompson)
7. Review of Process Heater Scope of Supply / Details (Mark Stevens / Matt Hauth from Optimus)
8. Potential Bidders Questions (ALL)
9. Follow-Up Actions (ALL)
Introductions – Project Related Information

COMPANIES:
• Gas Technology Institute (GTI) – Prime Contractor with DOE
• Southwest Research Institute (SwRI) – Subcontractor to GTI - Host Site
• General Electric Global Research (GE-GR) – Subcontractor to GTI – Turbomachinery
• Stanley Consultants Inc. (SCI) – Site Engineering Contractor
• Optimus (OPT) – STEP Process Heater Equipment Manufacturer

CONTACTS:
• Brian Lariviere – GTI Project Program Manager
• Aaron Mc Clung – SwRI Program Manager
• Jason Mortzheim – GE-GR Program Manager
• Mark Payne – SCI Project Manager
• Eric Thompson – SwRI Construction Manager
• Mark Stevens – GTI Heater System Engineer
• Tavin Dille – SCI Project Engineer
• Scott Macadam – GTI Plant Engineer
• Matt Hauth – Optimus Project Manager
Introductions – Project Related Information

INVITED BIDDERS:
• How was the bidders list developed?
  - GTI reached out to SwRI, SCI and Optimus for contacts capable of installing equipment similar to the process heater.
  - GTI contacted the various contacts provided and discussed the general scope of the project to determine interest.
  - GTI reviewed company websites and information provided from prospective bidders and came up with the 6 bidders invited to this the prebid meeting.

BID PACKAGE CONTENTS
• The bid package consists of 8 files sent directly to each bidder from SCI.
• The list of files is shown on the next slide and SCI will walk through the key items within this package as part of this meeting.
Introductions – Project Related Information

INFORMATION SENT IN THE BID PACKAGE IS SHOWN BELOW:

Files from Sarah Tomase at Stanley Consultants
CONSTRUCTION PACKAGES & TASK PLANNERS:
• Task 6: Building, Foundations, UG Raceway, Bldg. Electrical - Eric Thompson/Craig Nolen
• Task 7A: Cooling Tower System – GTI: Doug Heim
• Task 7B: Process Heater – GTI: Mark Stevens
• Task 8E: Process Electrical – SwRI: Craig Nolen
• Task 8M: Process Mechanical – SwRI: Jonathan Wade

OTHER CONTACTS
• SwRI Warehouse Manager: Al Steiner
• Project Control/Schedule: Katie McCloud (SwRI)
• GTI Document Control: Michelle Poughassamians
• SwRI Document Control: Andrea Barnett

KEY THEME: Complete all work safely!
Introductions – Project Related Information

OVERALL SITE MAP / PICTURES

West Side of Building – March 2020

East Side of Building – March 2020

Ammonia Storage

Process Heater

Task 7B Heater Installation Prebid Meeting – 4/23/20
Supercritical Transformational Electric Power (STEP)  
10 MW_e sCO2 Pilot Plant Demo  
Heater Installation – Prebid Meeting Project Background

Date Held: April 15, 2020
Supercritical Transformational Electric Power (STEP) Project DE-FE0028979

Scope: Design, construct, commission, and operate a 10 MWe sCO₂ Pilot Plant Test Facility - reconfigurable to accommodate other testing – **First of a kind at this scale**

Goal: Advance state of the art for high temperature sCO₂ power cycle performance from Proof of Concept (TRL3) to System Prototype validated in an operational system (TRL7)

Team: U.S. Department of Energy (DOE NETL)  
Gas Technology Institute (GTI®)  
Southwest Research Institute (SwRI®)  
General Electric Global Research (GE-GR)

**Joint Industrial Partners:**

Schedule: Three budget phases over six years (2016-2022)
Promise of $sCO_2$ Power Cycles

Promise:
- Efficient, Compact, Scalable, low water, low-carbon power generation

Plans to Demonstrate:
- Operability, Turbomachinery, Seals, Heat Exchangers, Durability, Materials, Corrosion, Cost

Versatile Technology – Broad Applicability:

- Concentrated Solar
- Fossil Fuel
- Geothermal
- Nuclear
- Ship-board Propulsion
- Waste Heat Recovery
STEP Program Objectives

STEP Demo will demonstrate a fully integrated functional electricity generating power plant using transformational sCO2-based power cycle technology

Demonstrate pathway to high efficiency

Demonstrate cycle operability at 10 MWe net power generation

Quantify performance benefits:
  - Reduced emissions, fuel, and water usage

Demonstrate Reconfigurable flexible test facility

Beyond STEP - sCO2 Technology Test Bed Available
  - Available for Testing future sCO2 equipment & systems

STEP will be among the largest demonstration facilities for sCO2
STEP - Flexible Test Facility

- Test Bay for Process Hardware
- Control Rooms, Offices, & Assembly Areas
- Process Heater
- Inventory Mgmt System
- Includes Area for Expansion
- Process Cooling
- Process Electrical
STEP Plan – Currently Mid-way through BP2

**Budget Period 1**
- **Ended mid February 2019**
- **Detailed Facility and Equipment Design**
  - 28 months
  - System analysis, P&IDs, Component Specs
  - Design major equipment
  - Procure heat source, cooling tower & long-lead items
  - Materials & seal tests
  - Start site construction

**Budget Period 2**
- **Ends January 2021**
- **Fabrication and Construction**
  - 24 months
  - Complete site construction and civil works
  - Fabricate & Install Major Equipment
  - Commissioning & Simple-Cycle Tests

**Budget Period 3**
- **Ends September 2022**
- **Facility Operation and Testing**
  - 20 months
  - Facility reconfiguration
  - Test Recompression Brayton Cycle
  - Validate Traceability to Performance Objectives

**Status:**
- **BP1 Completed**
  - System & Major Equipment Design
- **BP2 Progress**
  - Site Construction Well Underway
  - Procurement & Fabrication of major equipment nearing completion
  - Delivery of Major Equipment started in Nov 2019
  - Testing in Mid-2021
BP3: Recompression Closed Brayton Cycle

Objectives

Demonstrate high performance cycle with parallel compressors & multiple HEX
• Measure Steady & Transient Cycle Performance Data, evaluate operability
Bidding Process Schedule

The key dates associated with the Task 7B bid package are shown below:

- Issue Task 7B Heater Installation Bid Package: 4/16/20
- Conduct a Virtual Pre-Bid Meeting: 4/23/20
- Schedule a Site Walk Through For Interested Bidders: Wk. of 5/4 – 5/11
- Bids Due Date: 5/22/20
- Complete Bid Reviews, Clarifications, Analysis, Recommendation: 6/12/20
- Award the Task 7B Heater Installation Bid Package: 6/22/20
- Selected Contractor Mobilization Complete: 7/13/20
- Power Available for Task 7B Contractor for Final Checkout: 10/5/20
SCI will walk through each of the documents below to highlight key items:

- GG101: General Site Plan
- Project Manual
- SCI Electrical Drawings
- SCI Structural Drawings
- SCI Mechanical Drawings
- Vendor Documents
GG101: GENERAL SITE PLAN NOTES:

• Foundations are poured including anchor bolts for heater and stack
• Underground (UG) Raceway is installed
• Building will be complete by the time 7B starts
• Task 8E work will be occurring simultaneously to this contract
• Task 7A (Cooling Tower work will also be occurring)
Bid Package Review of Content

PROJECT MANUAL NOTES:

• Milestone Schedule PDF Page 22
  ➢ Power available on October 5\textsuperscript{th} – Contractors to determine schedule that allows them to be able to finish by November 10\textsuperscript{th}.
  ➢ Note there is LD for substantial completion

• Division of Responsibility (DOR)
  ➢ You are Contractor Responsible for Task 7B – Installation of Process Heater
  ➢ Item 83 on PDF Page 25
    • Must move exhaust stack from somewhere on SwRI campus to site
    • Very limited laydown space, must coordinate shipment of all other Optimus equipment to site such that it can be hoisted off truck and into place.
  ➢ Item 374 (blank) on PDF page 35—First fill of aqueous ammonia
Bid Package Review of Content

PROJECT MANUAL NOTES:

• Exhibit 1-4 Adjustable Unit Prices PDF page 46 and Exhibit 1-5 Subcontractor Pricing PDF page 4
  ➢ Please fill these out with bids

• Bid Summary Sheet – Section 00 43 22 – PDF Page 61 -- Please break pricing in this manner.
  ➢ Note Option Pricing for Heater Maintenance Activities – (PDF Page 105 of Vendor Docs)
  ➢ Include allowance for maintenance of construction entrance. Maintain access road in as found condition from W Commerce St to the jobsite. Also listed as Item 293 in Division of Responsibility.
  ➢ Include allowance for 3rd Party Inspections of Structural Steel. Refer to Section 05 10 00. No pressure part welds to perform or inspect.

• Section 01 11 00 Summary of Work –
  ➢ PDF Page 65 - Plans submitted 20 days prior to mobilization
  ➢ PDF Page 69 – Safety plan needs to include lockout tagout
  ➢ Provide Safety Statistics with Bid
Bid Package Review of Content

PROJECT MANUAL NOTES:

• Electrical Lists –
  ➢ Cable Schedule PDF Page 161
    • List is used by multiple contractors - highlights indicate new additions (For other’s reference)
    • Note Scope
  ➢ Conduit Schedule for Reference Only PDF Page 166
  ➢ Excel versions
• Section 40 80 00 Pre-Commissioning-PDF Page 189
  ➢ Contractor responsible for pre-commissioning checkout, cleaning, blowing, megger tests, bumping motors, loop checks, etc.
  ➢ Start up of system as a whole will be by SwRI.
• Section 48 05 00 – PDF Page 201, Part 3.04 H – Vent to safe area
• Mechanical Lists PDF Page 234 – 7B is highlighted Yellow
Bid Package Review of Content

PROJECT MANUAL NOTES:

• EG010/EG011 -Equipment List – Scopes
• EO003 Series-Scopes shown in boxes (7B)
• EU Series Drawings (EU104 as an example) – UG Conduit for reference – UG Raceway is installed but not cable
  ➢ In general, from an electrical pulling and terminating perspective, the philosophy is that if you install the equipment, you pull and terminate the cable for it.
  ➢ Cable Schedule provided in Excel so you can sort it by 7B.
  ➢ Refer to Vendor Docs – PDF Pages 38, 48, 178, 237 as examples

➢ Structural
  ➢ All foundations are poured
  ➢ SF112/312
    • Stack and Heater anchors installed
    • For auxiliary equipment – 7B to provide epoxy anchors per SF112
  ➢ SF113/313 – all this is installed
    • Must get equipment through or over existing gate/fence SF113
  ➢ SS581 – Pipe Support Supplementary Steel by 7B
Bid Package Review of Content

PROJECT MANUAL NOTES:

• P&ID’s-Not too much piping.
  - PI601 as an example- Scopes are defined – “Others” Category Marked by “O” – Pipe Supplied by Optimus, installed by 7B. Refer to PDF Page 65 of Vendor Docs for Optimus P&IDs

• Pipe Supports
  - All supplementary steel is installed by 7B contractor.
    - Supplementary steel is by 7B Contractor. Refer to MS001, MS501 for pipe supports and SS581 for supplementary steel.
  - Small bore is field supported (7B Contractor chooses from typical details and locates). Please be sure to include a small amount of engineer time on your side to look at tables and details and choose the right support.
  - All large bore pipe supports are provided by Optimus – (Except for FG 009 – refer to MP103—short run of FG pipe)
    - Refer to Drawing 6971 – PDF page 149 of Vendor Docs
    - Hot ammonia needs to be insulated – none for rest of piping
Bid Package Review of Content

PROJECT MANUAL NOTES:

- Equipment Erection (Vendor Documents)
  - Shipping List PDF Page 15
  - PDF Page 131 for typical equipment arrangement
  - Equipment Insulation -- PDF Page 259
  - PDF Page 280 for platforms provided by Optimus, installed by 7B
GTI Commercial Terms and Conditions

BRIEF SUMMARY OF GTI’S TERMS & CONDITIONS:
• ARTICLE 1 - WORK & SPECIFICATIONS
• ARTICLE 2 - COST AND SCHEDULE
• ARTICLE 3 - REPRESENTATIVES
• ARTICLE 4 - CHANGES AND EXTRAS
• ARTICLE 5 - RESPONSIBILITY FOR WORK; SAFETY OF PERSONS AND PROPERTY
• ARTICLE 6 - PROTECTION OF EXISTING STRUCTURES AND PROPERTY; CONTRACTOR’S LIABILITY.
• ARTICLE 7 - CLEAN UP
• ARTICLE 8 – SUBCONTRACTORS
• ARTICLE 9 – INDEMNIFICATION
• ARTICLE 10 - INSURANCE
• ARTICLE 11 - INDEPENDENT CONTRACTOR
• ARTICLE 12 - STOP WORK ORDER
• ARTICLE 13 - WARRANTY OF CONSTRUCTION
• ARTICLE 14 – TESTING
• ARTICLE 15 – COOPERATION AMONG CONTRACTORS
• ARTICLE 16 - LIENS
Program Construction Status

- Task 6 – Finishing Construction
- Task 8E – Awarded
  - Mob 6/1/20
  - 5 month schedule
  - Permanent Power Available to Heater 10/5/20
- Task 7B – Bidding
  - Mob _________
- Task 7A – Future
  - Mob late summer
- Task 8M – Future
  - Mob late summer
West Side of Building 294 – April ‘20
North Side of Building 294 – mid April ‘20
East Side of Building 294 – April ‘20
South Side of Building 294 – April ‘20
Bidder Assumptions

1) Stable Site
2) UG Conduit installed
3) UG Piping installed
4) Foundations poured
5) Gravel installed
6) Roadways are paved
7) No Temporary Chillers
8) Building has CO
FURNISHED AND INSTALLED BY TASK 8E
SET BY TASK 7B, WIRED BY TASK 8E
Construction Entrance

Pilot Scale Test Facility

Commerce
Working on SwRI Campus

• Working hours are 6:30am – 6:30pm, Monday through Friday
  • Work outside these hours must be approved in advance by SwRI Security
  • List of people at least 48 hours in advance
  • Workers must use entrance off West Commerce and stay on job site or entrance road at all times

• Workers on campus must be authorized to work in the U.S. and carry evidence as such while on campus
  • Examples of evidence:
    • Driver’s license with gold star in upper right corner
    • Birth, naturalization, or citizenship certificate
    • Passport
    • Permanent resident card
  • Citizens from Syria, Iran, North Korea, Cuba, and Sudan are not allowed on SwRI premises at any time
  • Illegal aliens are not authorized on SwRI premises at any time for any reason
  • Foreign workers must be pre-coordinated 24 hours in advance before being given access

• Obey traffic laws on campus
  • Vehicles must be current with registration

• COVID-19 situation, if still applicable, will require additional reporting
SwRI Safety & Requirements

Questions for the bidders

- What is your company’s RIR for last three years?
- Have you had a fatality within the past three years?
- What is your corporate approach to Safety?
- How would you manage Safety on a daily basis?

Needs for Awarded Contractor

- Safety Plan due 30 days before mobilization
- Monthly Stats – Near Miss, First Aid, Recordable, Property Damage, Environmental Incident
Crane Operation & Heavy Lifting at SwRI

Questions for the bidders

➢ How many modules do you plan to set per day?
➢ Time to set the 2 stack sections, 9 modules, air fan

Needs for Awarded Contractor

➢ Crane checklist & operator qualification
➢ Rigging design for large modules
➢ Where are you at on the crane chart
➢ Crane location / Ground bearing pressures
➢ Roadway protection
Other Considerations for Bidders

Other considerations for bidders
- Weekly Contractor coordination meetings
  - In addition to weekly meeting
- Contractor to provide portable bathrooms
- Contractor to provide water / hydration for workers
- Contractor to provide wash stations
- Contractor to provide their own office space
- Contractor to provide their own power / WiFi
- Quality Plan required 30 days before mobilization
- How much laydown are you requiring?
Site Visits / Questions

- Groups less than 6 persons (total)
- Time Slots
  - Thursday May 7\textsuperscript{th} and Friday May 8\textsuperscript{th}
  - Thursday May 14\textsuperscript{th} and Friday May 15\textsuperscript{th}
- COVID19 Visitor Form (need at least 1 week prior to visit)
- Provide own PPE / Mask
- Pictures
Review of Process Heater Scope of Supply

The Optimus process heater consists of the 10 modules listed below being fabricated independently. Module A45 is the only item left in fabrication.

- Module A15: Inlet Transition
- Module A25: Burner Section
- Module A35: Combustion Chamber
- Module A45: Heat Transfer / Coil
- Module A55: Tempering Air Injection
- Module A65: Expansion Module A
- Module A75: Expansion Module B
- Module A85: Outlet Transition
- Module A95: Exhaust Stack
- Module 3200: Catalyst Section
Process Heater Background - Equipment Overview

Heater Stack (A95)  
1/4" x 10' dia. X 70' tall

Heater Stack (A95) Stored at SwRI until Installed.

Outlet Transition (A85)

Heater Coil Module (A45)

Inlet Transition (A15)

Burner Management Skid
Pictures of Completed Modules for Reference

Miscellaneous pictures of the completed fabrication of typical Modules A15 to A85
Pictures of Completed Exhaust Stack Module for Reference

Miscellaneous pictures of the completed fabrication of Module A95, Exhaust Stack, which is on site at SwRI.
Process Heater Background: Pictures of Fabricated Module A45

Pictures of the fabrication of Module A45 showing the 740H tubing used. Frame shown that was used for PWHT handling.
Review of Heater Scope of Supply

Optimus Typical Field Assembly Drawing Examples: Part of the Vendor Documentation Package.

- Weight: 33,100 lbs.
- Bottom Half of the Stack Module A95
- Inlet Transition Module A15
Bidder Questions?

Open for questions from potential bidders.

Any Questions?
Follow-Up Actions?

Summary of follow-up actions and next steps.