



SCOPE OF SERVICES

Solicitation Number: *CLMP193*

Project Name: *2016 IDENTIFICATION AND ANALYSIS OF FLAWS IN POWER GENERATION FACILITIES ROTATION LIST*

PROJECT FOR:

CITY OF AUSTIN, *AUSTIN ENERGY*, THROUGH ITS CAPITAL CONTRACTING OFFICE

PROJECT TITLE:

2016 IDENTIFICATION AND ANALYSIS OF FLAWS IN POWER GENERATION FACILITIES ROTATION LIST

OBJECTIVES OF THE PROJECT:

Austin Energy anticipates selecting up to four (4) firms to provide testing and inspection services as outlined and described in this document at Austin Energy's Power and District Cooling Plants. Services will include the identification of necessary examinations, engineering, failure analysis, Non-Destructive Examination (NDE) inspections, laboratory testing, root cause analysis, sampling, and interpretations. The contractor will provide engineering reports and recommendations as outlined and described below in the Deliverables section.

Projects will include, but are not limited to, boilers and auxiliary components, piping systems, and various rotating equipment with the objective of upgrading overall safety and reliability of plant operations.

BACKGROUND:

Austin Energy (AE) owns and operates three (3) power plants and two (2) district cooling plants in and near Austin. The power plants consist of a total of six (6) steam units, eight (8) simple cycle gas turbines and one (1) combined cycle unit. The district cooling plants consist of Mueller Energy Center — Central East Austin (district cooling, thermal storage, Combined Heat and Power (CHP) technology), and District Cooling Plant II — Downtown Austin (district cooling, thermal storage).

The adopted Generation Reliability Improvement Program (GRIP) and AE Boiler Strategy Program (AE-BSP) are primary drivers for non-destructive testing. This program has provided recommendations for inspection, testing and failure analysis, in addition to those services routinely performed for the maintenance of AE Power Generation and District Cooling Plants.

ANTICIPATED SERVICES:

Services to be provided under this contract will include conducting all necessary tests, inspections and analysis in accordance with commonly used practices under the Electric Power Research Institute (EPRI) and American Society of Mechanical Engineers (ASME) guidelines, but not necessarily be limited to their guidelines.

Certification requirements are as follows:

1. "R" Stamp by the National Board of Boiler and Pressure Vessel Inspection
2. American Society of Nondestructive Testing (ASNT-TC-1A) Level II & III:
 - a. Provide visual inspections (VT) per B31.1
 - b. Visually examine (VT) 100% of the welds
 - c. Magnetic testing, Radiographic, and Ultrasonic Testing Methods
3. American Welding Society-Certified Welding Inspector (AWS / CWI)

Code requirements are as follows:

1. ASME Boiler and Pressure Vessel
2. National Board Inspection Codes (NBIC)

Services to include:

- a. Ultrasonic Shear Wave Testing (UT)
- b. Ultrasonic Thickness Testing (UTTH)
- c. Ultrasonic Testing for Hydrogen Embrittlement
- d. Radiographic Examination using Iridium or Cobalt Sources
- e. Magnetic Particle Examination Dry Particle and Wet Fluorescent (WFMT)
- f. Eddy Current
- g. Visual inspection of boilers and various power plant equipment – external and internal video-borescope examinations
- h. Microscopic Analysis, Micro-etching Metallurgical Replication, and Failure Analysis
- i. Mechanical Testing including INSITU hardness testing
- j. Chemical Composition Analysis
- k. Application of Acoustical Leak Detection Systems
- l. Ultrasonic oxide thickness measurement and analysis (Note: Consultant should list accuracy and minimum oxide measurement capabilities)
- m. Tube sample analysis
- n. Alloy verification positive metal identification (PMI) (Note: Consultant should state type and method used.)
- o. Determination of location of critical areas for metallurgical replications on headers and long seam welds. (Note: Consultant is to list headers and areas.)
- p. Replication
- q. Flux Leakage Test
- r. Oxide thickness measurements and remaining tube life based Larson Miller curve

- s. 10% of the welds passing visual examination will be examined using ultrasonic (UT) with recordable equipment as required by B31.1. This allows for permanent records of the examinations and follow-up QA/QC. These records will serve as documentation within the final reports and verification of compliance with B31.1.
- t. Radiography or X-rays (RT) can be used as an alternative to UT in which case; the radiographic films serve as the permanent examination record.
- u. The UT/RT frequency shall be increased to 100% in portions of the pipe that will be inaccessible for future repairs or that during pressure testing.
- v. Alternative NDE methods will be considered on a case by case basis.

Consultant's QA/QC or AWS-CWI inspector shall review and approve Welding Procedure Specification (WPS), Procedure Qualification Record (PQR), and Welder Performance Qualification (WPQ) submittals. Consultant shall also confirm that the PQR's include the tensile testing results and that the testing laboratory has specific lab identification numbers assigned to the test results and traceable to the WPS's and the PQR's.

Consultant's inspectors performing field tests shall be certified at a minimum as an AWS-CWI to perform B31.1 visual inspections (VT) and as an ASNT-TC-1A Level II for the type of NDE selected for the project. It is preferred to have one inspector with both certifications and qualifications. If one inspector cannot be hired with both certifications and qualifications; it may be necessary to have two inspectors.

Engineering analysis and disposition of defects including, but not limited to tolerable flaw calculations and suitability for service analysis, fracture mechanics evaluations for:

- Critical defect size (The size of a crack)
- The life expended in growing a crack from a specified initial size to a critical size (Active)
- The likelihood that cracks will be non-propagating or arrest (Dormant)

Emergency – Consultant must have personnel and equipment available to respond to emergency plant needs which commonly arise from generating units. Emergency responders must be on-site at the location of the emergency within six (6) hours following notification including evenings, weekends and holidays.

DELIVERABLES:

1. Visual and NDE UT/RT Inspection Reports will be certified, documented in writing and approved as follows:
 - a. Visual and NDE UT/RT daily examination report sheets to include:
 - Identifying type and extent of indications even when indications are in compliance with the specified code.

- Examination record from the recordable UT device or if RT is used, the x-ray film.
 - Examination calibration sheet, identifying equipment, probes/transducers, calibration block and critical defect sizes.
 - NDE Inspection Technique Sheets.
- b. ASNT-TC-1A Level III inspector shall review the report for accuracy and if correct, sign and return it to the City Inspector within three (3) business days unless a faster turnaround is specified by the AE Project Manager. This will ensure that inspection errors are discovered before installation is too far along. Should the ASNT-TC-1A Level III contractor reviewing the reports be the same inspector performing the field inspections, then an additional level of review is not required for the field reports. Also, if a separate inspector is performing the VT, the AWS-CWI inspector shall sign and certify the VT report.
- c. All reports include a statement that NDE performed adheres to ASME B31.1, Visual Examination and 1364.2 and 136.4.5, Ultrasonic Examination 136.4.6 or Radiography Examination.
2. Weekly Reports shall be submitted within ten working days of week's end. Failure to meet this commitment may result in contract cancellation.

The contractor should provide weekly reports identifying for each project:

- a. Work performed since the previous report;
- b. Current work percentage complete;
- c. Tasks scheduled for the following period;
- d. Billable costs incurred during the report period;
- e. Cumulative billable cost;
- f. Minority Owned Business Enterprise (MBE) and Women Owned Business Enterprise (WBE) participation to date and at completion;
- g. Cost to complete;
- h. Identify any potential technical issues, cost or schedule matters which may impact approved project plans.

3. Final Test Report

The consultant shall provide a minimum of five (5) copies with color reproduction (as applicable).

The final test report shall include:

- a. Project Summary:
 - Discussion of indications found
 - Recommended repairs
 - Remaining Equipment Life

- Material and Specifications
- b. Final Recommendation(s) to include suggested options, if applicable.
- c. Signed by ASNT-TC-1A Level III contractor certifying results and AWS-CWI if VT performed by another contractor.
- d. Examination procedures
- e. Test Results Summary:
 - Engineering Calculations
 - Computer Analysis ((FEA and pipe stress analysis)
 - Data table showing inspection results on each weld
 - Weld Map(s)
 - UT Device Records or X-rays
 - Examination calibration sheet or RT Reader Sheets
- f. Reports:
 - Metallurgical Laboratory Reports
 - Certified Daily Reports of Visual and UT/RT Inspections

2. Photographic documentation

PROPOSED PROJECT SCHEDULE:

Estimated for three (3) years or until available funding authorization is expended.

COST ESTIMATE:

The maximum cost of services for all firms is approximately \$4,000,000.

The City anticipates selecting up to four (4) firms with an authorization of \$1,000,000 per firm.

MAJOR AND OTHER SCOPES OF WORK:

Below is a list of the major scopes of work that the City has identified for this project. ****There must be representation for all major scopes of work listed in the prime’s Contractor statement of qualifications. The experience of the firms listed to perform the Major Scopes of Work, whether a sub-consultant or prime firm, will be evaluated under Consideration Item 6 – Major Scopes of Work – Comparable Project Experience.***

In addition, the City has identified Other Scopes of work that MAY materialize during the course of the project. The City does not guarantee that the scopes listed under Other Scopes of work will materialize on this contract. If the prime consultant intends to enter into a subconsulting agreement on a scope of work not listed below, the prime consultant is required to contact SMBR and request an updated availability list of certified firms in each of the scopes of work for which the prime consultant intends to utilize a subconsultant.

*** Major Scopes of Work**

INSPECTION/EXAMINATION SERVICES, NON-DESTRUCTIVE
MECHANICAL ENGINEERING
METALLURGICAL ENGINEERING
FORENSIC ENGINEERING

Notes:

- If the City determines that a conflict of interest exists at the prime or subconsultant level, the City reserves the right to replace/remove the prime or instruct the prime consultant to remove the subconsultant with the conflict of interest and to instruct the prime consultant to seek a post-award change to the prime consultant's compliance plan as described in City Code § 2-9B-23. Such substitutions will be dealt with on a case-by-case basis and will be considered for approval by Small and Minority Business Resources (SMBR) in the usual course of business. The City's decision to remove a prime or subconsultant because of a conflict of interest shall be final.
- For Subproject assignments that include construction activities performed by the CONSULTANT or Subconsultants, workers shall be paid not less than the prevailing wage rates, as referenced in Section 00830 (http://www.austintexas.gov/sites/default/files/files/Contract_Management/Construction_Bid_Docs/00830_02.04.15_.pdf).
- A consultant performance evaluation will be performed on all professional services contracts. This evaluation will be conducted at the end of each Preliminary, Design and Construction phase, or at assignment completion for those projects with no distinct phases (i.e., surveying, SUE services, etc.).
- Workforce Security Clearance and Identification – See Attachment A in the RFQ documents Table of Contents