Statement of Work (SOW) for Design and Fabricate Piezo-Actuated Pilot Valves for High Magnetic- and Radiation-Field Environments

Abstract or description:

Describes the work to be performed by contractors who will design and fabricate piezo-actuated pilot valves in high magnetic- and radiation-field environments encountered at the ITER facility.

<table>
<thead>
<tr>
<th>Workflow Role</th>
<th>Name</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signatory</td>
<td>RUPPEL F.</td>
<td>16 Aug 18:signed</td>
</tr>
<tr>
<td>Co-signatories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviewers</td>
<td>BAILEY JR H.</td>
<td>20 Aug 18:recommended</td>
</tr>
<tr>
<td></td>
<td>COWART C.</td>
<td>16 Aug 18:recommended</td>
</tr>
<tr>
<td>Approver</td>
<td>VETTER K.</td>
<td>20 Aug 18:approved</td>
</tr>
<tr>
<td>Version</td>
<td>Latest Status</td>
<td>Issue Date</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td>v0.0</td>
<td>In Work</td>
<td>01 Nov 16</td>
</tr>
<tr>
<td>v1.0</td>
<td>Approved</td>
<td>12 Dec 16</td>
</tr>
<tr>
<td>v2.0</td>
<td>Signed</td>
<td>30 Jun 17</td>
</tr>
<tr>
<td>v2.1</td>
<td>Approved</td>
<td>06 Jul 17</td>
</tr>
<tr>
<td>v2.2</td>
<td>Revision Required</td>
<td>13 Aug 18</td>
</tr>
<tr>
<td>v2.3</td>
<td>Approved</td>
<td>16 Aug 18</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

1. Introduction .......................................................................................................................................... 2
2. Scope .................................................................................................................................................... 2
3. Applicable Documents.......................................................................................................................... 2
   3.1 References ..................................................................................................................................... 2
   3.2 Acronyms ...................................................................................................................................... 2
4. Performance Requirements ................................................................................................................... 2
   4.1 Work Tasks .................................................................................................................................... 2
   4.2 Project Management ...................................................................................................................... 3
   4.3 Data Management .......................................................................................................................... 4
   4.4 Packaging, Shipping, and Delivery ............................................................................................... 5
5. Quality Assurance ................................................................................................................................. 5
   5.1 Conflicts ........................................................................................................................................ 5
   5.2 Quality Program ............................................................................................................................ 5
   5.3 Quality Plan ................................................................................................................................... 5
   5.4 Inspector Safety ............................................................................................................................. 6
   5.5 Seller-Requested Deviations ......................................................................................................... 6
6. Deliverables .......................................................................................................................................... 6
   6.1 Work Task Documentation ............................................................................................................ 6
   6.2 Documentation ............................................................................................................................... 7
1. **INTRODUCTION**

US ITER is in need of pilot valves that are immune to high magnetic and radiation fields to supply to the ITER facility in Cadarache, France. The pilot valves will be used to pneumatically actuate process valves.

2. **SCOPE**

The scope of this statement of work is for the design and fabrication of piezo pilot valves intended to be used by the Vacuum Systems at ITER.

3. **APPLICABLE DOCUMENTS**

3.1 **References**


3.2 **Acronyms**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>UT-Battelle, Inc.</td>
</tr>
<tr>
<td>IO</td>
<td>ITER Organization</td>
</tr>
<tr>
<td>ITER</td>
<td>“The Way” in Latin, formerly International Thermonuclear Experimental Reactor</td>
</tr>
<tr>
<td>PO</td>
<td>Procurement Officer</td>
</tr>
<tr>
<td>POC</td>
<td>Point of Contact</td>
</tr>
<tr>
<td>QA</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>Seller</td>
<td>Provider of Goods or Services under this Contract</td>
</tr>
<tr>
<td>SOW</td>
<td>Statement of Work</td>
</tr>
<tr>
<td>TPO</td>
<td>Technical Project Officer</td>
</tr>
<tr>
<td>US ITER</td>
<td>United States contributions to ITER</td>
</tr>
</tbody>
</table>

4. **PERFORMANCE REQUIREMENTS**

4.1 **Work Tasks**
4.1.1 Work Task 1, Design Piezo Pilot Valve
Seller shall design a piezo pilot valve meeting the requirements in the technical specification [1].

4.1.2 Work Task 2, Fabricate and Test Prototype Piezo Pilot Valves
Seller shall fabricate and test ten (10) prototype piezo pilot valves designed in Work Task 1.
   - Prior to the fabrication and assembly process, the Seller shall propose a performance test plan identifying all tests necessary to meet the basic pneumatic and electrical technical specification. The test plan shall be submitted to the TPO, and Subcontract Administrator (SA), prior to beginning of fabrication.
   - The Seller may proceed with fabrication, once the Company TPO approves of the proposed test plan.
   - After fabrication, the Seller shall test the basic pneumatic and electrical performance of the valves according to the test plan.

4.1.3 Work Task 3, Deliver Prototype Piezo Pilot Valves
Seller shall package and ship the completed prototype piezo pilot valves to the Company for inspection and functional testing. Possible testing activities, in addition to basic pneumatic and electrical tests, to be performed by the Company include, but are not limited to harsh conditions of magnetic, radiation, seismic, and fire-load testing. The Company will use the Seller’s test plan of the basic pneumatic and electrical performance to assess the performance of the device under the harsh conditions. After these tests, the Company may return failed prototype piezo pilot valves to the Seller for evaluation of testing and recommendations for modification to the design to improve performance of the valve design.

4.2 Project Management

4.2.1 Project Plan
The Seller shall designate an official single Point of Contact (POC) to work with the Company’s Technical Project Officer (TPO) and Procurement Officer (PO). Technical issues shall be discussed with the Company’s TPO. Subcontract administration issues shall be discussed with the Company’s PO. Changes to the Statement of Work (SOW) or technical specification can be officially authorized only by the Company’s PO. The Seller shall prepare a project plan that integrates each element of subcontract management into a concise written document. The project plan shall identify the Seller’s key personnel in this project and describe their individual roles and responsibilities.

4.2.2 Project Schedule
The Seller shall prepare a schedule, which shall identify, at a minimum, all work tasks, meetings, progress reports to the TPO, hold points, key milestones, and dates for deliverables. The TPO shall have the option to add additional items to the project schedule. The project schedule shall be kept up to date by the Seller when changes occur.
4.2.3  Project Kickoff Meeting
The Seller shall participate in a project kickoff meeting, which shall be scheduled at a mutually agreeable time and place as soon as practicable after award of contract, but not before the draft schedule (Sec. 4.2.2) and draft quality plan (Sec. 5.3) are submitted by the POC to the TPO.

The kickoff meeting shall include the POC and Seller’s other project management and engineering team participants as requested by the Company. The primary purpose of the meeting is to confirm that the meeting participants understand the terms and conditions of the subcontract, the SOW, and the technical specification.

The Seller shall prepare written draft kickoff meeting minutes that document the agreements and commitments resulting from the kickoff meeting discussions. The Seller shall send the minutes to the TPO for review and approval within ten working days after the meeting.

4.2.4  Progress Meetings
Technical and progress teleconferences and meetings between the Company and Seller shall be held at a scheduled time and location mutually agreeable to the TPO and POC. The discussions shall include the Seller’s progress, potential problems, resources, technical issues, contractual issues, manufacturability issues, testing results, and value engineering. The Seller shall prepare and send minutes of the teleconferences and meetings to the TPO for review and approval within ten working days after the meeting.

4.3  Data Management

4.3.1  Language and Units of Measure
All documentation shall be in English, and all dimensions and parameters shall be reported in metric units. Dual English/metric units are acceptable.

4.3.2  Electronic Copy Format
The Seller shall provide electronic copies of all documentation. The electronic copies shall be in searchable (not scanned) Portable Document Format (PDF).

4.3.3  Correspondence
Electronic documents shall be supplied to the Company using e-mail, a USB storage device, or a compact disc. Any documentation supplied by the Seller to the Company via email shall be sent to the TPO. Documentation supplied by the Company to the Seller will be sent to the POC, who shall be responsible for distributing it to the Seller’s appropriate staff.

4.3.4  Configuration Management
The Seller shall maintain a configuration management system to control changes to items/documents that define the configuration of the device(s).

4.3.5  Documentation
All documentation associated with this contract that is under the control of the Seller, including, but not limited to the following, will become the property of and must be made available to the Company, as requested.

1. Fabrication drawings used by the Seller to fabricate the prototype piezo pilot valves
2. Any As-built drawings prepared by the Seller
3. Dimensional inspection documentation
4. Material Certificates and test reports

4.4 Packaging, Shipping, and Delivery

The valves shall be shipped by conventional motor freight in shock-resistant packaging, which offers sufficient protection against device damage during handling/transit. The devices shall be protected from exposure to rain and snow during transport and during temporary outdoor storage. Provisions for ensuring that moisture is controlled to a level that prevents damage to the devices shall be identified and implemented.

5. QUALITY ASSURANCE

5.1 Conflicts

In the event of a conflict between the technical specification [1] and this SOW, or between either of these documents and a requirement in a specified code or standard, the Seller shall notify the Company’s TPO and PO. The TPO and PO will determine which document takes precedence and advise the Seller accordingly. Failure to notify the Company of any such conflict shall not relieve the Seller of any responsibility to meet all requirements.

5.2 Quality Program

The Seller’s quality program shall be implemented and be sufficient to ensure that the quality of items produced or services provided will meet all the requirements as stated in this document and as-contracted. The Seller must produce the items or services in accordance with its quality assurance program as identified in its subcontract with the Company. Changes to the program that could affect the items or services must be approved by the Company in advance.

5.3 Quality Plan

ITER requires that a quality plan be prepared by the Seller that incorporates the requirements of producing a quality plan [2], specifically for this subcontract, identifying how they will fulfill the specific subcontract requirements.
Work on the subcontract may not begin until notice is received that the quality plan is approved by the Company.

The requirement for a subcontract-specific quality plan shall be flowed down contractually from the Seller to the Seller’s suppliers and subcontractors, unless the requirement is waived in writing on a case-by-case basis by the Company.

A revised quality plan (at all levels) shall be subject to the same approval and acceptance procedure as the original quality plan. In case of revision, work should continue in accordance with the current approved quality plan until the revised quality plan is accepted.

A standard template [3] is available from the Company for documenting the contract-specific quality plan, but the Seller may propose to use its own equivalent format.

5.4 Inspector Safety

To ensure the safety of Company and/or IO representatives who visit the Seller’s facility(ies), the Seller shall provide relevant information about its facility safety procedures including, for example, safety glasses, hearing and respiratory protection, emergency preparedness, rally point, and general safety rules; and shall review typical workplace hazards with the representative(s) upon their arrival.

5.5 Seller-Requested Deviations

The Seller may propose deviations from the specifications, drawings, or other technical requirements from this procurement [4]. Where time is a consideration, the Seller may communicate the proposed deviation directly to the TPO, with a copy to the Company’s PO. The request should identify the affected items, drawing/specification number and revision number, a description of the proposed deviation, and the justification for it. The Company’s TPO will evaluate the technical aspects and recommend to the PO, who will communicate acceptance or disapproval to the Seller.

6. DELIVERABLES

The Seller shall supply the following deliverables as required per the applicable section in parentheses:

6.1 Work Task Documentation

- Deliverable 1, Work Task 1— Design Piezo Pilot Valve (Sec. 4.1.1).
  - Outline drawings, electrical drive requirements, and full materials list.
- Deliverable 2, Work Task 2— Fabricate and Test Prototype Piezo Pilot Valve (Sec. 4.1.2).
  - Test plan of basic pneumatic and electrical operation expected of the device.
  - Test report of the prototype tested at the Seller’s site per the test plan above.
- Deliverable 3, Work Task 3— Deliver Prototype Piezo Pilot Valves (Sec. 4.1.3).
  - Deliver ten (10) prototype piezo pilot valves; along with all inspection reports, material certifications, and test reports.
• Deliverable 4, After Company Testing of Prototype Piezo Pilot Valves (Sec. 4.1.3).
  – Recommendations for modification to the design to improve the manufacturability of the piezo pilot valves.
  – Summary of the fabrication and inspection process used to fabricate the prototype valves; including a summary of test performed and results.
  – List of non-conformances and any proposed changes to the design or fabrication techniques to avoid non-conformances in manufacturing.
  – Cost estimate to manufacture a production version of piezo pilot valves; using an estimated production run of 1,000 individual piezo pilot valves.

6.2 Documentation

• Project Plan (Sec.4.2.1)
• Project Schedule (Sec. 4.2.2)
• Quality Plan (Sec. 5.3)
• Test Plan and Report (Sec. 4.1.2)