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CONTRACT TECHNICAL SPECIFICATION

Technical Support and Preparation of Documentation for the ITER HTS Current Leads

Technical Specification

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1 Abstract

The scope of this contract is for a senior expert to provide services on documentation preparation and technical support related to the ITER HTS current leads.

2 Background and Objectives

The ITER superconducting magnet system consists of 18 TF coils, 6 PF coils, 6 Central Solenoid (CS) modules, 18 Correction Coils (CC) and a Feeder System. There are 31 Feeder systems, 9 for the toroidal field (TF) magnet system, 6 for the central solenoid (CS) and 6 for the poloidal field (PF) magnet system, respectively, 5 for the correction coil (CC) system, 2 for the cooling of the structures, and 2 for special instrumentation. The ITER magnet Feeders are being procured by ITER IO through the Chinese Institute of Plasma Physics (ASIPP) in Hefei/China, as well as external contractors, under a Procurement Arrangement (PA) with the China Domestic Agency (CN DA).

An important feature of the Feeders is the transition from 4.2K to room temperature (300 K) along the electric current path. This transition takes place in what are called HTS (High-Temperature Superconducting) current leads. The HTS current leads are a fully modular component at the end of the Feeders, connecting the superconducting busbars with the room-temperature aluminum busbars and the power supply.

The manufacturing process qualification for the HTS current leads is now its final phase, consisting of the manufacturing and testing of six prototypes and the preparation of the series production. These prototypes will be built by ASIPP and two companies under supervision of CNDA according to the IO design using the pre-qualified manufacturing procedures. The role of IO will consist of ensuring that the approved manufacturing procedures will be applied and to support the CNDA in its supervision.

The objective of this contract is to support IO in its role during the manufacture and test of the ITER HTS current lead qualification prototypes and in the subsequent preparation of the series manufacturing.

3 Work Description

The work required in this technical specification includes engineering support activities for the completion of the HTS current lead qualification and series production preparation. Additionally, it includes activities related to the preparation of QA documentation and other key documents (e.g. schedules) for the HTS current leads.

The scope of work described below is expected to entail a time commitment of approximately 50% over the contract duration on the part of the expert.

Work is organized over a one-year period, with specific tasks and deliverables defined on a quarterly basis.

The reference documents are appended at the end of this specification and their references listed hereafter.

Design Report of the 55 kA and 68 kA HTS Current Leads (https://user.iter.org/?uid=3QNTXG)

Design Report of 10 kA HTS Current Lead for the ITER Correction Coils (https://user.iter.org/?uid=3QNX6M)

DDD11-6: Feeders, CTBs, and Current Leads (https://user.iter.org/?uid=2NMSYG)

Magnet Feeders PA with CN DA, Annex B, Technical Specification for the Procurement (https://user.iter.org/?uid=2MW8VS)

Scope of work:

This section describes the scope of work to be performed under the present contract.

Since the contract is for engineering services, technical support, and provision of expertise in the procurement activities related to the HTS current leads, the exact tasks will be agreed upon between IO and the expert (or company providing the expertise) on a quarterly basis. At the beginning of each three-month period, and based on the priorities of IO and the Feeder procurement, a work plan will be agreed upon, including deliverables for the period.

The overall scope includes:

1) Technical support and expertise for the manufacturing of the HTS current lead prototypes in China

a) Provide guidance on a day-to-day basis to cope with manufacturing issues (trouble-shooting)

b) Review quality documentation provided by ASIPP and sub-suppliers.

c) Witness operations at the manufacturing sites in China.

d) Participate in manufacturing status assessment reviews as well as regular meetings.

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2) Technical support and expertise for the preparation of the series manufacturing of the HTS current leads in China

a) Review final quality documentation provided by ASIPP and sub-suppliers.

b) Support IO in preparing for series production (e.g. structure of manufacturing data-base and schedule).

c) Participate in manufacturing readiness assessment reviews as well as regular meetings.

. It is envisaged that the services will include some mission travel.

4 Duration

The total contract duration shall be up to 12 months from the official starting date. The duration period of the contract and provision of services may be extended as stipulated in the contract.

5 Deliverables and Time Schedule

The specific work to be carried out in the frame of the scope given above is to be established quarterly (every three months). The IO will, in mutual agreement with the expert, establish tasks and priorities, along with the written reports to be produced, documentation to be reviewed, or travel needed. These will be part of a work plan for the three-month period.

Specific deliverables by the expert are the quarterly reports with a summary of activities during the reporting period, including approximate time spent on each activity (tims-sheets).

6 Acceptance Criteria (including rules and criteria)

The acceptance of the work will be based on completion of the tasks and goals set on the work plan for each trimester, as well as on the completion of reports and documents specified in the work plan and as submitted through the quarterly reports.

7 Payment schedule / Cost and delivery time breakdown

The payments shall be granted according to the payment schedule in the contractual documents.

8 Specific Requirements

The staff proposed by the bidder to carry out the work described in Section 3 must have proven experience in the following areas:

- Experience in design, manufacturing, and test of HTS current leads;
- Experience in design, manufacturing, and test of other superconducting devices (e.g. magnets,…);
- Experience with international projects;
- Ability to work in a team, yet be able to carry out tasks independently if needed;
- Availability for travel to China for follow up some of the HTS current lead-related activities.

Curriculum Vitae, CV showing evidence of the above is required.

9 Work conditions

- Work plan for every three months is established and agreed by IO. Travelling and missions shall be only upon an agreement with IO.
- This contract shall be executed by one person. Split it into parts for sharing is not acceptable.
- The contractor shall have its own office and computer resources. The contractor will be given access to the necessary data and documents either in paper or in computer files form at Cadarache ITER site. The contractor will also be allowed accessing to the necessary folders in the computer server at Cadarache ITER site via internet. The contractor shall be given temporary office space in the premises of the Magnet Division for the purposes of working onsite and hold meetings with Magnet Division personnel.