

Engineering support in IC an LH system on interface and quality management

Contract Technical Specifications

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1 Background and Objectives

Several Heating and Currents Drive (**H&CD**) systems are foreseen in ITER. The Ion Cyclotron (**IC**) and the Lower Hybrid (**LH**) H&CD systems are part of them.

The IC H&CD shall provide radio-frequency (**RF**) heating and current drive to the ITER plasmas in the frequency range [40 MHz;55 MHz]. A total of 20 MW of RF power in plasma is initially required from the system. An RF heating and current drive system is composed of power sources, transmission line components and antennas that are in charge of coupling this power to the plasma. In addition, for IC system, some components are dedicated to match the impedance of the plasma to the impedance of the generator output.

The IC H&CD system is composed of the antenna port plugs, the matching systems, the transmission lines, the RF power sources, High Voltage Power Supplies, plus auxiliary sub-systems and services such as decoupling units, instrumentation and control systems (**I&C**), and test facilities.

The LH H&CD system of ITER is very similar to the IC one. It is not part of the construction baseline but it is part of the H&CD system upgrades. The system is foreseen to provide 20 to 40 MW at 5 GHz depending on the upgrade scenario. Its architecture is similar to the IC system one.

The contract concerns the support in the integration process and quality management of these systems. It is organized around three major items:

- Quality management,
- Interface Management,
- Support in Design Review Process.

2 Scope of Work

The scope of this contract includes the supply of specialised engineering services to perform the following activities:

1- Quality documentation management:

Considering IC system, most of the Procurement Arrangements (PAs) are signed with Domestic Agencies (DAs) in charge of the procurements. All along the procurement process, procedures are implemented in DAs in order to ensure that the quality is in agreement with the quality plan and the quality classification of the components procured within the PA. Implementation of detailed processes implemented in DAs and validated by IO in order to comply with the safety and quality requirements has to be follow-up: the scope of the task is to manage the corresponding documentation, to perform regular updates and records. These processes can be attached to manufacturing, testing or storage phases for instance.

2- Interface documentation management:

All these systems components are “connected” to each other by functional and physical ways and also “connected” to other ITER services as cooling, power supply, buildings....

This implies that the interfaces have to be described and agreed between each subsystem.

For IC system, all components are under the preliminary or final design phase. The designs are more and more detailed and the interface definitions need to be updated regularly: technical data have to be implemented in the correct documents stored in the ITER Document Management (IDM) system. The scope of the task is the management of the interface documentation

3- Support in Design review process:

The organization of the design reviews is defined in a procedure. This task is aiming to provide support in the management of this process. It includes records of the minutes, of decisions, classification of the documentation necessary before and after the review. Follow up of actions as regard to design review procedure.

3 Estimated Duration

The total duration of this contract shall be 2 years (440 working days) from its formal signature date.

4 Work Description

The contract will be performed by one engineer working full time in IO premises.

Interface management:

- Description of the interfaces
- Organization and Report of technical discussion with other ITER subsystems in the frame of this interface definition,
- Draft of Interface documentation and Follow up of their validation process.

Quality management

- Analysis of the DA quality plans and accompanying work for the processes put in place in DAs.
- Check conformity of Codes and Standards applied to the procurements.
- Support in section documentation management and quality management within the section work.
- Define/Check QA processes to be applied during the procurement and within the IC and LH daily work.

Organization of Design Review Meeting

- Support Technical Responsible Officers for the organization of the Design Review Meeting
- Taking minutes of the meeting
- Support in the follow up of actions and discussions undertaken after the meeting

5 Responsibilities (including customs and other logistics)

5.2 Responsibility of ITER

ITER has the responsibility of providing detailed technical specifications when required during the execution of the work described in §4.

ITER has the responsibility of timely communicating to the contractor any change in requirements, specifications, planning and budget that might affect the contract development.

Access will be granted to IDM folders to perform the tasks.

5.2 Responsibility of the contractor

The contractor has the responsibility of regularly submitting to ITER the progress of the contract, for ITER approval as per §6 and 9.

6 List of deliverables and due dates (proposed or required by ITER)

The deliverables are made of monthly reports describing both calendar of worked days and actions carried out during the month.

7 Acceptance Criteria (including rules and criteria)

This criteria shall be the basis of acceptance by IO following the successful completion of the services. These will be in the form of progress reports in accordance with section 6 (monthly reports) of the technical specification.

Report and Document Review criteria:

Reports as deliverables shall be stored in the ITER Organization's document management system, IDM by the Contractor for acceptance.

A named ITER Organization's Contract Technical Responsible Officer is the Approver of the delivered documents.

The Approver can name one or more Reviewers(s) in the area of the report's expertise.

The Reviewer(s) can ask modifications to the report in which case the Contractor must submit a new version.

The acceptance of the document by the Approver is the acceptance criterion.

8 Specific requirements and conditions

The activities are driven by IO responsible officer in IC & LH section, in close relation with the contractor's manager.

The contractor's staff will work at IO site during all the task completion but could have to participate to missions outside IO site if required by IO.

The successful candidate Expert will have at minimum master or engineer degree with competences in technical interface management and quality management and must have proven experience in the following item:

- Minimum 5 years of experience in technical interface management
- Experience in quality management
- Competences in document management
- Ability to work in multidisciplinary, international team environment
- Must be fluent in the English language, both written and oral.

9 Work Monitoring / Meeting Schedule

The work will be managed by means of Progress Meetings and/or formal exchange of documents transmitted by emails which provide detailed progress. Progress Meetings will be called by the ITER Organization, to review the progress of the work, the technical problems, the interfaces and the planning.

The main purpose of the Progress Meetings is to allow the ITER Organization/IC&LH Section and the Contractor Technical Responsible Officer to:

- a) Allow early detection and correction of issues that may cause delays;
- b) Review the completed and planned activities and assess the progress made;
- c) Permit fast and consensual resolution of unexpected problems;
- d) Clarify doubts and prevent misinterpretations of the specifications.

In addition to the Progress Meetings, if necessary, the ITER Organization and/or the Contractor may request additional meetings to address specific issues to be resolved.

For all Progress Meetings, a document describing tasks done, results obtained, blocking points shall be written by the engineer.

All reports will be stored in the ITER IDM in order to ensure traceability of the work performed.

10 Payment schedule / Cost and delivery time breakdown

Interim monthly payments.

11 Quality Assurance (QA) requirement

The organisation conducting these activities should have an ITER approved QA Program or an ISO 9001 accredited quality system.

The general requirements are detailed in ITER document [ITER Procurement Quality Requirements \(22MFG4\)](#)

Prior to commencement of the task, a Quality Plan [Quality Plan \(22MFMW\)](#) must be submitted for IO approval giving evidence of the above and describing the organisation for this task; the skill of workers involved in the study; any anticipated sub-contractors; and giving details of who will be the independent checker of the activities.

Prior to commencement of any manufacturing, a Manufacturing & Inspection Plan [Manufacturing and Inspection Plan \(22MDZD\)](#) must be approved by ITER who will mark up any planned interventions.

Deviations and Non-conformities will follow the procedure detailed in IO document [MQP Deviations and Non Conformities \(22F53X\)](#)

Prior to delivery of any manufactured items to the IO Site, a Release Note must be signed [MQP Contractors Release Note \(22F52F\)](#).

Documentation developed as the result of this task shall be retained by the performer of the task or the DA organization for a minimum of 5 years and then may be discarded at the direction of the IO. The use of computer software to perform a safety basis task activity such as analysis and/or modelling, etc shall be reviewed and approved by the IO prior to its use, it should fulfil IO document on Quality Assurance for ITER Safety Codes [Quality Assurance for ITER Safety Codes \(258LKL\)](#).

12 References / Terminology and Acronyms

N/A

Acronyms are defined within the text.