

Expert Engineer to provide support for design and structural analysis within Diagnostics Division

Technical Specifications

| | | |
|-----------------|--------------------|-------------------------|
| | <i>Version 1.0</i> | <i>Date: 27/01/2012</i> |
| | <i>Name</i> | <i>Affiliation</i> |
| <i>Author</i> | M. KEANE | CHD/DIAGNOSTICS |
| <i>Reviewer</i> | L. BERTALOT | CHD/DIAGNOSTICS |
| <i>Reviewer</i> | M. WALSH | CHD/DIAGNOSTICS |
| <i>Approver</i> | D. BORA | CHD |

Table of Contents

| | | |
|----|--|---|
| 1 | Abstract | 3 |
| 2 | Background and Objectives | 3 |
| 3 | Scope of Work..... | 4 |
| 4 | Estimated Duration..... | 5 |
| 5 | Work Description | 5 |
| 6 | Responsibilities (including customs and other logistics) | 5 |
| 7 | List of deliverables and due dates (proposed or required by ITER)..... | 5 |
| 8 | Acceptance Criteria (including rules and criteria)..... | 5 |
| 9 | Specific requirements and conditions..... | 6 |
| 10 | Work Monitoring / Meeting Schedule | 6 |
| 11 | Payment schedule / Cost and delivery time breakdown..... | 7 |
| 12 | Quality Assurance (QA) requirement | 7 |
| 13 | References / Terminology and Acronyms | 7 |

1 Abstract

This document describes technical needs of **Diagnostics, with particular reference to Design Engineering Work**, including activities and follow up activities as appropriate.

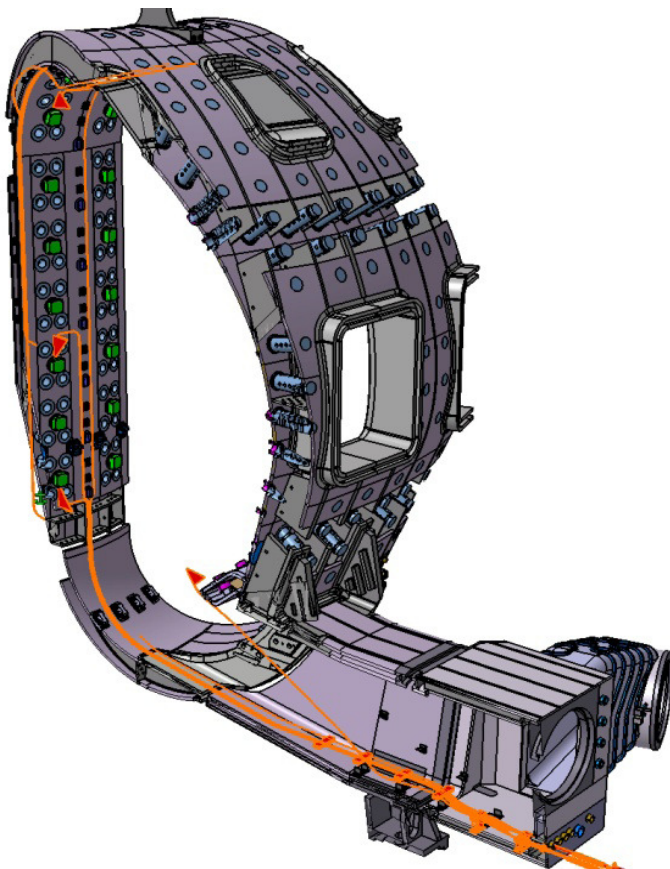
2 Background and Objectives

ITER is a major new device that is under construction at Cadarache, near Marseille, France. This device will study the potential of controlled nuclear fusion to provide energy for mankind. To study the behaviour of this device, a set of monitoring systems (called Diagnostics) are required. These systems will provide the information required to understand and control the performance of the device.

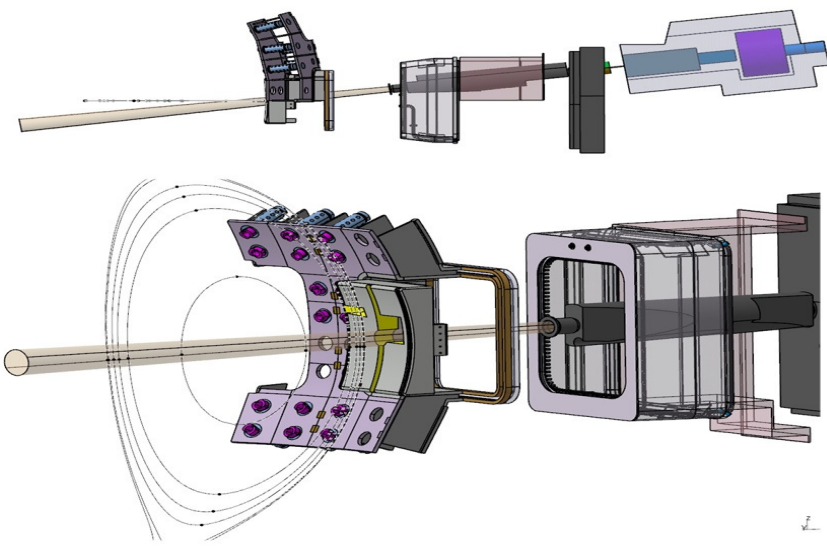
The work described below is related to the hardware required to physically support the diagnostics in ITER, and in some cases the diagnostics themselves.

Two examples of such areas of work are as illustrated below:

Neutron Activation System (Inside Vacuum Vessel)



High Resolution Neutron Spectrometers



- Provision is made for a later installation of high-resolution neutron spectrometers (HRNS) for DD and DT neutron spectroscopy by adding a collimator into the neutron camera on equatorial port 1
- Different type of spectrometer will be considered (Time of Flight, Thin Proton Recoil, etc.)
- A neutron beam dump and housing surrounding HRNS for local shield have to be installed in the Port Cell #1 in order to meet radiation safety parameters

3 Scope of Work

The primary objective of this engineering contract is to support the ITER Diagnostic Team in the **mechanical design and structural assessment** of key components.

Depending on the location, various loads will need consideration - thermal, electromagnetic and seismic.

All the interfaces will be considered, such as, but not limited to, the following areas; piping (both gas and water), electrical cabling with appropriate connectors and feedthroughs, in addition to similarly related structures of diagnostic key components.

Additional mechanical design works as may arise in the duration of the contract

It is anticipated that the contracting body will second an expert to ITER to fulfill the Work Description below.

4 Estimated Duration

The duration of the contract can be for up to 24 months from the starting date of the contract. The work will be based mainly at the ITER IO Worksite with some off-site work possible.

5 Work Description

See References in Section 11 for background information.

Description of the tasks to perform:

- Preparing appropriate design outputs in key areas such as outlined in the above Scope of Works.
- Reviewing technical designs, created by others, and agreeing/implementing required changes, in collaboration with appropriate ITER staff.
- Draft and report the performed work in the required format; primarily in the form of structural integrity reports.
- Provide analytical and additional appropriate assessment with the aim of justifying the feasibility of the proposed designs.
- Carry out additional design work as may arise during the course of the contract.
- Promoting safety and quality at all times in all job site activities.

6 Responsibilities (including customs and other logistics)

When applicable.

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

| Subtask | Deliverable | Dates |
|---------|-------------------------|-----------------------------|
| 1 | Initial progress report | 1 month after starting date |
| 2 | Progress reports | Every two months thereafter |
| 3 | Final report | At end of contract period |

8 Acceptance Criteria (including rules and criteria)

The selection will be done taking into account the following criteria:

- | | |
|--------------|-----|
| 1) Expert CV | 70% |
| 2) Price | 30% |

9 Specific requirements and conditions

The person to carry out the work described in this document must have proven experience, as appropriate, in the following:

- Masters Degree level in Mechanical Engineering is desirable
- Minimum; 5 years experience in Structural Design
- Experience in Nuclear Fission/Fusion is an advantage
- Experience of working with CAD Designers
- Expertise in performing numerical analysis
- Ability to balance quality/risk/cost when providing design information.
- Ability to work in multidisciplinary, international team environment.

Must be fluent in English language, both written and oral.

10 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. It is expected that Progress Meeting will be held frequently as required, generally weekly.

The main purpose of the Progress Meetings is to allow the ITER Organization/Diagnostics Division and the Contractor Technical Responsible Officers 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.

It is expected that on occasion the Contractor will be required to make a presentation to Topical Technical Meetings either by videoconference or in person. If in person, the ITER Organization will reimburse travelling expenses, if appropriate for off-site meetings

For all Progress Meetings, a document (the Progress Meeting Report) describing tasks done, results obtained, blocking points and action items must be written by the Contractor. Each report will be stored in the ITER IDM in order to ensure traceability of the work performed.

After the first monthly report, every 2 months, the Contractor shall submit to ITER Organization a Progress Report to be issued five working days before a Progress Meeting so that the report can be reviewed prior to, and discussed at, that Meeting.

11 Payment schedule / Cost and delivery time breakdown

Quarterly payment, after submission and acceptance of reports to the ITER Organization.

12 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 \(258LKL\)](#).

13 References / Terminology and Acronyms

These documents are available upon request.