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1 Abstract

This document specifies the requirements for the provision of Nuclear System Engineer services for a fixed period to assist in the realization of ITER Remote Handling Equipment within the Hot Cell building.

2 Background and Objectives

The ITER remote handling section is responsible for the remote maintenance of the ITER machine. During the current phase of the project, the RH section is defining the specifications for the design and manufacture of the RH equipment systems.

The ITER Remote Maintenance System (IRMS ITER Remote Maintenance Management System (IRMMMS) (ITER_D_2FMAJY v1.6)) is made up of sets of Remote handling equipment designed to perform maintenance operations on ITER where man access is highly restricted or forbidden.

The main approach for machine remote maintenance at ITER is to:-

- remove vessel components using dedicated handling equipment,
- transfer the components to the Hot Cell facility using a transfer cask system,
- maintain/refurbish components in the Hot Cell facility using general purpose RH equipment (lifting devices, dextrous manipulators, tooling),
- transfer the component back to the Tokamak,
- install the components back on the machine.

The ITER Hot Cell (HC) provides space and handling facilities for receiving, dispatching, decontamination, storage, repair, refurbishment and testing of highly radioactive and/or contaminated Tokamak components from the vessel.

During the machine shutdown, the components are delivered to the HC through the cleaning cells where they are initially loaded into support frames as they are unloaded from the transfer casks. They are then cleaned by Remote Handling equipment and subsequently transferred by trolley, with their support frames, to the refurbishment area which contains a number of refurbishment work stations. The workstations are equipped with further RH equipment for performing the refurbishment tasks.

The ITER remote handling section is responsible of developing and procuring the Hot Cell Remote Handling Systems (PBS 23.06) for which design support is required. That system is currently at pre-conceptual design maturity stage.

3 Scope of Work

3.1 Nuclear System Engineer 1

The primary area of work for Nuclear System Engineer 1 will be to provide support to the IO in the realization of Hot Cell Remote Handling Equipment concept design activities. The scope of work shall include, but not necessarily be limited to the following engineering and design tasks in support of the ITER System Design process of PBS 23.06:

1. Development of the System Requirements Documentation made Interface control, interface sheet and Configuration Management Models.
2. Development of the System Description Documentation made of System Description, System load specification, system detailed performance definition, mechanical engineering Drawings, bill of material and component classification.
3. Development of the System Operation Documentation made of the Maintenance plan
4. Development of the System Design justification documentation made of Engineering analysis reports, calculations notes and design compliance matrix.

3.1 Nuclear System Engineer 2

The primary area of work for Nuclear System Engineer 2 will be to provide support to the IO in the realization of Hot Cell Remote Handling Equipment concept design activities. The scope of work shall include, but not necessarily be limited to the following engineering and design tasks in support of the ITER System Design process of PBS 23.06:

1. Development of the System Requirements Documentation made of system requirement,
2. Review of the System Requirements Documentation made of Interface control, interface sheet and Configuration Management Models.
3. Development of the System Description Documentation made of System functional analysis.
4. Review of the System Description Documentation made of System Description, System load specification, system detailed performance definition, mechanical engineering Drawings, bill of material and component classification.
5. Development of the System Operation Documentation made of system integrated logistic support plan, Operation plan.
6. Review of the System Operation Documentation made of Maintenance plan
7. Review of the System Design justification documentation made of Engineering analysis reports, calculations notes and design compliance matrix.
8. Development of the System Design management Documentation made of Work plan, risks assessment.
9. Providing support to monitor design contracts.

4 Estimated Duration

The contract is for a minimum of 110 work days over a period of 26 weeks (firm part) from the signature date with an option (1) of 220 work days over a period of 52 weeks.

5 Resource Profiles

The engineers providing the services should meet the following requirements:-

- Master Degree in Mechanical engineering or equivalent,
- Minimum of 10 years' experience in Nuclear and system engineering.
- Experience in complex system concept design.
- Experience in Remote handling field would be an advantage
- Knowledge/skills in the following are an advantage:-
 - Project management,
- Excellent knowledge of English, to allow easy communication and adequate drafting of technical documentation.

6 Work Monitoring and Reporting

The expert Nuclear System Engineers shall work under the direction of the TRO of the contract.

The nature of the work shall require the permanent presence of the expert Nuclear System Engineers at the site of the ITER Organization.

Bi Weekly progress meeting shall be held between the experts and the TRO along with other relevant staff. The experts shall be responsible for producing minutes of these meetings and tracking actions.

7 Specific requirements and conditions

In response to this call for expertise the company/individual shall provide:

- Financial proposal
- Profile(and/or CV) of key personnel involved in execution of the work activity

The official language of the ITER project is English. Therefore all input and output documentation relevant for this Contract shall be in English. The Contractor shall ensure that all the professionals in charge of the Contract have an adequate knowledge of English, to allow easy communication and adequate drafting of technical documentation. This requirement also applies to the Contractor's staff working at the ITER site or participating to meetings with the ITER Organization.

Documentation developed shall be retained by the contractor 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 calculation code for safety analysis.

The work shall require the presence of the Contractor's personnel at the site of the ITER Organization, Cadarache, 13108 St Paul-lez-Durance, France, for the duration of the contract.

For all deliverables submitted in electronic format the Contractor shall ensure that the release of the software used to produce the deliverable shall be the same as that adopted by the ITER Organization.

Financial proposal: The daily rate will involve all travelling and accommodation costs.

The engineer provided for on-site duties shall keep the normal daily working hours of the ITER Organization.

8 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 v4.0](#)) and can be used in analogy to this Task Agreement.

Prior to commencement of the task, a DA Quality Plan (conformant with [22MFMW v3.0](#)) 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.

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 v1.4](#)).

9 References / Terminology and Acronyms

9.1 Terminology and Acronyms

In the following table denominations and definitions are given of all the actors, entities and documents referred to in this Specification, together with the acronyms used in this document.

<u>Denomination</u>	<u>Definition</u>	<u>Acronym</u>
ITER Organization	For this Contract the ITER Organization	IO-
ITER Organization Task Responsible Officer	Person delegated by the IO-RO for all technical matters, but limited to one specific task order	IO-TRO
Remote Handling	Remote handling	RH