

Service Contract (Call for Expertise) for support of modular design of Tritium Plant Systems

Technical Specifications

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1 Abstract

The purpose of this contract is to provide engineering studies to support implementation of modular design of Tritium Plant systems. The concept of equipment design on skids has been adopted in design of Detritiation Systems for Tokamak Complex (TC-DS) and Hot Cell Facility (HCF-DS). This concept shall be further developed including design of skids for other systems such as Water Detritiation System (WDS) and Isotope Separation System (ISS). This work includes development of the optimum solution for skids design and development of 3D models to fulfill requirements on systems mechanical integrity, optimized system layout in tritium plant building, requirements for skids fixing interface to the building and requirements for systems installation and assembly of internal components.

2 Background and Objectives

Modular design has been adopted for the construction of detritiation systems for Tokamak Complex and for Hot Cell Facility. During conceptual design phase several standardized modules – skids have been defined: recombiner skids, molecular sieve skids, blowers skid.

Modular construction of the plant systems provides significant advantages including: improved quality control, reduced site installation cost, reduced site labor cost, reduced need for personnel of defined skills on site and reduced installation duration (schedule contingency).

Skid mounted design becomes a “must” requirement for construction of Tritium Plant systems in the areas where building fastening system defined as regular pattern of embedded plates. Therefore skid mounted equipment assemblies shall be defined not only for DS systems but also for other systems such WDS, ISS, etc.

Skid design expertise is needed to complete detailed design of DS systems modules and integrate all design features in 3D configuration model for definition of all relevant interfaces. Modular design shall be applied to all other systems of Tritium Plant.

3 Scope of Work

Under the scope of this contract contractor is foreseen to:

- Review present design proposal for skid mounted equipment for TC-DS and HCF-DS
- Develop detailed design of skids for TC-DS and HCF-DS integrated into systems layout
- Develop detailed design of skids for ISS, WDS and other systems as required
- Develop 3D configuration model
- Prepare artist’s view of the selected skids and systems modules for presentation purpose
- Prepare kinematic study

4 Work description

Subtask-1: Review present design proposal for skid mounted equipment for TC-DS and HCF-DS and provide options for completion/optimization of design. Review shall include consideration of changes in configuration of the DS system: change of modules layout and functions, change of technology

Subtask-2: Develop detailed design of skids for TC-DS and HCF-DS integrated into systems layout. This work includes definition of all interfaces to utilities and electrical and signal cables distribution. Task includes development of 3D CAD model in ITER ENOVIA/CATIA CAD system

Subtask-3: Prepare engineering descriptions of skid assemblies. Prepare input information for the seismic analysis of skid assemblies including 2D drawings and bill of material documentation.

Subtask-4: Review layout of WDS, ISS and other systems as required and propose option for the modular design of the systems with equipment mounted on skids. Develop detailed design of skids for selected systems.

Subtask-5: Prepare installation studies related to integration of skids at ITER facilities including specific assembly operation necessary to fit skids into system layout and into building.

Subtask-6: Provide installation studies of internal parts for various components for operations which are required to be performed on site. This includes operation of packing for DS columns, packing of WDS columns, packing and assembly of ISS columns.

Subtask-7: Prepare artistic view of the selected skids and systems modules for presentation purpose. Prepare artist's kinematic study.

Subtask-8: Participate to model/drawings review of the skids and integrated systems reviews.

5 Deliverables and Timetable

The total duration of this contract will be 24 month. Contractor shall be available for 100% at ITER site for performance of all activities.

A monthly report shall be submitted to IO by the end of the fifth working day following the end of each month. The report shall cover the following:

1. A brief summary of the work and achievements during the month
2. Financial summary showing amount to be charged by contractor for previous month; the cumulative totals.
3. A time sheet for the previous month with short description on day by day basis

In addition, ITER Organization shall during the Contract period establish the Expert work plan on ad hoc basis and relative to the specific tasks defined in section 4 and deliverables defined on a quarterly basis.

6 Specific requirements and conditions

In response to this call for Expertise Contractor shall provide

- CV of the expert
- References to the relevant experience and/or projects according to ITER requirements defined in the technical specification and the criteria defined of the letter of invitation
- Statement of exclusivity and availability
- financial offer

The ITER Organization may organize an interview with the Contractor to complement the assessment of submission.

The official language of the ITER project is English. Therefore all input and output documentation relevant for this contract shall be in English.

All CAD work shall be performed according to ITER CAD Manual.

The work requires full time presence of the Contractor at the site of the ITER Organization, Cadarache, 13108 St. Paul-lez-Durance, France.

7 Work Monitoring / Meeting Schedule

A monthly report shall be submitted by the contractor. Contractor shall also propose a list of meetings with ITER for progress monitoring in agreement with schedule proposed. At least the following meetings should be foreseen for the contract including meetings for the particular subtasks as required.

Scope of meeting	Point of check	Deliverable	Place of meeting
Kick-off meeting	Initiation	Written report/meeting minutes	ITER site
Coordination or progress meeting as required	Questions and issues to address Progress review	Written meeting summary – resolution of questions, future actions	ITER site
Final draft report/deliverable review meeting	Deliverable completion, draft report	Draft written and oral reports	ITER site
Closing Task Order meeting	Deliverables acceptance	Final written report	ITER site

8 Quality Assurance (QA) Requirement

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 \(258LKL\)](#).

9 Terminology and Acronyms

<u>Denomination</u>	<u>Definition</u>	<u>Acronym</u>
ITER Organization	For this Contract the ITER Organization	IO-
ITER Organization Responsible Officer	Person appointed by the ITER Organization with responsibility to manage all the technical aspects of this contract	IO-RO
Contractor	Firm or group of firms organized in a legal entity to provide the scope of supply.	C-
Contractor's Team	The Contractor plus all the sub-contractors/consultants working under its responsibility and coordination for the performance of the contract	C-Team
Contractor Responsible	The person appointed (in writing) by the legally authorised representative of the Contractor, empowered to act on behalf of the Contractor for all technical, administrative legal and financial matters relative to the performance of this contract	C-R
ITER Organization Task Responsible Officer	Person delegated by the IO-RO for all technical matters, but limited to one specific task order	IO-TRO
Contractor Task Responsible Officer	Equivalent to the IO-TRO in the Contractors team.	C-TRO