

## **Technical Specifications (In-Cash Procurement)**

### **CFE - System engineering expertise for the PPTF**

This document describes technical needs for system engineering and engineering expertise for the Port Plug Test Facility (PPTF) procurement follow-up.

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## 1 Purpose

This document describes technical needs for system engineering and engineering expertise for the Port Plug Test Facility (PPTF) procurement follow-up.

## 2 Scope

The aim of the Port Plug Test Facility is to reduce the risk of a Port Plug failure during the ITER machine operation. The PPTF provides the capability to test the Upper and Equatorial Port Plugs before installation on the machine and after refurbishment in the hot cell facility (HC) of ITER, which is INB 174. The port plugs to be tested are the ion cyclotron heating system equatorial port plugs, electron cyclotron heating system equatorial and upper port plugs, diagnostics equatorial and upper port plugs, and test blanket modules. For more details, see [1].

The ITER Central Team (IO-CT) is responsible for the Port Plug Test Facility. The Russian Federation Domestic Agency (RF-DA) is in charge of the in-kind procurement of the PPTF. The PPTF procurement arrangement has been signed with the RF-DA.

The scope of this contract is the updating of the PPTF engineering documentation, in particular concerning interfaces and design description.

Some of the PPTF equipment are PIC (Protection Important Components). Related activities are PIA (Protection Important Activity) and are submitted to surveillance by the IO.

## 3 Definitions

CAD	Computer Aided Design
DA	Domestic Agency
DCIF	Design Collaboration Implementation Form
DO	Design Office
EU-DA	European Domestic Agency
FDR	Final Design Review
HC	Hot Cell
ICD	Interface Control Document
INB	Nuclear Basic Installation (in French: Installation Nucléaire de Base)
IO	ITER Organization
IO-CT	ITER Organization – Central Team
IS	Interface Sheet
PBS	Plant Breakdown Structure
PIA	Protection Important Activity
PIC	Protection Important Component
PPTF	Port Plug Test Facility
QA	Quality Assurance
RF-DA	Russian Federation Domestic Agency
SIC	Safety Important Class
TRO	Technical Responsible Officer

For a complete list of ITER abbreviations see: [ITER Abbreviations \(ITER\\_D\\_2MU6W5\)](#).

## 4 References

Ref	Document
[1]	<a href="#">Port Plug Test Facility System Design Description (35ULM3 v2.1)</a>
[2]	<a href="#">Provisions for Implementation of the Generic Safety Requirements by the External Interveners (SBSTBM v1.1)</a>
[3]	<a href="#">Surveillance plan for PBS 58 – PPTF – Annex 2: Detailed List of PIAs (SQ2WKC v1.2)</a>
[4]	<a href="#">Defined requirements for PBS 58 (PPTF) (N6D34S v1.3)</a>
[5]	<a href="#">Sign-Off Authority (SOA) for Project Documents (2EXFXU v5.1)</a>

The other links are inserted in the text (where applicable).

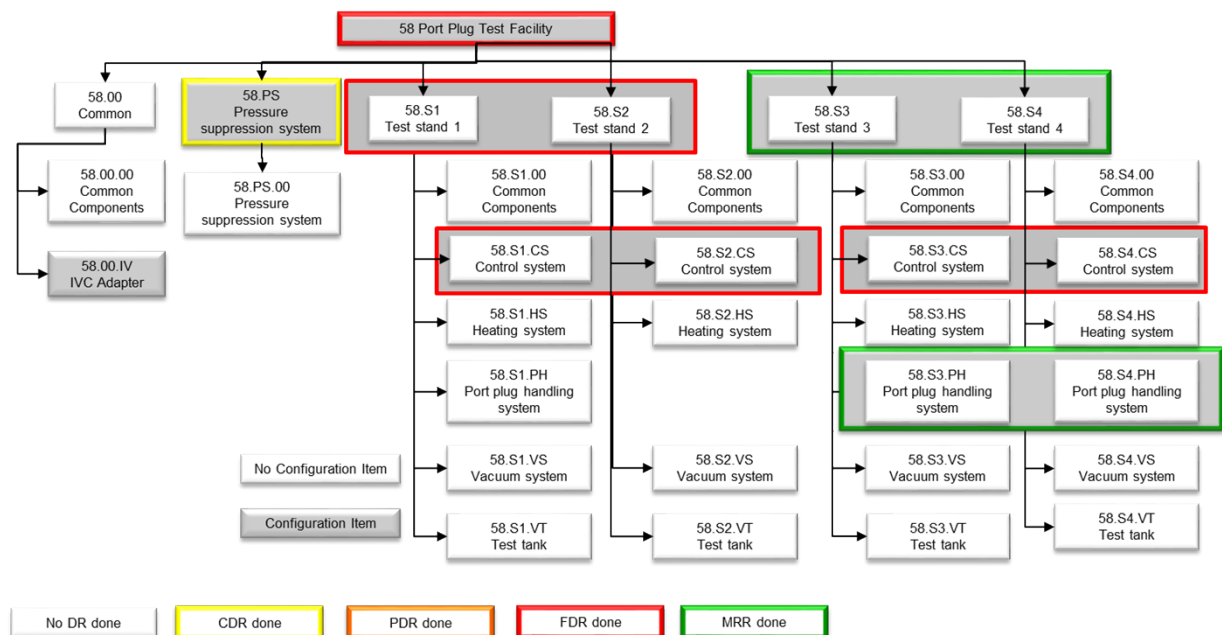
## 5 Estimated Duration

The duration shall be for 12 months from the starting date of the contract. Services are to be provided predominantly at the IO work site.

## 6 Work Description

The following tasks shall be performed in the frame of the contract:

- Update the System Design Description of the PPTF according to the design progress of each configuration item.  
The PPTF (PBS 58 at level 1) breaks down in the following sub-systems (PBS at level 2 and 3). Some sub-systems are grouped in Configuration Items, which are developed in a common life cycle.  
The drafting will be carried out with the support of RF-DA and their suppliers, who can participate in drafting the description of sub-systems they are in charge of.



- Update or create missing Interface Sheet (IS) according to ICD ([PBS 58 - Port Plug Test Facility \(ICDs\)](#)). Update is foreseen mostly for the following systems:
  - PBS 16 Blanket System  
First Walls and Shield Blocks are tested in the PPTF using the IVC Adapter. IS shall be updated to collect the PBS 16 input data for the design of the IVC adapter.
  - PBS 18 Fuelling and wall conditioning  
The ICD shall be updated and a new IS shall be created for the DMS EPP#2
  - PBS 55 Diagnostic port plugs and diagnostic racks  
Two IS shall be created (IS-55-58-018 In-Vessel diagnostic components functional tests and IS-55-58-019 Maintenance in PPTF)
  - PBS 23 Remote Handling  
The transfer cask installs or remove the EPP and UPP and the IVC adapter in the PPTF Test Tanks. IS shall be updated for EPP and created for UPP. IS shall be created for the remote handling of the IVC adapter in the refurbishment area and by the transfer cask
  - PBS 26 Cooling Water System  
The ICD shall be updated as:
    - the liquid effluent in the HC shall be sent to the safety drain tanks of PBS 26, instead of PBS 66 Radwaste Treatment & Storage
    - water samples shall be analysed in laboratories that are in the scope of PBS 26
  - PBS 32 Detritiation System  
IS shall be updated with the new contamination assessment and Hot Cell layout.
  - PBS 43 Steady State Electrical Network  
IS in the Hot Cell shall be updated (LV Class IV OL, LV Class II Safety, LV Class II IP)
  - PBS 44 Cable Trays  
IS shall be created
  - PBS 62.21 Hot Cell Building  
The Hot Cell Complex building design has changed recently. The room layout of the PPTF has changed.  
IS shall be updated according to the new building design.
  - PBS 63.55 Poloidal Field Coils Fabrication Building, Port Integration Facility (PIF)  
Three non-nuclear test stands will be installed in B55.  
ICD and IS shall be created.
  - EU-DA European Domestic Agency  
One non-nuclear test stand will be installed in EU-DA site.  
ICD and IS shall be created.
  - PBS 65 Liquid & gas distributions  
IS shall be updated with current PPTF design and the new PPTF layout in the Hot Cell Complex
  - PBS 66 Radwaste Treatment & Storage  
ICD and IS shall be updated according to the updated maintenance plans and contamination assessments.
- Collect and integrate the needs for specific equipment and requirements (e.g. cabling, cubicles, buffer storage for instrumentation, liquid and gas, electrical power, control desks) from the different PPTF clients (PBS 51, 52, 55, 56).

## 7 Responsibilities

### 7.1 Contractor's Responsibilities

In order to successfully perform the tasks in these Technical Specifications, the Contractor shall:

- Strictly implement the IO procedures, instructions and use templates;
- Strictly implement the requirements specified in [2];
- Implement a technical control for each PIA defined in [3];
- Implement the defined requirements [4] for the PIC.
- Provide experienced and trained resources to perform the tasks;
- Contractor's personnel shall possess the qualifications, professional competence and experience to carry out services in accordance with IO rules and procedures;
- Contractor's personnel shall be bound by the rules and regulations governing the IO ethics, safety and security rules.

### 7.2 IO's Responsibilities

The IO shall:

- Nominate the Responsible Officer to manage the Contract;
- Organise monthly meetings on work performed;
- Provide offices at IO premises.

## 8 List of Deliverables and due dates

The main deliverables are provided in the table below.

D #	Description	Due Dates
D1	Finalization of all <b>PPTF interface sheet</b> . Upload them in the IDM for review and approval. The reviewers of the technical documents need to be coherent with [5].	T0 + 5 months
D2	<b>System Design description of the PPTF</b> . Upload it in the IDM for review and approval. The reviewers of the technical documents need to be coherent with [5].	T0 + 10 months
D3	<b>Synthesis of the PPTF client's needs &amp; requirements</b> . Upload it in the IDM for review and approval. The reviewers of the technical documents need to be coherent with [5].	T0 + 12 months

## 9 Acceptance Criteria

The deliverables will be posted in the Contractor's dedicated folder in IDM, and the acceptance by the IO will be recorded by their approval by the designated IO TRO. These criteria shall be the basis of acceptance by IO following the successful completion of the services. These will be in the form of reports as indicated in section 8, Table of deliverables.

## 10 Specific requirements and conditions

Design and Development of equipment designs for nuclear facilities;  
Operational experience of procedures in nuclear environment;  
Experience relevant to all techniques in deliverables list;  
Experience in manufacturing of large mechanical components for nuclear facilities;  
Experience in mechanical engineering and analysis;  
Experience in thermo-hydraulics;  
Experience in vacuum;  
Experience in application of appropriate industrial Codes and Standards of nuclear/non-nuclear equipment;  
Experience in 3D and 2D drawings interpretation;  
Monitoring and reporting of status of projects;  
Generation of technical, administrative, and managerial documents;  
Communication with international local and remote teams in context of nuclear fusion research or similarly complex research and engineering environment;  
Organization, taking minutes and action tracking of international meetings;  
Technical document generation;  
System requirements management.

## 11 Work Monitoring / Meeting Schedule

Work is monitored through reports on deliverables (see List of Deliverables section) and at regular progress meetings.

## 12 Delivery time breakdown

See Section 8 "List Deliverables section and due dates".

## 13 Quality Assurance (QA) requirements

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 Procurement Quality Requirements \(ITER\\_D\\_22MFG4\)](#).

Prior to commencement of the task, a Quality Plan 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 (see [Procurement Requirements for Producing a Quality Plan \(ITER\\_D\\_22MFMW\)](#)).

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, in accordance with [Quality Assurance for ITER Safety Codes \(ITER\\_D\\_258LKL\)](#).

## 14 CAD Design Requirements (if applicable)

For the contracts where CAD design tasks are involved, the following shall apply:

The Supplier shall provide a Design Plan to be approved by the IO. Such plan shall identify all design activities and design deliverables to be provided by the Contractor as part of the contract.

The Supplier shall ensure that all designs, CAD data and drawings delivered to IO comply with the Procedure for the Usage of the ITER CAD Manual ([2F6FTX](#)), and with the Procedure for the Management of CAD Work & CAD Data (Models and Drawings [2DWU2M](#)).

The reference scheme is for the Supplier to work in a fully synchronous manner on the ITER CAD platform (see detailed information about synchronous collaboration in the ITER [GNJX6A](#) - Specification for CAD data production in ITER Contracts.). This implies the usage of the CAD software versions as indicated in CAD Manual 07 - CAD Fact Sheet ([249WUL](#)) and the connection to one of the ITER project CAD data-bases. Any deviation against this requirement shall be defined in a Design Collaboration Implementation Form (DCIF) prepared and approved by DO and included in the call-for-tender package. Any cost or labour resulting from a deviation or non-conformance of the Supplier with regards to the CAD collaboration requirement shall be incurred by the Supplier.

## 15 Safety requirements

ITER is a Nuclear Facility identified in France by the number-INB-174 (“Installation Nucléaire de Base”).

For Protection Important Components and in particular Safety Important Class components (SIC), the French Nuclear Regulation must be observed, in application of the Article 14 of the ITER Agreement.

In such case the Suppliers and Subcontractors must be informed that:

- The Order 7th February 2012 applies to all the components important for the protection (PIC) and the activities important for the protection (PIA).
- The compliance with the INB-order must be demonstrated in the chain of external contractors.
- In application of article II.2.5.4 of the Order 7th February 2012, contracted activities for supervision purposes are also subject to a supervision done by the Nuclear Operator.

For the Protection Important Components, structures and systems of the nuclear facility, and Protection Important Activities the contractor shall ensure that a specific management system is implemented for his own activities and for the activities done by any Supplier and Subcontractor following the requirements of the Order 7th February 2012. Design and development of PIC components and systems including PIC components, management of deviation and non-conformities are PIA in relation with this contract.

The supplier must comply with the all requirements expressed in the document ITER\_D\_SBSTBM v1.1 - Provisions for Implementation of the Generic Safety Requirements



by the External Interveners is a declination of the Order 7th February 2012. The goal of this document is to describe more practically the requirements defined in the French order.