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Technical Specifications (In-Cash Procurement)

Hot Cell Complex - Building interfaces and cost optimization

This document aims at specifying two transverse activities to be performed in parallel:

1 - Interfaces management: review of the input data for building design activities, elaboration of the Interfaces Sheets between the building (PBS62) and the systems,

2 - Cost optimization: continuous effort to minimize the overall cost of the Hot Cell Complex, prevention of contractual claim regarding the Hot Cell Building design activities

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1 Purpose

This document aims at specifying two transverse activities to be performed in parallel for the Hot Cell Complex design activities:

1 - Interfaces management which corresponds to:

- review of the input data for building design activities,
- tracking of the Request For Information between the Engineering contractor and IO,
- elaboration of the Interfaces Sheets between the building (PBS62) and the systems,

2 - Cost optimization which corresponds to continuous effort to minimize the overall cost of the Hot Cell Complex, covering but not limited to the building, and covering the full duration of the present contract.

2 Scope

The scope includes the overall Hot Cell Complex, including the building and the processes, in particular the Hot Cell Remote Handling System, the Radwaste process, the Port Plug Test Facility and the air Detritiation System.

The Hot Cell Facility is described in ITER_D_L9V43M - Functional description of the Hot Cell Building. The Radwaste facility is described in ITER_D_L5G67Y - HCC TF - Functional description of the Radwaste Building

To be noted that the Hot Cell layout has changed in 2016 (see figure below). This is the reaon why all existing Interface Sheets between the building and the systems will have to be updated.

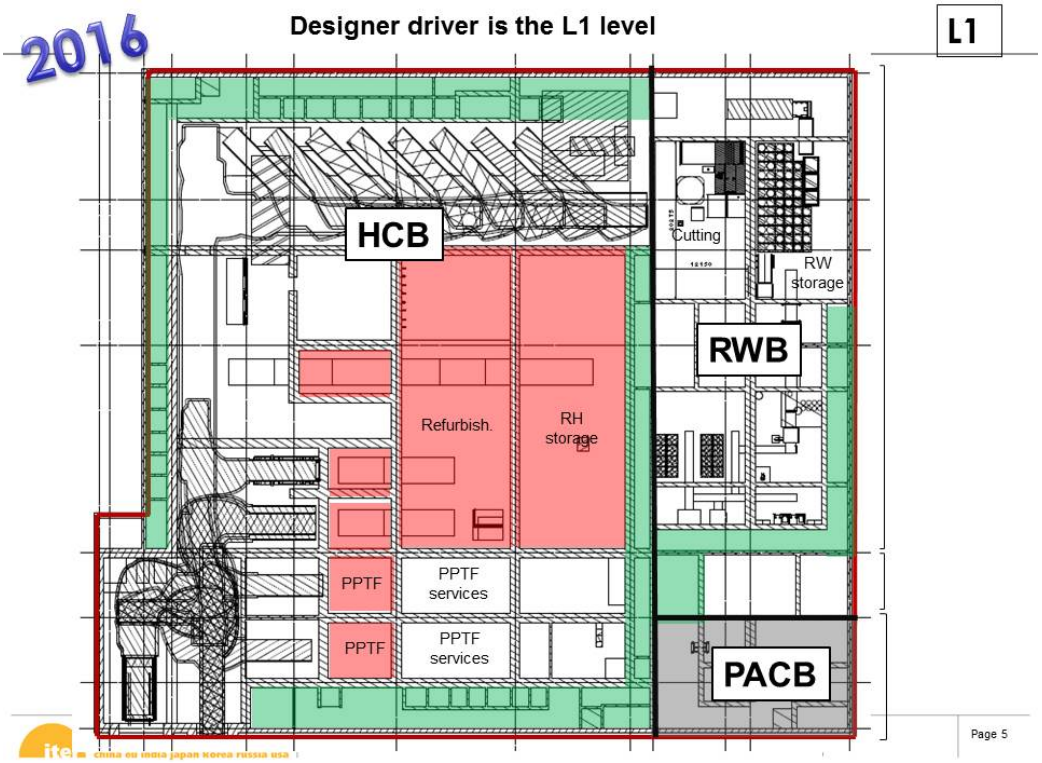

Figure 1 Level L1 of the 2016 Design of the Hot Cell Complex.

The table in appendix summarizes main features of the Hot Cell Complex, illustrating the level of complexity and the required skills.

3 Definitions

For a complete list of ITER abbreviations see: ITER Abbreviations (ITER_D_2MU6W5).

4 References

Acronyms:

- C-R: Contractor Responsible. See Contract specifications for definition of duty.
- C-TRO: Contractor Task Responsible Officer. See Contract specifications for definition of duty.
- IO-RO: ITER Organization Responsible Officer. See Contract specifications for definition of duty.
- IO-TRO: ITER Organization Task Responsible Officer. See Contract specifications for definition of duty
- ICS: Interface Control Document
- IS: Interface Sheet
- PBS: Project Breakdown Structure

5 Estimated Duration

The contract duration shall be one year and shall commence after the official start date and upon the mutual agreement of both parties. It is envisaged that the services shall be performed on-site at IO.

6 Work Description

6.1 Context

Two types of activities are being performed in 2016 / 2017 aiming at designing the Hot Cell Complex and answering to the French regulator:

- Design activities regarding the building and the processes located within the building,
- Safety analysis based on the Hot Cell Complex design.

One major contract has been placed for the Hot Cell building engineering activities (technical specification at the link ITER_D_SW5UFF - Technical Specification Hot Cell Complex - Building Engineering Contract), while series of contracts have been launched in order to study the Radwaste and Remote Handling Systems located within the Hot Cell Complex.

Regarding the safety analysis, part of it is integrated into the Hot Cell building engineering ITER_D_SW5UFF - Technical Specification Hot Cell Complex - Building Engineering Contract, n parallel, a Safety framework contract has been put in place for complementary analysis.

The requested work is focused on design activities and cost optimization, knowing that these optimizations shall not downgrade the safety features of the facility.

6.2 Objective of the contract

The objective of this contract is to focus the effort on the building design activities, in close relation with the systems, aiming at managing the interfaces and reducing the cost as much as possible.

Main activities are described as followed:

- to manage properly all the interfaces between the building and the systems, starting from the beginning of the Hot Cell building engineering activities in order to prevent any risk of claims from the consortium in charge of this design activity… up to the end of this contract for which the Interfaces Sheets between the building and the different PBS will have to be updated. Indeed, the "process equipment datasheet" is part of the Hot Cell engineering contract, but the overall process of updating the Interface Sheets on IDM, iterating with the systems as needed to get them fully reviewed and approved document will have to be done within the activities specified in the current document. This activity includes also a tracking of exchanges between IO and the Hot Cell engineering contractor in order to prevent any risk of contractual claim due to unclear or too vague input data.
- to investigate, during the building design activities and the process design activities, ways to minimize the overall cost of the Hot Cell Complex, in term of investment cost and in term of operational cost.

It means that during this contract duration, the IO-CT will be working with a Third Party contractor on the engineering design of the Hot Cell Complex. The present contractor will follow and report to the IO on progress made by this Third Party in the above areas, and will provide feedback to the Third Party contractor on behalf of the IO-CT. This is the reason why the required skills (see section 9) shall correspond to expertise in building design activities, safety, Radwaste, remote handling and contract management.

6.3 Interfaces

Interface Control Document (ICD) and Interface Sheets (IS) between the buildings and processes to be integrated correspond to the following reference documents:

- [REF 1.] to [REF 4.] for the remote Handling Systems PBS 23,
- [REF 5.] to [REF 10.] for the Radwaste process PBS 66,
- [REF 11.] and [REF 12.] for the Port plug Test Facility PBS 58,
- [REF 13.] and [REF 14.] for the Air Detritiation System PBS 32,

The interfaces between the HCC buildings and the "In Vessel and Port Cell equipment" are presented in [REF 15.] to [REF 24.]. Interfaces are missing with Fueling (PBS18), Vacuum Cryopump (PBS31), Electron Cyclotron Heating (PBS52) and neutral Beam (PBS53), the ICD have been created recently and they will be under review on IDM for the start of the contract.

The interfaces between the HCC buildings and the “Control System” are presented in [REF 25.] to [REF 42.].

The interfaces between the HCC buildings and the plant systems and services (Power supply PBS43, Cooling water PBS26, Radiological monitoring PBS64, Access Control PBS69) are in [REF 43.] to [REF 68.]. Regarding cable trays (PBS44) and Assembly (PBS22), they are in [REF 69.] to [REF 76.].

The IDM links are the following:

Interfaces with PBS23

[REF 1.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Remote Handling (PBS 23) (2EPQJM v1.11) (current)

[REF 2.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Remote Handling (PBS 23) (32Z3B4 v2.0) (current)

[REF 3.] Interface Control Document (ICD) between Personnel Access Control Building (PBS 62-24) - Remote Handling (PBS 23) (2X2H7L v2.0)

[REF 4.] Interface Sheet (IS) between Personnel Access Control Building (PBS 62.24) and Remote Handling (PBS 23) (34NNVH v2.1)

Interfaces with PBS66

[REF 5.] ICD-62.21-66 Interface Control Document for Hot Cell Building (PBS 62-21) and Radwaste Treatment & storage (PBS 66) (2EPRNT v1.8) (current

[REF 6.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Radwaste Treatment & Storage (PBS 66) (35LTTZ v1.2) (current)

[REF 7.] ICD-62.23-66 Interface Control Document between RadWaste Building (PBS 62.23) - Radwaste Treatment & storage (PBS 66) (2EQCYZ v1.6) (current)

[REF 8.] Interface Sheet (IS) between Radwaste Building (PBS 62.23) and Radwaste Treatment & storage (PBS 66) (33622M v1.5) (current)

[REF 9.] Interface Control Document (ICD) between Personnel Access Control Building (PBS 62-24) - Radwaste Treatment & storage (PBS 66) (2LYAR9 v2.2)

[REF 10.] IS-62.24-66-001 Interface Sheet (IS) between Personnel Access Control Building (PBS 62.24) and Radwaste Treatment & storage (PBS 66) (34TRX3 v2.0)

Interfaces with PBS58

[REF 11.] Interface Control Document (ICD) Hot Cell Facility Building (PBS 62-21) - Port-Plug Test Facility (PBS 58) (35UDKG v1.6) (current).

[REF 12.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Port Plug test Facility (PBS 58) (35GD3N v1.2) (current)

Interfaces with PBS32

[REF 13.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Tritium Plant (PBS 32) (2EPQM4 v1.4) (current)

[REF 14.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Tritium Plant (PBS 32) (34QUFZ v1.5) (current)

Interfaces with PBS16

[REF 15.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Blanket Systems (PBS 16) (2EPQ5C v1.7) (current)

[REF 16.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Blanket System (PBS 16) (34VVMF v1.4) (current)

Interfaces with PBS17

[REF 17.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Divertor (PBS 17) (2EPQ6T v1.5) (current)

[REF 18.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Divertor (PBS 17) (335XA6 v1.3) (current)

Interfaces with PBS51

[REF 19.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Ion Cyclotron H&CD System (PBS 51) (2EPR35 v1.4) (current)

[REF 20.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and IC H&CD System (PBS 51) (33A8WX v1.2) (current)

Interfaces with PBS55

[REF 21.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Diagnostics (PBS 55) (2EPR54 v1.4) (current)

[REF 22.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Diagnostic (PBS 55) (357AB7 v1.2) (current)

Interfaces with PBS56

[REF 23.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Test Blanket Modules (PBS 56) (2EPR92 v1.5) (current)

[REF 24.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Test Blanket Modules (PBS 56) (34M9LV v2.0) (current)

Interfaces with PBS45

[REF 25.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - CODAC (PBS 45) (2EPQSR v1.6) (current)

[REF 26.] Interface Sheet (IS) between Hot Cell building (PBS 62.21) and CODAC (PBS 45) (33TKS6 v1.2) (current)

[REF 27.] Interface Control Document (ICD) between Rad Waste Building (PBS 62-23) - CODAC (PBS 45) (2EQCLT v1.5) (current)

[REF 28.] Interface Sheet (IS) between Radwaste building (PBS 62.23) and CODAC (PBS 45) (2W33PH v1.6) (current)

[REF 29.] ICD-62.24-45 Interface Control Document between Personnel Access Control Building (PBS 62.24) - CODAC (PBS 45) (2EQDJJ v3.0)

[REF 30.] IS-62.24-45-001 Physical and environmental interface between Personnel Access Control building (PBS 62.24) and CODAC (PBS 45) (2W3S8S v2.2)

Interfaces with PBS46

[REF 31.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Central Interlock System (PBS 46) (2EPQV8 v1.6) (current)

[REF 32.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Central Interlock System (PBS 46) (353ENC v1.3) (current)

[REF 33.] Interface Control Document (ICD) between Rad Waste Building (PBS 62-23) - Central Interlock System (PBS 46) (2EQCSW v1.5) (current)

[REF 34.] Interface Sheet (IS) between Radwaste Building (PBS 62.23) and Central Interlock System (PBS 46) (2ZSBB4 v1.5) (current)

[REF 35.] Interface Control Document (ICD) between Personnel Access Control Building (PBS 62-24) - Central Interlock System (PBS 46) (2EQDQM v2.2)

[REF 36.] IS-62.24-46-001 Interface Sheet (IS) between Personnel Access Control Building (PBS 62.24) and Central Interlock System (PBS 46) (2YLVJ3 v2.1)

Interfaces with PBS48

[REF 37.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Central Safety System (PBS 48) (2EPR2M v1.7) (current)

[REF 38.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Central Safety System (PBS 48) (354JFX v2.1) (current)

[REF 39.] Interface Control Document (ICD) between Rad Waste Building (PBS 62-23) - Central Safety System (PBS 48) (2EQCUX v1.6)

[REF 40.] Interface Sheet (IS) between Radwaste Building (PBS 62.23) and Central Safety System (PBS 48) (2W7ZUZ v2.1) (current)

[REF 41.] Interface Control Document (ICD) between Personnel Access Control Building (PBS 62-24) - Central Safety System (PBS 48) (2EQDUP v2.2)

[REF 42.] IS-48-62.24-001 Interface Sheet (IS) between Personnel Access Control Building (PBS 62.24) and Central Safety System (PBS 48) (2YKVC2 v2.0)

Interfaces with PBS43

[REF 43.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Steady State Power Supply (PBS 43) (2EPQNK v2.1) (current)

[REF 44.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Steady State Power Supply (PBS 43) (333ZBE v2.0) (current)

[REF 45.] Interface Control Document (ICD) between Rad Waste Building (PBS 62-23) - Steady State Power Supply (PBS 43) (2EQCEQ v2.2) (draft)

[REF 46.] Interface Sheet (IS) between Radwaste Building (PBS 62.23) and Steady State Power Supply (PBS 43) (34JQAQ v2.0) (current)

[REF 47.] Interface Control Document (ICD) between Personnel Access Control Building (PBS 62-24) - Steady State Power Supply (PBS 43) (2EQDCX v3.3)

[REF 48.] IS-62.24-43-001 Interface Sheet (IS) between Personnel Access Control Building (PBS 62.24) and Steady State Power Supply (PBS 43) (34NTX9 v3.0)

Interfaces with PBS26

[REF 49.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Chilled Water (PBS 26-CH) (2FK378 v1.4) (current)

[REF 50.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Component Cooling Water (PBS 26-CC) (2FGZEU v1.6) (current)

[REF 51.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Water Cooling System (PBS 26) (33HRHN v1.2) (current)

[REF 52.] Interface Control Document (ICD) between Rad Waste Building (PBS 62-23) - Chilled Water (PBS 26-CH) (29P4VP v1.3) (current)

[REF 53.] Interface Control Document (ICD) between Rad Waste Building (PBS 62-23) - Component Cooling Water (PBS 26-CC) (27WBMC v1.4) (current)

[REF 54.] Interface Sheet (IS) between Radwaste Building (PBS 62.23) and Water Cooling System (PBS 26) (33Z5VT v1.2) (current)

[REF 55.] Interface Control Document (ICD) between Personnel Access Control Building (PBS 62-24) - Chilled Water (PBS 26-CH) (2FQJA2 v2.3)

[REF 56.] Interface Sheet (IS) between Personnel Access Control Building (PBS 62.24) and Chilled Water (PBS 26.CH) (33LDMC v1.2)

Interfaces with PBS64

[REF 57.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Radiolg & Env Monitoring (PBS 64) (2EPRD8 v1.4) (current)

[REF 58.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Radiological Protection (PBS 64) (358TTF v2.1) (current)

[REF 59.] Interface Control Document (ICD) between Rad Waste Building (PBS 62-23) - Radiological Protection (PBS 64) (2EQCWY v1.3) (current)

[REF 60.] Interface Sheet (IS) between Radwaste Building (PBS 62.23) and Radiological Protection (PBS 64) (35FU7Q v2.0) (current)

[REF 61.] Interface Control Document (ICD) between Personnel Access Control Building (PBS 62-24) - Radiological and Environmental Monitoring (PBS 64) (2EQDYR v2.4)

[REF 62.] Interface Sheet (IS) between Personnel Access Control Building (PBS 62.24) and Radiological Protection (PBS 64) (33BTL3 v2.3)

Interfaces with PBS69

[REF 63.] Interface Control Document (ICD) between Hot Cell Bldg (PBS 62-21) - Access Control & Security (PBS 69) (345UM8 v2.0) (current)

[REF 64.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Access Control & Security (PBS 69) (35X2F8 v1.1) (current) (*)

[REF 65.] Interface Control Document (ICD) between Low Level Radwaste Bldg (PBS 62-23) - Access Control & Security (PBS 69) (32ZWYQ v2.0) (current)

[REF 66.] Interface Sheet (IS) between Radwaste Building (PBS 62.23) and Access Control & Security (PBS 69) (35XSCM v1.1) (current) (*)

[REF 67.] ICD-62.24-69 Interface Control Document between Personnel Access Control Bldg (PBS 62.24) and Access Control & Security (PBS 69) (34B5CX v3.1)

[REF 68.] Interface Sheet (IS) between Personnel Access Control Building (PBS 62.24) and Access Control & Security (PBS 69) (32ZT2J v1.1) (*)

(*) Document not part of the tender documentation, IDM access of document provided at the Kick of Meeting

Interfaces with PBS44

[REF 69.] ICD-62.21-44 Interface Control Document for Hot Cell Facility Building (PBS 62.21) and Cable Trays System (PBS 44) (343LNZ v2.0) (current)

[REF 70.] IS-62.21-44-001 Interface between PBS 62.21 Hot Cell Building CLIENT PBS 44 Cable Tray System for cable tray network & openings (2NQ72U v1.1) (current)

[REF 71.] ICD-62.23-44 Interface Control Document for Radwaste Facility Building (PBS 62.23) and Cable Trays System (PBS 44) (34FS59 v2.1) (current)

[REF 72.] IS-62.23-44-001 Interface between PBS 62.23 Rad Waste Building and CLIENT PBS 44 Cable Tray System for cable tray network & openings (2NQT8Y v1.1) (current)

[REF 73.] ICD-62.24-44 Interface Control Document (ICD) between Personnel Access Control Building (PBS 62-24) and Cable Trays System (PBS 44) (346QDP v3.6)

[REF 74.] IS-62.24-44-001 Interface between PBS 62.24 Personnel Access Control Building and CLIENT PBS 44 Cable Tray System for cable tray network & openings (2YFJXL v2.1)

Interfaces with PBS22

[REF 75.] Interface Control Document (ICD) between Hot Cell Building (PBS 62-21) - Machine Assembly and Tooling (PBS 22) (2EPQGW v1.4) (draft)

[REF 76.] Interface Sheet (IS) between Hot Cell Building (PBS 62.21) and Machine Assembly & Tooling (PBS 22) (33RKVE v1.1) (current)

6.4 Cost optimization

The first part of this activity is to extensively participate to the trade-off studies performed by the building Engineering company (please refer to WP01 described in ITER_D_SW5UFF - Technical Specification Hot Cell Complex - Building Engineering Contract), extending the scope to the overall facility, including the process.

The goal is then to pursue this cost optimization during design and safety analysis activities, aiming at reviewing the technical options, the safety demonstration, identifying ways to minimize the cost without jeopardizing the requirements (functional and safety).

Goal is to share with third parties a tracking table of opportunities and options to be investigated in close relation with the teams in charge of the building and the process design. The aim is also to reduce major risks that have been identified. This activity shall include analysis and comparison between different options, based on lessons learned and feedback from existing technologies wildly used in nuclear field.

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;

• 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 IO rules.

7.2 IO's Responsibilities

The IO shall:

• Nominate the Responsible Officer to manage the Contract;

- Organise a monthly meeting(s) on work performed;
- Provide offices at IO premises.

8 List of deliverables and due dates

D #	Description*	Due Dates
D1	Review of input data for building design activities, tracking table of the “Request for Information” (RFI) between IO and the Hot Cell Engineering contract, Review of the trade-off studies and complementary analysis aiming at reducing the overall investment cost of the facility.	T0 + 3 months
D2	Preliminary version of the updated Interface Control Documents and Interface Sheets between the HCC buildings and the systems, based on the “process equipment datasheet”, Tracking of the “Request for Information” Tracking table of the cost optimization to be integrated into the building and process design	T0 + 6 months
D3	First version of the updated Interface Control Documents and Interface Sheets between the HCC buildings and the systems, loaded on IDM for review by the PBS Responsible Officers Preliminary summary of cost optimization, including cost estimate and justification (e.g. comparison between options)	T0 + 9 months
D4	Second IDM version of the updated Interface Control Documents and Interface Sheets between the HCC buildings and the systems, taking into account the comments made by the PBS Responsible Officers Final summary of cost optimization, including cost estimate, justification (e.g. comparison between options) and proposal to pursue this cost optimization in the next stages of design	T0 + 12 months

9 Acceptance Criteria

These criteria shall be the basis of acceptance by IO following the successful completion of the services. These will be in the form of monthly progress reports as indicated in section 8, table of deliverables and further detailed below:

- 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.
- The acceptance criteria of the document correspond to:
    - Justified and documented comments,
    - Lessons learned of existing nuclear facilities,
    - Reference to existing technologies and proven solutions used in nuclear field,
    - Reference to existing and applicable Norms and Standards,

10 Specific requirements and conditions

- Significant experience in the design of nuclear facility, in particular Hot Cells, dealing with complex interfaces,
- Significant experience in contract management of nuclear projects,
- Experience in Radwaste processing,
- Experience in Robotic, cranes and Remote Handling Systems

11 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 and the planning. It is expected that Progress Meeting will be held weekly or biweekly. Progress meetings will involve C-R, CTROs, IO-RO and IO-TROs.

The main purpose of the Progress Meetings is to allow the ITER Organization/RHRM 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, additional meetings to address specific issues to be resolved may be requested by the ITER Organization.

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.

12 Delivery time breakdown

See Section 8 – Deliverables and Due Date

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 [20].

16 Appendix: Main features of the Hot Cell Complex

	Requested experience	Main features of the Hot Cell Complex facilities
Nuclear civil engineering of complex large scale project	High technology project	First-of-a-kind or research construction projects
	Strong links with industry and potential Plant manufactures	Wide range of disparate leading edge/high-tech systems and equipment to be designed, in order to avoid risk of change during suppliers manufacturing design.
	International projects	ITER stakeholders are China, the European Union, India, Japan, Korea, Russia and the United States. It corresponds to 35 different nations.
	Engineering/design	Design and overall integration of : - Building structure. Volume about 300,000 m^3 nuclear concrete building - Approximately 600 rooms within the Hot Cell Complex, - Building systems, e.g. Heating, Ventilation, and Air Conditioning (HVAC), fire protection, electrical distribution, Instrumentation & Control (I&C), liners, red zone cooling, piping, - Mechanical heavy handling, e.g. cranes, doors, trolleys
Hot Cells expertise	Numbers of hot cells / red zones	15 different hot cells in HCB, in total volume of red zones / C4 ventilation class = 26,000 m^3
	Management of irradiated and contaminated components	Contact dose rate = 250 Sv/h due to activation in the Tokamak. Contamination of tritiated and activated dust on In Vessel components and IRMS Constant efforts to prevent spread of dust in red zones (from design stage to operational procedures), ALARA
	Tritiated environment	High level of tritium concentration > 4000 DAC (Derived Atmospheric Contamination) in red zones Red zone / C4 areas fully covered by stainless steel liner, with a gap between the concrete wall and the liner. This gap is maintained under air Detritiation System.
	Nuclear maintenance	10 different hot workshops, 300 m^2 average each, dealing with hands-on maintenance on components after remote decontamination, ALARA
	Remote heavy handling in red zone	Handling of various heavy components, non-exhaustive list: – Equatorial Port Plug (50t, 3.5m length x 2.4 m x 2m), – Upper Port Plug (25t, 6 m length), – Divertor (9t, 3.5m length, 2m high, 0.8m wide), – Vacuum Cryopump (2.9m length, 1.7m diameter),

	Requested experience	Main features of the Hot Cell Complex facilities
		– Oversized Neutral Beam components up to 8m length, 3m high and 3.3m wide Two lines of defence: high reliability of heavy transfer systems and mitigation means in case of unexpected load drop.
	Docking of transfer casks	Transfer and docking of Remote Handing Transfer Cask, large size docking door: 2m x 2.4m, between the TKM and the HCC, and within the Hot Cell Building.
Radwaste management	Treatment of radioactive solid waste	Orders of magnitude during 20 years operation: – 1000 tons of MAVL waste – 100 tons FMA-VC – 100 tons purely tritiated waste – 10 tons TFA
	Treatment of radioactive liquid effluent	Orders of magnitude: 200 m^3 / year
	Radwaste process remotely controlled	Type B radwaste process located in the red zones / C4 areas shall be fully remotely controlled (no man access) and with in situ remote maintenance or hands-on maintenance after remote decontamination.
Hot Cell Remote Handling	Complex remote operation	Port Plug refurbishment, example of tasks to be performed fully remotely: – tilting 90° of 50t port plugs, – removal of subcomponents, – welding and control, – testing.
	Hot Cell Remote Handling	Design and integration of: – Tens of heavy duty long range manipulators, fully powered by electrical motors, – Few telescopic power manipulators, – Shielded windows, – Lighting and viewing systems, – Frames and handling tools, Buffer storage, remote decontamination, hands-on maintenance.
	Centralized control system	Functions such as ventilation management, remote transfers, remote refurbishment of In Vessel Components, remote waste treatment, shall be controlled from a centralized control room located in the Personal Access Control Building
	Seismic requirement	High seismic requirement (2 to 3 g acceleration in different dimensions) on building structure and part of the building system and process which is seismic classified according to the safety analysis