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1 Purpose

This white paper provides background information to facilitate market response to the ITER Organization (IO) market survey (ref IO/MSY/21/HCC/PI) regarding the contract for the Project

contractual in any way and will evolve based on response to the market survey and other information.

This document first introduces the HCC Project, describes foreseen PI main role, missions and scope at each phase of the project, as well as Procurement strategy, and provides a first project schedule outline.

- the Remote Handling and Radwaste processes (e.g. bespoke remote handling equipment, decontamination processing, size reduction and detritiation systems, liquid and cementation processing, laboratories).

The scope does not include the design and construction activities of the TAPB, B27, Port Plug

The final outcome shall be an integrated facility, complying with safety and functional requirements, within the Client budget and schedule constraints, and substantiated with all the requested documentation.

It must be noted that part of the requested documentation shall be used as support documentation for the Client to answer to the French nuclear regulator.

The ITER

By the end of this phase, the Collaboration participants, including the PI, shall prepare and hold a dedicated review, appropriate the Concept Design and Design Brief and formally take the full responsibility for them and the future design development of the HCC.

The PI shall in agreement with the Client, refine the scope allocation with the analysis and remedy to any potential gaps and overlaps.

The PI shall in agreement with the Client, also update the target cost, schedule and R&O plans.

5.1.3 Implementation phase

This phase shall start with the Preliminary Design, to be followed by the Final Design stage, both to be reviewed and validated through formal design gates.

The Preliminary Design will detail the solution appropriated in the previous phase, or any alternatigt with the Client,

3.

Figure 2 : Illustration of the sequence of activities (including FPO activities) illustration only

Appendix 1: Abbreviations

ALARA	As Low As Reasonably Achievable
ASN	*« Autorité de Sûreté Nucléaire »* - French Safety Authority
Be	Beryllium
C4	Ventilation Classification C4 according to ISO 17873

PACB	Personal Access Control Building
PCR	Project Change Request
P&ID	Piping and Instrumentation Diagram
PIA	Protection Important Activity
PIC	Protection Important Composant
PFD	Process Flow Diagram
PP	Port Plug

Appendix 2: Requirements, main features of plant and buildings

ITER project lifecycle

The Hot Cell, the Radwaste Facility and the Personal Access Control Buildings shall accommodate different phases of operations, with related constraints and objectives:

- The operational phase where plasma will be performed in the TKM, with very low activation but production of Beryllium dust: in this configuration, there shall be man access into the hot cells,
- The operational phase without Tritium but with low activation level of In-vessel components,
- The operational phase with Deuterium-tritium Plasma producing activated and contaminated In-vessel components, in particular with activated dust and tritium,
- The deactivation phase for which the HCC shall support, in particular, the removal, the treatment and the buffer storage of In-vessel components,
- The decommissioning of the TKM and later the decommissioning of the HCC itself.

Location of the HCC

The B21 concrete building is located adjacent to the Tokamak Complex, north side (see **Error! Reference source not found.** and **Error! Reference source not found.**). It is connected to the

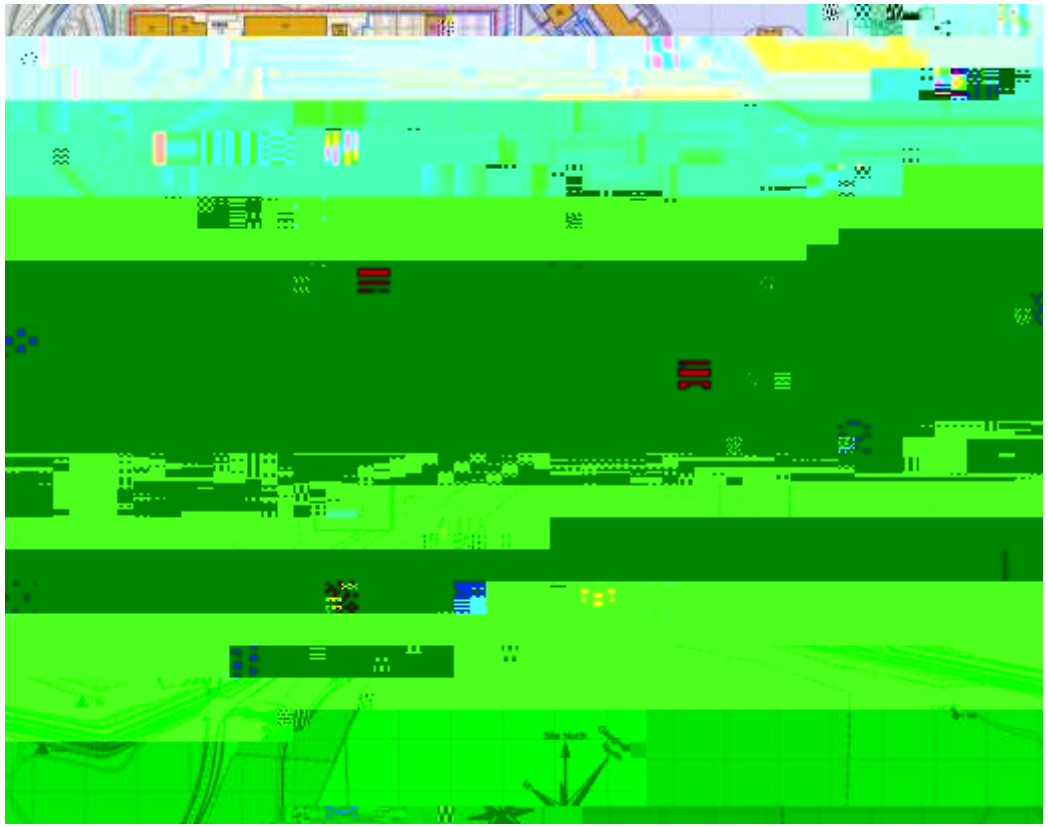

Figure 3 : Site master plan

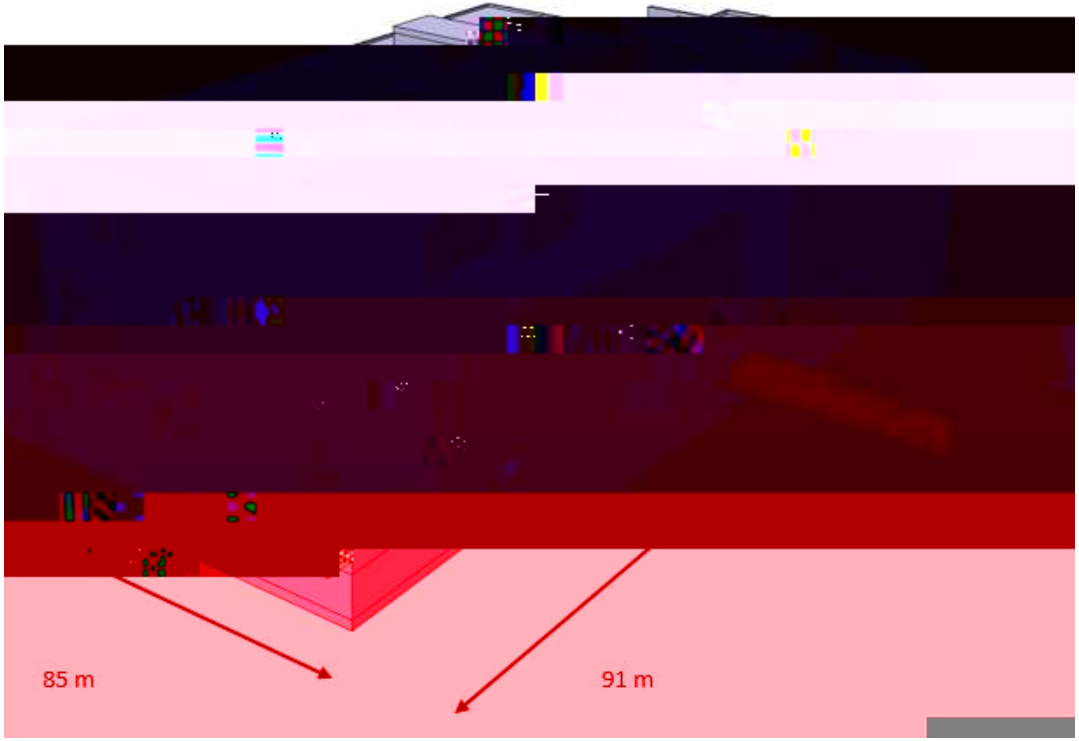

Figure 4 : Overview of the Hot Cell Complex (B21)

It must be noted that the construction of the HCC could occur at the same time as the construction of the TKM and the adjacent buildings, or during the TKM assembly and operation. This strong constraint shall be considered at an early stage of design, in term of technical feasibility, cost, functional and physical interfaces, and coordination of the work on site.

Maintenance and Radwaste process

The HCC and the PACB shall provide the following functions:

Implementation phase

HCC functional analysis	HCC components list	Catalogue of standard qualified components
HCC Design plan	Detailed safety analyses	Status of PIC list
List of applicable documents	Updated zoning (ventilation, radioactive, tritium, beryllium, fire)	HCC mock-up program
Configuration items reporting and status	Safety room book	HCC detailed WBS
Change proposals	Detailed safety requirements status	HCC cost estimate
Minutes of CCB	Compliance matrix for Defined Requirements propagation	PCR cost estimate
Assessment reports for deviation requests	PIA/PIC status reporting	HCC DWS schedule

Surveillance plans

Appendix 4: Required skills face to main features of the HCC

	Demonstrable skills and experience	Main features of the Hot Cell Complex facility
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 for in the

	Demonstrable skills and experience	Main features of the Hot Cell Complex facility
	penetrations and anchorage	
Hot Cells expertise	Numbers of hot cells / red zones	15 different hot cells in HCC, in total volume of red zones / C4 ventilation class = 20,000 m^3
	Management of irradiated and contaminated components	Contact dose rate = 400 Sv/h due to activation in the Tokamak. Contamination of tritiated and activated dust on In Vessel components and IRMS

	Demonstrable skills and experience	Main features of the Hot Cell Complex facility
		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).
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 manipulator, 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
Safety	Safety demonstration	Full traceability of safety requirement, to the detailed safety requirement and the related reference documentation

Demonstrable skills and experience	Main features of the Hot Cell Complex facility
	Exhaustive list of prevention, detection and mitigation means for each internal and external safety hazard (deterministic approach).
ALARA	particular regarding shielding calculation and hot workshops.
Human Factor	Human factor integration, definition and tracking of Human Factor requirements, development of virtual mockup and Human Machine Interfaces for the centralized control room.
French Nuclear Regulator licencing process	Safety analysis of the HCC and continuous support to the licencing process: answer to ASN request, data and safety analysis for the update of the RPrS.

Table 1: Demonstrable skills and experience