

## Technical Specifications (In-Cash Procurement)

# BRN I-14-695 Senior Planning Engineer Support

The objective of this Contract is to provide the IO Technical Responsible Officer or deputy (hereafter known as the IO-TRO) with Senior Planning Engineer services (hereafter referred to as the 'Planner') for Site Construction (assembly & installation).

The scope of work to be performed will be carried out in close liaison with the IO-TRO, engineers and planners of the Assembly and Operations (AOP) Division, and with other ITER staff as necessary.

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## 1 Purpose

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## 2 Scope

### 2.1 The ITER Project

The ITER project aims to demonstrate the scientific and technological feasibility of fusion power for peaceful purposes and to gain the knowledge necessary for the design of the next-stage device, DEMO, or the DEMOnstration fusion power plant.

Receiving 50MW of input power, the ITER Machine is designed to produce 500 MW of fusion power for extended periods of time. This represents ten times more than the input power needed to keep the plasma at temperature. It will therefore be the first fusion experiment to produce net energy. It will also test a number of key technologies, including heating, control, and the diagnostics and remote maintenance that will be needed for DEMO.

The main regulatory documents pertaining to the mechanical components for ITER are:

- The Quality Order dated 7 February 2012 relating to the general technical regulations applicable to INB – EN updating:
  - Order of 10 August 1984 relating to the quality of design, construction, operation and decommissioning of nuclear installations (so called quality order);
  - Order of 26 November 1999 setting general technical stipulations concerning limits and modalities of the samples and releases subject to authorization, carried out by the INB; and
  - Order of 31 December 1999 setting the general technical regulatory controls intended to prevent and limit external nuisances and risks resulting from the operating of INB.
- Decree No. 99-1046 dated 13<sup>th</sup> December 1999 concerning pressure equipment – Introduction of the pressure Equipment Directive in France (French acronym ESP/PED)

Further information can be found on the ITER website (<http://www.iter.org>) and also at the web pages of the ITER Parties that can be accessed via the ITER website.

### 2.2 The ITER Organization

ITER is a joint international research and development project for which initial construction activities have recently started.

The seven Members of the ITER Organization are the European Union (represented by EURATOM), Japan, The People's Republic of China, India, the Republic of Korea, the Russian Federation and the USA. ITER will be constructed in Europe, at Cadarache, in southern France, where the ITER Organization (IO) has its headquarters.

The Members of the ITER Organization will bear the cost of the project through its 10-year construction phase, and its 20-year operational phase before decommissioning. With respect to the construction of the ITER machine, most of the components will be contributed by the Members as in-kind contributions. The remaining investment will be via cash contributions from the members.

### 2.3 Assembly and Operations – The Mission

The scope of the Assembly and Operations (AOP) Division is to provide construction support for:

- The assembly of the ITER machine;
- The installation and functional testing of IO Plant Systems in Buildings and Areas on the ITER Site.

Specify requirements for special (custom) tools used in assembly and installation of the Machine and IO Plant Systems. Tools are defined and approved by PBS 22 Machine Assembly and Tooling Section and are supplied either by DA or from IO Fund.

Undertake role and responsibilities of the **Construction Manager** <sup>(1)</sup> during assembly, installation and testing at the ITER site. Specific site construction activities include materials management (site reception, offloading, unpacking, storage, handover to Constructor), execution of works (assembly, handling, installation) and testing (installation, component, performance).

Undertake role and responsibilities of the **Start-up and Testing, and Integrated Commissioning Manager** <sup>(2)</sup> subsequent to assembly, installation and testing at the ITER site.

Undertake role and responsibilities of the Operator, following the Handover of Structures, Systems and Components (SSCs) for the ITER Facility.

Provide support to Transport and Logistics associated with the delivery of components to the ITER Site.

<sup>(1)</sup> **Construction Manager** is the unit within the Operator for the oversight, planning and coordination of all Assembly and Installation activities. The Construction Manager takes overall responsibility for the coordination of safety of assembly and installation activities and reports to the IO Site Safety Coordinator. The Construction Manager is responsible for issuing work permits on the worksite.

<sup>(2)</sup> **Start-up and Testing and Integrated Commissioning Manager** is the unit within the Operator for the oversight, planning and coordination of all testing and commissioning activities. The Start-up and Testing and Integrated Commissioning Manager is responsible for ensuring that the overall sequence of commissioning activities is planned, prepared and performed.

## 3 Definitions

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

Acronym	Description
<b>AACE</b>	American Association of Cost Engineers
<b>AOP</b>	Assembly and Operations Division
<b>BoE</b>	Basis of Estimate
<b>CPD</b>	Construction Process Description

<b>CWP</b>	Construction Work Package
<b>DA</b>	Domestic Agency
<b>IO</b>	ITER Organization
<b>IO-TRO</b>	IO Technical Responsible Officer
<b>INB</b>	Basic Nuclear Installation
<b>PBS</b>	Plant Breakdown Structure
<b>SSC</b>	Structures, Systems and Components

## 4 References

- [1] [ITER Policy on Authority and Responsibilities during Assembly, Installation and Testing at the ITER Site \(A5TUQN\)](#)
- [2] [ITER Site Construction Project Management Plan \(ECBZWE\)](#)
- [3] [ITER Site Construction Requirements Management Plan \(DZHMAK\)](#)
- [4] [ITER Site Construction Scope Management Plan \(DZL8VL\)](#)
- [5] [ITER Site Construction Engineering Management Plan \(EH5ET3\)](#)
- [6] [ITER Site Construction Schedule Management Plan \(E38VRM\)](#)
- [7] [ITER Site Construction Cost Management Plan \(EBUTK5\)](#)
- [8] [ITER Site Construction Field Quality Management Plan \(FCYR7F\)](#)
- [9] [ITER Site Construction Field Configuration Management Plan \(EBUK3B\)](#)
- [10] [ITER Site Construction Resource Management Plan \(ECEFE6\)](#)
- [11] [ITER Site Construction Communication Management Plan \(EBQA66\)](#)
- [12] [ITER Site Construction Risk and Opportunity Management Plan \(ECH4AK\)](#)
- [13] [ITER Site Construction Materials Management Plan \(92VZ3G\)](#)
- [14] [ITER Site Construction Works Management Plan \(ECCBR2\)](#)
- [15] [ITER Site Construction Health, Safety and Environmental Management Plan \(EC8ALD\)](#)
- [16] [ITER Site Construction Procurement and Contracts Management Plan \(JPDBFC\)](#)
- [17] [ITER Site Construction Documentation and Data Management Plan \(JQGTVR\)](#)
- [18] [ITER Site Construction Start up, Testing and Turnover Management Plan \(LX96CK\)](#)

## 5 Estimated Duration

The duration of this Contract shall be 12 months (fixed part), plus two options to extend by 6 months each.

## 6 Overview and Work Description

1. During 2013-2014 a comprehensive **contracts strategy** has been prepared comprising the following Site Construction contracts:
  - Construction Management Services Contract
  - Machine Assembly Works Contract
  - Mechanical & Piping Works Contract
  - Electrical, Cabling, Instrumentation & Control Works Contract
  - Specialised Works Contract
  - Field Quality, Testing & Surveillance Support Contract
  - Welfare Premises Support Contract

- Finishing/Civil Works Support Contract
- Site Materials & Logistics Support Contract
- Scaffolding and Access Equipment Support Contract
- Tools and Plant Hire Support Contract

Preparation of specifications for the above contracts commenced in Q4 2014 and contract tenders, evaluations, and award are anticipated to continue into Q2-Q3 2016.

2. During 2014-2015 a comprehensive performance baseline for Site Construction is being developed, comprising:

- **Primavera schedule** including contracts preparation, engineering, project management, materials management, works, testing and commissioning related tasks, this is used for managing the performance of work and for forward planning:
  - Preparation for Construction
  - Site Materials
  - Construction (Assembly and Installation works)
  - Start-up and Testing
  - Integrated Commissioning
- **Statements of the work scope** consistent with the approved ITER detailed WBS using a web based application:
  - Description of the scope
  - Technical Pre-Conditions
  - Exclusions
  - Process for execution
  - Completions and Acceptance Criteria
- **Cost Estimate** for the Site Construction scope of work to include all IO scope including Management, Surveillance, and Assembly, and Testing activities on the ITER platform.
  - The Cost Estimate is being prepared at an overall Class 3<sup>1</sup> (budgetary) level and is being produced in the Cleopatra Enterprise Cost Estimating software with deviations in the estimate quality for discrete work packages i.e. to Class 2 or Class 4 level.
  - The Cost Estimate is being prepared using European industrial Labor rates contained within the IO Cleopatra Enterprise software and using industry best practices for Cost Estimation.
  - The Basis of Estimate (BoE) is being prepared in Microsoft Office software.

3. During 2014-2015 a comprehensive **constructability / engineering study** is being developed for the site construction scope comprising:

- Construction Process Descriptions (CPD), a non-contractual description of the assembly and installation of components within a Construction Work Package (CWP)<sup>2</sup> and shall contain information sufficient to describe and demonstrate a

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<sup>1</sup> American Association of Cost Engineers (AACE) 17R-97: Cost Estimate Classification System

feasible methodology for Assembly and Installation purposes. The CPD will be developed as the system design matures and technical details are finalised. The generic issues to be addressed during evolution of the CPD are:

- Configuration of SSC upon Delivery to Worksite
- Assumptions
- Exclusions
- Technical and Schedule Constraints
- Planning Basis
- Sequence Diagram
- Preparation
- Construction
- In-Process Verifications and Inspections
- Completion and Final Inspections
- Identification of risks and opportunities in the design
- Tooling and Equipment

Planning and Scheduling is thus a critical activity in the areas of Machine Assembly and Plant Installation, and full-time planning and scheduling support is required to support these activities.

The primary area of work will be the revision/development of the Machine Assembly baseline schedule. The scope of work shall include, but not necessarily be limited to the following planning and scheduling tasks:

1. Development of updated, detailed, resource loaded schedules for the complete Machine Assembly project, covering both Assembly Phase I and Phase II. The Machine Assembly scope includes all site activities required to receive, handle, prepare, install, test and inspect the machine components.
2. As a senior member of the planning support team for Machine Assembly, provision of support, guidance and organisational expertise to the other schedulers developing individual, sub-project schedules.
3. Implementation of the schedule for all machine assembly activities, including the preparation and delivery of weekly progress reports to AOP management.
4. Securing approval of deliverable schedules and associated underpinning (Basis of Schedule) from AOP management.
5. Integration of approved, detailed Machine Assembly Schedule in the overall Integrated Construction Schedule.
6. Development and documentation of schedule delay mitigation scenarios and proposals.
7. Identification of Risks and Opportunities and the development of associated response plans, workarounds and what-if scenarios.
8. Provision of administration services to maintain the Primavera Construction database. To effectively complete this function the Planner will be a qualified Primavera Administrator.

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<sup>2</sup> A Construction Work Package (CWP) is an executable construction deliverable that defines in detail a specific scope of authorised work and which includes a budget and schedule that can be compared with actual performance. The scope of work in a CWP is such that it does not overlap another CWP. Nominally a CWP is therefore a discrete element of the ITER Plant Breakdown Structure (PBS) or other significant work scope such as the preparation of a facility or area.

9. Support to the development of the Construction Management Database architecture, processes and standards.

Sub-tasks include but are not limited to:

- Integration of detailed schedules within the Primavera database.
- Identification and application of coding for every detailed activity.
- Identification of all Plant and Tooling Requirements for every detailed activity.
- Coding and logic integration to enable 4D modelling software integration.
- Evaluation of schedule issues, risks and opportunities.
- Analysis of interfaces and critical dependencies.
- Preparation of summary reports.
- Analysis of design changes affecting machine assembly and plant installation activities.
- Recommendation of schedule optimisations and delay mitigation and recovery measures.
- Preparation of materials and participation in reviews of assembly and installation schedules.
- Support in the areas of Primavera administration and development of database applications.

## **7 Acceptance Criteria**

All deliverables and bi-weekly reports will be subject to the approval of the IO-TRO mentioned in the Contract or his authorized deputy.

## **8 Specific requirements and conditions**

The Planner shall use the ITER software's, aided by plans and procedures that are being implemented by the IO. ITER has chosen:

- *Primavera* as its scheduling tool.
- *IDM Construction Portal* for scope management.
- *Intergraph SmartPlant Materials, SmartPlant Construction, and SmartPlant for Owner Operators* as the system to support the execution phases of the work.
- *Cleopatra* for Site Construction cost estimating

The work will require detailed investigation and review of existing documentation, industry standards and best practices.

Briefing materials will be prepared as necessary to explain results of analysis, progress etc., to the IO-TRO.

The IO-TRO will provide necessary support to the Planner in the form of input materials, access to existing documentation, and access to subject matter experts. The Planner's full-time presence at the ITER site is necessary for the effective performance of the duties.

Each work task will be individually discussed in consultation with the IO-TRO and a deliverable date will be agreed.



## **9 Work Monitoring / Meeting Schedule**

Completion of work items will be confirmed by the IO-TRO or his authorized deputy. For longer tasks an interim monitoring point may be defined.

The work shall require the permanent presence of the Planner at the site of the ITER Organization.

Bi-weekly progress meetings shall be held between the Planner and the IO-TRO, or his deputy, along with other relevant staff. The experts shall be responsible for producing minutes of these meetings and tracking actions and for preparing a report including the actual number of days worked.

The official language of the ITER project is English.

## **10 Required Qualifications and Experience**

The Planner shall provide the following skills:

- Minimum of 7 years (but preferably 10 years) planning, and scheduling experience.
  - Primavera Administrator / advanced user status.
  - Background and proven track record in planning for the installation and maintenance of systems of a similar nature and scale to those of the ITER project
  - Fully familiar with Construction industry and Project Management best practices and global standards.
  - Ability to function autonomously when required, adding real value to the planning and scheduling process, and with technical skills necessary to build, develop, analyse and update detailed, resource-loaded Primavera Schedules based on existing Assembly Plans.
- Fluent in English both written and oral
  - Ability to communicate effectively and to write clear and concise reports in English
  - Good interpersonal, communication and organizational skills
  - Previous experience in a multi-cultural environment