CONTRACTS TECHNICAL SPECIFICATION

Support to Assembly and Operations for Interfaces Coordination and Integration

Technical Specification

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1. Abstract

This document specifies the technical requirements for the provision of support services to the Assembly and Operations (AOP) Division for interfaces coordination during and after IO Cost Estimate, and Basis of Estimates development for the Phase I Assembly, Installation, and Testing of the ITER Machine, Plant and Auxiliary Systems, this being to support the delivery of a consistent and comprehensive baseline package of integrated scope, schedule and cost.

2. Background and Objectives

Planning is a major activity in the areas of Machine Assembly and Plant Installation, as well as in support of all ITER subsystems.

The IO AOP Division has been instructed to develop a Cost Estimate for the Phase I Assembly, Installation, and Testing of the ITER Machine, Plant and Auxiliary Systems. Project Management Planning (PMP), and specifically high quality cost estimates, provides an essential element for successful project and program management. The Cost Estimate shall be integrated with the Construction Master Schedule and Scope Statements which are currently under development.

The actual Cost Estimate and Basis of Estimate are deliverables from the third party Cost Estimating contractor.

The objective of this contract is to provide support to the IO for the planning and coordination of technical, scope and schedule interfaces during and after the preparation of estimates by the third party Cost Estimating contractor for ITER Worksites No. 1-6.

Worksite No. 1: Tokamak Basic Machine (incl. Bldg 13, Bldg 17 & Sub-Assembly)

Worksite No. 2: Tokamak Bldg 11

Worksite No. 3: Tokamak Complex & Control Complex's

Worksite No. 4: Cryoplant Complex and Site Services Complex's

Worksite No. 5: Magnet Power, Emergency Power, Reactive Power, and NB Power Supply Complex's

Worksite No. 6: Site Works (Cables, Cooling Water, Cryogenics, Fence)

Worksites No 2 -6 mostly contain 'conventional' Mechanical, Electrical, and Piping systems.

By aiding in the development of the process and supporting the coordination and integration of the estimate documentation, all planned cost estimates can be integrated into the overall project plan (integrated scope, schedule and cost) by the ITER Organization at the completion of the cost estimating.

For information only: The Cost Estimates are required to be at an overall level of Class 3[1] and produced in the Cleopatra Enterprise Cost Estimating software.

For information only: The Basis of Estimate can be produced in Microsoft Office software.

For information only: The structure of ITER Worksites is provided in Annex B of this specification.

For information only: The description of the Cost Estimates and Basis of Estimate is provided in Annex C of this specification.

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[1] American Association of Cost Engineers (AACE) 17R-97: Cost Estimate Classification System

3. References

The references below are applicable to this contract. Other reference materials are being developed by the IO and they will be provided before commencing this scope of work.

[1] *Order of 10 August 1984 on Quality for Basic Nuclear Installations* (IDM_D_33WQMW): French version and *Order of 10 August 1984 on Quality for Basic Nuclear Installations EN*: translation to English for guidance (IDM_D_27AGR5).

Arrêté du 7 février 2012 fixant les règles générales relatives aux installations nucléaires de base (IDM_D_7GJHSE): French version and *Order dated 7 February 2012 relating to the general technical regulations applicable to Basic Nuclear Installations*: translation to English for guidance (IDM_D_7M2YKF).

[2] ITER Management & Quality Programme (MQP) (IDM_D_2NS3UH)

[3] ITER On-Site Testing Strategy (IDM_D_44U2Y4)

[4] ITER Integrated Safety, Quality and Security Management System (ISMS) Manual (IDM_D_4HCWJU)

[5] Overall Site Organisation, Safety Coordination and Environmental Protection during ITER Construction (IDM_D_2LH9QC)

4. Estimated Duration

The required services shall have a duration of 12 months. The services are expected to start in September 2014.

5. Work Description

5.1 Overall program of Support and Coordination

The Contractor shall support the IO in the areas of planning and interface coordination during and after development of the Cost Estimates and associated Basis of Estimate documentation by the third party Cost Estimating contract.

The overall program of support is summarized as:

- On-Site support for AOP cost estimate preparation meeting and fact finding
- On-Site support for analysis and coordination of Basis of Estimate documentation predicated on ITER WBS, maturity of design at subsystem levels, AACE cost classification guidelines, and baseline reference schedule (these could be prepared remotely)
- On-Site support to the IO for cost estimate consolidation, documentation audit, and preparation of the final packages of cost estimate data.
- Consultation support as needed.
- On-Site support for integration of cost estimates with schedule
- On-Site support for integration of scope statements with cost estimates and schedule

The construction cost estimate process will be initially assessed and based on each technical subsystems scope, maturity of design, an appropriate estimating methodology (parametric, analogous, or bottom-up) and then progressively updated and controlled and approved through configuration management processes.

The integration and coordination of the Cost Estimates with the associated Basis of Estimate documentation, scope and schedules will be aided by plans and procedures that are being implemented by the IO.

5.2 IO Inputs

The IO will provide the Contractor with access to all necessary data as is being provided to the third party Cost Estimating contractor.

6. Responsibilities

ITER: The IO will assign appropriate subject matter Contractors to attend meetings and workshops as needed.

The IO will review and verify the completion of all estimates. The IO will direct the Contractor on the priority of all deliverables described below.

The IO will be responsible for determination of reserves for each Work Package based upon the uncertainties (Design maturity, detailed work sequence, congestion etc..,) and identified risks.

The IO will be responsible for budget reconciliation.

Contractor: The Contractor shall be responsible for assistance in the organisation of the work and supporting production of the Cost Estimate. Contractor Deliverables are outlined in Section 7 below.

7. List of deliverables and due dates

D1: Report of baseline assessment of cost estimate readiness by technical subsystem.

D2: Collection / coordination of subsystem cost estimate data based on design maturity and cost classification guidelines.

D3: Coordination of Construction Cost Estimate BOE's for Worksite 1;

D4: Coordination of Construction Cost Estimate BOE's for Worksite 2;

D5: Coordination of Construction Cost Estimate BOE's for Worksite 3;

D6: Coordination of Construction Cost Estimate BOE's for Worksite 4;

D7: Coordination of Construction Cost Estimate BOE's for Worksite 5;

D8: Coordination of Construction Cost Estimate BOE's for Worksite 6;

D9: Support to cost simulations and determination of reserves based on uncertainties and major risks;

D10: Integration of Scope Statements with Construction Master Schedule;

D11: Integration of Cost Estimates and BoEs with Construction Master Schedule;

D12: Presentation of drafts and completed documents to AOP/PCA Management;

D13: Bi-weekly reports summarizing work completed on-site with follow-up actions that have been completed remotely.

The deliverable dates provided below are indicative and are relative to the contract start date (T0). Earliest dates have been indicated for Deliverables D3-D8; these being subject to availability of the Cost Estimate and Basis of Estimate from the third party Cost Estimating contractor. It is anticipated

that amendments to Deliverables shall comprise an ongoing exercise throughout the duration of the Task.

Deliverable	Due Date
D1	T0+1 Month
D2	T0+1 Month
D3	T0+4 Months
D4	T0+4 Months
D5	T0+4 Months
D6	T0+4 Months
D7	T0+4 Months
D8	T0+4 Months
D9	T0+4 Months
D10	T0+4 Months
D11	T0+8 Months
D12	Monthly
D13	Bi-Weekly

8. Acceptance Criteria

Deliverables shall be provided in accordance to the requirements as set in this Technical Specifications.

For report type of deliverables, the Contractor shall submit a draft deliverable to the IO TRO, who shall review it and reply, within the agreed time, a commented version of it. The Contractor shall perform all the necessary modifications or iterations to the deliverable and submit a revised version.

9. Specific Requirements and Conditions

The Contractor for this Task will have a background and proven experience in the coordination and integration of documents and data that comprise a scope, schedule and cost baseline, including consistency with the Project Management Institute (PMI) and the Association for the Advancement of Cost Engineering (AACE) International standards and more specifically consistent with the planned installation, testing and commissioning of the technical systems that will be employed on ITER.

The following previously acquired experience and skills are required or considered advantageous for the Contractor to fulfil the task:

- 10 years' minimum experience of the following:
  - Cost estimation and administration/management best practice;
  - Cost estimation and administration/management software (e.g. Cleopatra, SAP);
  - Work involving substantial liaison with third parties;
  - Multinational or international working environment;

  Experience to be predominantly associated with technical (engineering) systems, and processes;
- Fluent in English, both written and oral;
- Familiarity with other software used on the ITER Project an advantage (e.g. CATIA/AutoCAD/Intergraph software, Primavera software);
- Prior knowledge of the ITER Project an advantage;

- Good interpersonal, communication and organizational skills.

The Contractor is expected to prepare well written documents in high quality English, checked by a native speaker for clarity, grammar and spelling, which are suitable for senior management approval and use by ITER, Domestic Agencies and Contractors.

10. Work Monitoring / Meeting Schedule

The official language of the ITER project is English.

The work described within the specification can be performed through a mix of on-site and off-site working.

There shall be weekly progress meetings between the Contractor and the IO's Contract Responsible Officer, along with other relevant staff. The Contractor shall be responsible for producing minutes of these meetings and tracking actions.

Annex A: Categories of Cost Estimates

The most significant characteristic used to categorise cost estimate types is the maturity level of project definition deliverables, end usage of the estimate, estimating methodology, and the effort and time needed to prepare the estimate.

The "primary" characteristic used in the AACE guideline to define the category is the maturity level of the project definition and deliverables.

	Primary Characteristic	Secondary Characteristic			
ESTIMATE CLASS	MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES Expressed as % of complete definition	END USAGE Typical purpose of Estimate	METHODOLOGY Typical Estimating Method	EXPECTED ACCURACY RANGE Typical +/- range relative to index of 1 (i.e. Class 1 estimate) [a]	PREPARATION EFFORT Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Screening or feasibility	Stochastic (factors and/or models) or judgment	4 to 20	1
Class 4	1% to 15%	Concept study or feasibility	Primarily stochastic	3 to 12	2 to 4
Class 3	10% to 40%	Budget authorization or control	Mixed but primarily stochastic	2 to 6	3 to 10
Class 2	30% to 75%	Control or bid/tender	Primarily deterministic	1 to 3	5 to 20
Class 1	65% to 100%	Check estimate or bid/tender	Deterministic	1	10 to 100

[a] If the range index value of "1" represents +10/-5%, then an index value of 10 represents +100/-50%

[b] If the cost index value of "1" represents 0.005% of project costs, then an index value of 100 represents 0.5%.

Source: American Association of Cost Engineers (AACE) 17R-97: Cost Estimate Classification System

Annex B: Work Packages to be Coordinated

Scope	Work Packages
Worksite No.1 Tokamak	
Tokamak	12
Worksite No.2 Tokamak Building	
Tokamak Bldg 11	13
Worksite No.3 Tokamak Complex & Control Complex	
Tritium Bldg 14	13
RF Heating Bldg 15	6
Personnel Access Control 24	6
Control Bldg 71	5
Diagnostics Bldg 74	4
Worksite No.4 Cryoplant Complex and Site Services Complex	
Site Services Bldg 61	3
Cooling Tower Basins Bldg 67	4
Cooling Water Pumping Station Bldg 68	3
Heat Exchangers Bldg 69	3
Worksite No.5 Magnet, Emergency Power, Reactive Power, and NB Power Supply Complex's	
Magnet Power Conversion Bldg 32	4
Magnet Power Conversion Bldg 33	3
NB Power Supply Building Bldg 34	4
Pulsed Power HV Substation Area 35	1
Main AC Distribution Bldg 36	2
NB High Voltage Power Supply Bldg 37	4
Reactive Power Control Bldg 38	4
Steady State Power HV Substation Area 41	1
Fuel Storage Tanks (EPS Train A) Bldg 42	1
Fuel Storage Tanks (EPS Train B) Bldg 43	1
Emergency Power Supply (Train A) Bldg 44	2
Emergency Power Supply (Train B) Bldg 45	2
MV Distribution Bldg 46 (LC / 1A)	2
MV Distribution Bldg 47 (LC / 2B)	2
FD & SN Resistor Bldg 75	3
Worksite No.6 Site Works (Cables, Cooling Water, Cryogenics, Fence)	
Cooling Water	1
I&C Systems	1
Electrical	1
Cryogenics	1
Fence	1
Total	**113**

Annex C: Cost Estimate and Basis of Estimate

Cost Estimate and Basis of Estimate for each of the Construction Packages that are identified in Annex B of this specification in Worksite No.2 – 6, per direction from the IO.

The number of Cost Estimates and Basis of Estimate documents to be prepared is approximately one hundred [113]. This quantity is based upon the IO installation packages in six [6] distinct Worksites.

Cost Estimate

The overall quality of the Cost Estimate will be to Class 3. Deviations in the estimate quality for discrete work packages i.e. to Class 2 or Class 4 level will be clearly identified and accepted by the IO.

Cost Estimates based upon the Bills of Quantities (BoQs) and design information that will be provided by the IO for each system to be estimated.

The Cost Estimate will be developed using European industrial Labor rates contained within the IO Cleopatra Enterprise software and using industry best practices for Cost Estimation.

Each Cost Estimate will be in Euro values.

Each Cost Estimate will reflect the IO Cost Breakdown Structure (CBS) provided by the IO upon commencement of the task order.

Each Cost Estimate will clearly define cost ranges for the Work Package as, *Most Likely, Optimistic* and *Pessimistic* values based upon criteria provided by the IO.

Each Cost Estimate will contain the following classifications:

- Direct Costs
  - Labor
  - Material
  - Equipment
- Indirect Costs
- Overheads
- Allowances
- Mark-ups

Basis of Estimate

A Basis of Estimate document for each Work Package to include the following sections (or contain references to the applicable existing information):

- Purpose
- Project Scope Description
- Documented Data Sources
- Subject Matter Expert Inputs
- Estimate Methodology
- Estimate Classification
- Design Basis
- Planning Basis
- Cost Basis
- Vender Quotations
- Direct Costs
- Indirect Costs
- Allowances
- Assumptions

- Exclusions
- Exceptions
- Risks and Opportunities
- Contingencies
- Reserves
- Reconciliation
- Benchmarking
- Estimate Quality Assurance
- Estimators Name