SUMMARY

Call For Nomination IO/12/CFN/70000045/BGD

Framework Service Contract for the Nuclear Safety Control System (SCS-N)
design and procurement

Purpose

The purpose of the contract is to provide services and products related to preliminary design, detailed design, manufacturing, integration, factory acceptance, site installation, site acceptance and qualification of the Nuclear Safety Control System (SCS-N) Control Logic, support to the commissioning.

Background

ITER Instrumentation and Control (I&C) System comprise the complete control, interlock and safety systems required to operate the ITER Tokamak, under construction in Cadarache, France. ITER I&C system has two layers, central coordination and local plant systems. The central systems are “in-fund”, i.e. procured by the ITER Organization (IO), while plant systems are “in-kind”, i.e. procured by the seven ITER Domestic Agencies (DAs). An estimated number of 89 contracts, called Procurement Arrangements (PA), including plant system I&C is being signed by the ITER Organization and the Domestic Agencies. Each Procurement Arrangement may include multiple plant system I&C with a current total estimate of 220. About 10 of them should have nuclear safety I&C functions for the Assembly phase 1 (see below for project phases). The Domestic Agencies is contracting out the detailed design and manufacturing of the plant systems, including their plant system I&C, to local industry.

However, the SCS-N has to have an exceptionally high level of design and manufacturing integrity, and to comply with very specific nuclear safety I&C standards: IEC 61513 and associated standards, with safety I&C functions classified as Cat A, B and C.

In this context, IO decided to set-up a common framework contract for all DAs and IO, to have an integrated procurement for all the Nuclear Safety I&C functions and control logic. In this context, aside of overall design and qualification tasks, each PA which will have nuclear safety I&C functions shall place Task Orders with the detailed specification of its functions to the Contractor to implement the related part of the system.
Preliminary design choices have already been performed to establish the Preliminary Safety Report (RPrS). Some important design choices, that are now commitments, are:

- Compliance with the IEC 61513 and associated standards,
- Cat A and cat B functions will be implemented using industrial **solid-state hardwired safety I&C systems** of the highest safety level (no software),
- Cat C functions will be implemented in Siemens S7F (or FH) PLCs,
- The Human Machine Interface will be hardwired for the cat A and cat B functions, and computerized and classified cat C for the cat C functions.

The nuclear qualification process will have to consider the qualification of the products, and aside of the classic environmental conditions (seismic, radiations, EMI, temperature…), the specificities of ITER like the strong magnetic field.

The project will in fact be developed over several assembly phases:

- Assembly phase 1 from December 2015 to April 2020. This phase will be concluded by the first Plasma end 2020,
- Assembly phase 2 from May 2021 to September 2022. Then Hydrogen-Helium Operations will start,
- Further assembly phases up to nuclear Deuterium-Tritium Operations in 2027.

Aside of those elements, IO will have to provide the relevant safety demonstrations to the licensing authority all along the design, manufacturing, qualification and installation process.
The next milestone is in December 2013, and is related to IO commitments related to the analysis of the RPrS by the licensing authority in December 2011 (Groupe Permanent).

**Scope of work**

The scope of supply covers:

- The Project management activities,
- The selection of the non-software based solid state SIC-1 Cat A and SIC-2 Cat B product (SIC-2 Cat C and SR PLC have been chosen by IO),
- The selection of a Cat C computerised SCADA,
- The product qualifications (except Siemens S7 PLCs) and associated environmental qualifications,
- The qualification service of the SCS-N for the application functions,
- The development of the SCS-N starting from this technical specification till the SAT according to the lifecycle,
- The supply of the SCS-N for SIC-1, SIC-2 and SR (only for CSS) subsystems including HMI and Operator safety desks furniture,
- The SCS-N – CODAC interface and the configuration of the CODAC,
- The access safety for its central part: Tokamak Building Access Safety (TBAS),
- The spare parts for SCS-N, TBAS,
- The handling, storage, packing and shipping of the SCS-N and tools,
- The configuration tools and services for the SCS-N,
- The assembly, integration and test platform with its test tools,
- The development tools,
- The project documentation,
- The SCS-N training,
- The support to the commissioning phase
- The knowledge transfer activity (reversibility),
- The warranty,
- The long term maintenance plan and commitments for the products selected.

The contract will be split in 3 sub parts:

1. Selection of the product for the SIC-1 cat A and SIC-2 cat B systems, and delivery of the answers to the GP commitments for November 2013.
2. SCS-N preliminary design, and qualification of the systems,
3. Framework contract to implement the different nuclear safety I&C functions.

The contractor will finalize the technological choices, setup the required quality framework, provide the answers to the GP commitments, and develop the product and environmental qualification files.

The different PA will procure the Nuclear Plant Safety System (PSS-N) of their PA, for the SIC part. Each PA shall place Task Orders with the detailed specification of the functions to the Contractor to implement in the scope of the PA. The workflow and role of the different actors is described in synthetized in below figure.
The contract will be focused on the functions required for Assembly phase 1 and that will be concluded by the first Plasma end 2020. Options will consider the further assembly phases.

**Duration of services**

The Contract is scheduled to come into force in the third quarter of 2013 for a duration of six (6) years.

**Procurement Time table**

A tentative time table is outlined as follows:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Call for Nomination release</td>
<td>Early August 2012</td>
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<tr>
<td>Receipt of Nominations</td>
<td>17th September 2012</td>
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<tr>
<td>Issuance of Prequalification Application</td>
<td>1st October 2012</td>
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<td>Prequalification Application due date</td>
<td><strong>Mid-November 2012</strong></td>
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<tr>
<td>Issuance of Call for Tender</td>
<td>Early January 2013</td>
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<tr>
<td><strong>Tender Proposals Due Date</strong></td>
<td><strong>End February 2013</strong></td>
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<td>Estimated Contract Award Date</td>
<td>June 2013</td>
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<tr>
<td>Estimated Contract Start Date</td>
<td>July 2013</td>
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Experience

The acceptance criteria for the selection of the tender cover a broad range as listed below:

- A solid experience working for nuclear facilities, and if possible Nuclear Power Plants or Experimental reactors projects,
- Experience in using IEC 61513 and related standards,
- Relevant experience in detailed specification of the safety I&C functions
- Relevant experience in the design, construction of solid-state hardwired safety I&C systems
- Relevant experience in the design, construction and operation of safety I&C systems based on Siemens S7 F and FH technology. Familiarity with IEC 61508 standards
- Relevant experience in the design and manufacturing of a category C SCADA,
- Experience in nuclear qualification of nuclear safety I&C systems (for example with IEC61709 and/or RCC-E),
- Experience in the licensing process of the I&C system and providing safety folders to the licensing authority,
- Experience on contract and project management for large multidisciplinary I&C projects
- Capability to understand the processes involved in the safety functions of the ITER machine,
- Capability to work with worldwide interfaces.

Candidature

Participation is open to all legal persons participating either individually or in a grouping (consortium) which is established in an ITER Member State. A legal person cannot participate individually or as a consortium partner in more than one application or tender. A consortium may be a permanent, legally-established grouping or a grouping, which has been constituted informally for a specific tender procedure. All members of a consortium (i.e. the leader and all other members) are jointly and severally liable to the ITER Organization. The consortium cannot be modified later without the approval of the ITER Organization.

Legal entities belonging to the same legal grouping are allowed to participate separately if they are able to demonstrate independent technical and financial capacities. Bidders’ (individual or consortium) must comply with the selection criteria. IO reserves the right to disregard duplicated references and may exclude such legal entities from the tender procedure.

Reference

Further information on the ITER Organization procurement can be found at: HTTP://WWW.ITER.ORG/ORG/TEAM/ADM/PROC