



Contract for Thermo-Hydraulic Analyses and Calculations for Process and System Engineering of TCWS (TCWS/FD/1)

SUMMARY

Purpose

The purpose of this Contract is to obtain process and system engineering support in the field of thermo-hydraulics for the IO Tokamak Cooling Water System (TCWS).

Background

The IO Cooling Water System (CWS) Section has the responsibility to design, procure and construct the TCWS. The TCWS has the following functions:

- To remove the heat load transferred from the Plasma to the Vacuum Vessel and in-vessel components (e.g. Blanket modules, Divertor, and In-Vessel Coils) with pressurised water (up to 156 °C and 4.0 MPa).
- To provide the decay heat cooling.
- To provide hot water (up to 240 °C and 4.4 MPa) and hot nitrogen gas (up to 350 °C 2.0 MPa) for baking of Vacuum Vessel and In-Vessel Components.
- To confine the activated corrosion products and the tritium potentially contained in the water.

In order to complete the final design of the TCWS, IO needs process & system engineering support in the field of thermo-hydraulics, under the direct responsibility of the IO CWS Section.

Scope of work

The Contract is expected to be divided into 3 phases:

- Phase 1: System analysis for TCWS captive piping.
- Phase 2: System analysis for TCWS First Plasma equipment.
- Phase 3: System analysis for TCWS after First Plasma equipment.

The required scope of the work under this Contract will be as follows:

- Thermo-hydraulic transient analyses of TCWS sub-systems by using RELAP code. This task includes normal operations at different Plasma scenarios, operational transients, incidental and accidental cases. These analyses include water and gas baking as well as the simulation of the draining and drying procedures.
- Thermo-hydraulic steady state analyses of TCWS sub-systems by using Fathom code.
- Water hammer analyses of TCWS sub-systems.
- Thermal stratification studies.
- Design of overpressure protection systems.
- Analysis of surge line of the Pressurizer.



Timetable

The tentative timetable is as follows:

- Call for Nominations April 2014
- Call for Pre-Qualification May 2014
- Call for Tender July 2014
- Tender Submission August 2014
- Award of the Contract October 2014
- Phase 1 completion April 2015
- Phase 2 completion April 2016
- Phase 3 completion April 2018

Experience

The contractor shall have adequate experience in Thermal-Hydraulics design of nuclear systems or complex processing plants cooled by pressurised water. This includes steady state and transient analyses as well as experience in water hammer analyses in closed circuits, thermal stratification phenomena in piping lines and overpressure protection systems of circuits and vessels. The contractor shall have experience in the design of pressurizer surge line and a deep knowledge of RELAP and Fathom codes.

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 for each contract. 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 groupings shall be presented at the pre-qualification stage. The tenderer's composition cannot be modified without the approval of the ITER Organization after the pre-qualification.

Legal entities belonging to the same legal grouping are allowed to participate separately if they are able to demonstrate independent technical and financial capacities. Candidates (individual or consortium) must comply with the selection criteria. The IO reserves the right to disregard duplicated reference projects and may exclude such legal entities from the pre-qualification procedure.