Job Title: Electrical Engineer IO0095

Requisition ID **7124** - Posted - (France, 13067 St Paul Lez Durance Cedex) - **Engineering of Systems** - **New Posting**

The ITER Organization brings together people from all over the world to be part of a thrilling human adventure in southern France—building the ITER Tokamak. We require the best people in every domain.

We offer challenging full-time assignments in a wide range of areas and encourage applications from candidates with all levels of experience, from recent graduates to experienced professionals. Applications from under-represented ITER Members and from female candidates are strongly encouraged as the ITER Organization supports diversity and gender equality in the workplace.

ITER Organization (IO) is an Equal Opportunity/Inclusive organization committed to diversity in the workplace, with diversity and Inclusiveness being one of the ITER Values.

As IO attracts and retains people coming from a vast array of different backgrounds and cultures, bias and exclusion cannot be tolerated. IO believes it is our diverse perspectives and backgrounds that gives unique strength and value to the ITER mission, regardless of race, member nation, gender, religion, status, sexual orientation, or disability - all are welcome and respected at ITER.

Our working environment is truly multi-cultural, with 29 different nationalities represented among staff. The ITER Organization Code of Conduct gives guidance in matters of professional ethics to all staff and serves as a reference for the public with regards to the standards of conduct that third parties are entitled to expect when dealing with the ITER Organization.

The south of France is blessed with a very privileged living environment and a mild and sunny climate. The ITER Project is based in Saint Paul-lez-Durance, located between the southern Alps and the Mediterranean Sea—an area offering every conceivable sporting, leisure, and cultural opportunity.

To see why ITER is a great place to work, please look at this video

Application Deadline: 10/09/2023
Department: Engineering Design Department
Division: Heating & Current Drive Division
Section: Ion Cyclotron Section
Job Family: Engineering
Job Role: Engineer – 3
Job Grade: P3
Language Requirements: Fluent in English (written & spoken)
Contract Duration: Up to 5 years

Purpose

As an Electrical Engineer you will oversee the design, procurement, installation and commissioning of the High Voltage (HV) Power Supply for the Ion Cyclotron (IC) Heating & Current Drive (HCD) system. These power supplies are procured partly by INDA as in-kind contribution through a Procurement Arrangement (PA) and partly as a direct IO contract placed to the industry. You will coordinate the engineering activities related to the integration, commissioning and operation of the HV power supplies into the Radio Frequency building and to be responsible for the interface with both the Pulsed Power Electrical Network (PPEN, HV) and Steady State Electrical Network (SSEN, LV). You will lead the system analysis, engineering simulation, and integration with the interfacing systems PPEN, SSEN and Reactive Power Compensation and Harmonic Filtering (RPC&HF). Moreover, you will be the responsible engineer of HCD team in the joint study and treatment of excessive reactive power, injected harmonics, frequency variances and protection strategy &setting of ITER electrical distribution system (PPEN and SSEN).

Background

The IC system will be used at ITER for Heating and Current Drive (H&CD) in a number of plasma operating scenarios, providing upto 20MW of power to the plasma. That power aims to increase the energy content in the plasma to assist fusion operation and control internal plasma parameters. The IC H&CD system is a powerful radiofrequency (RF) system composed of high voltage power supplies, RF sources, transmission line system and a set of antennas facing the plasma. Each RF Source shall deliver up to 2.5 MW RF power on Voltage Standing Wave Ratio (VSWR) 2:1, CW, in a frequency range from 35 MHz to 60 MHz (or 3 MW CW on VSWR = 1.5:1, frequency range from 40 MHz to 55 MHz). Each RF source consists of two parallel 3-stages amplifier chains with a combiner at the output. The IC HV Power Supply shall supply the last two stages of the amplifier chains with electrical power and with stringent requirements in terms of accuracy, voltage ripple, response time, turn off time and fault energy. Each amplifier chain is fed by its dedicated HV Power Supply. Each RF sources therefore requires 2 HV Power Supply units.

The IC HV Power Supply is closely related to the RF source it supplies, in terms of control, regulation, interlock, safety etc. and overall performance.

Key Duties, Scope, and Level of Accountability

- Acts as Technical Responsible Officer (TRO) for the IC HCD High Voltage Power Supply (HVPS) systems;
- Manages the design finalization of the IO and INDA HVPS;
- Oversees the direct IO procurement, installation and commissioning of the HV power supplies for the IC system as the primary interface with industry, which includes the definition of technical specifications, preparing and managing the industrial contract;
- Oversees Domestic Agency (DA) design activities and coordinates procurement, installation and commissioning; as the primary point of contact with DA counterparts;
- Integrates the HV Power Supplies into the IC system and into ITER, which includes management of interfaces (control system, interlocks, pulsed power network, cooling, building, services);
- Supervises and performs the systematic transient and thermal analysis of the overall IC HV Power Supply including the systems of PPEN and RPC&HF to verify the system performances and to support the trouble shootings during commissioning;
- Leads the engineering simulation of the IC HV Power Supply and with the interfacing systems of PPEN, SSEN and RPC&HF to verify the system operation stability and systematic joint protection;
- Conducts simulation and system analysis of the power flow of the IC system, and contributes to the establishment of the stabilization and protection system of the electrical distribution systems;
- Establishes the precise models of the heating modulation with the provision of electrical models of RTE and electrical generators, to study the influences of heating systems on the stability of the RTE;
- Contributes to the establishment and study of the Hardware-In-the-Loop (HIL) simulator of the ITER electrical distribution system and jointly conducts real-time simulation;
- Prepares related documentation, which includes interface management, contract preparation, schedule, and technical specifications
- Assists in the management of the scope, schedule and cost of procurement of the associated IC HCD systems and supporting hardware through the specified procurement packages and direct procurements;
- Supports IC component development, in all aspects related to electrical engineering
- Prepares the commissioning and operation documentation and prepares for the operation the IC HV Power Supplies;
- Monitors the overall development and delivery schedules of the IC power supplies, which includes development and maintaining the Schedule;
- Manages the coordination of the installation and commissioning of the HVPS within the construction detailed schedule, assuring the most cost and time effective logistics plans;
- Reports on activity progress and early risk mitigation to the section and project leader;
- May be requested to perform other duties in support of the project;
- May be required to work outside the ITER Organization (IO) reference working hours, including nights, week-ends and public holidays.

Measure of Effectiveness

- Completes the ITER Organization (IO) activities related to establishing the final design and associated technical specifications for the IC Power Supply Systems according to the Schedule and

milestones;
- Follows up the procurement according to the IN-DA schedule;
- Manage and performs simulation and engineering analysis as required to verify the performances of the components to a high standard and within the defined schedule;
- Develops HVPS interface descriptions with the IC and ITER plant systems according to the phased development requirements of the IC and interfacing systems;
- Provides regular and proactive status reports on the IC HVPS development program;
- Issues the deviation and non-conformity reports and manages their progress through the relevant Quality Assurance (QA) processes, on needed basis;
- Manages the PA documentation, reviewing and assessing deliverables;
- Performs activities related to the Project Construction Team in a safe, accurate and timely manner.

Experience & Profile

- ***Professional Experience:***
  - Minimum 8 years' experience in Electrical Engineering in the field of design/development, inspections & testing and/or assembly of high voltage power supplies within complex international environments or projects,

  or
  - Minimum 8 years' experience in design, manufacturing and testing of high power (above 10 MVA) current source and voltage source power converters within complex international environments or projects.
- ***Education:***
  - Master's degree or equivalent in Electrical Engineering or other relevant discipline;
  - The required education degree may be substituted by extensive professional experience involving similar work responsibilities and/or additional training certificates in relevant domains.
- ***Language requirements:***
  - Fluent in English (written and spoken).
- ***Technical competencies and demonstrated experience in:***
  - Designing, procuring and operating HVPS systems is required;
  - Interface Management of HV PS systems is required;
  - Problem solving; assess problems, identify root causes, and reach solutions in a way to reach project objectives within time and cost;
  - Transient analysis of electrical distribution systems and the calculation and analysis supporting the design of electrical components, e.g. thermal analysis, and calculation for cable selections is advantageous;
  - The engineering simulation software tools such as MATLAB/SIMULINK, PISM, EMTDC/PSCAD is advantageous;
  - Basic Project Management (Planning, measuring progress of work, managing risks/costs and reporting on progress of procurement process) is advantageous;
  - Real-time simulation platforms from SPEEDGOAT or OPAL-RT is desirable;
  - Experience in providing guidance and coordinating technicians in procuring and/or installation of high voltage electrical equipment is desirable;
  - Experience with HV PS system application to HCD systems is desirable.
- ***IO Core Behavioral Competencies:***
  - Collaborate: Ability to facilitate dialogue with a wide variety of contributors and stakeholders;
  - Communicate Effectively: Ability to adjust communication content and style to deliver messages to work effectively in a multi-cultural environment;
  - Drive results: Ability to persist in the face of challenges to meet deadlines with high standards;
  - Manage Complexity: Ability to analyze multiple and diverse sources of information to understand/define problems accurately before moving to proposals;
  - Instill trust: Ability to apply high standards of team mindset, trust, excellence, loyalty and integrity.

The following important information shall apply to all jobs at ITER Organization:

- Maintains a strong commitment to the implementation and perpetuation of the ITER Safety Program, ITER Values (Trust; Loyalty; Integrity; Excellence; Team mind set; Diversity and Inclusiveness) and Code of Conduct;
- ITER Core Technical Competencies (Knowledge of these competencies may be acquired through on-board training at basic understanding level for all ITER staff members) :
  1) Nuclear Safety, Environment, Radioprotection and Pressured Equipment
  2) Occupational Health, Safety & Security
  3) Quality Assurance Processes
- Implements the technical control of the Protection Important Activities, as well as their propagation to the entire supply chain;
- May be requested to work on beryllium-containing components. In this case, you will be required to follow the established ITER Beryllium Management Program for working safely with beryllium. Training and support will be provided by the ITER Organization;
- May be requested to be part of any of the project/construction teams and to perform other duties in support of the project;
- Informs the IO Director-General or Department Head of any important and urgent issues that cannot be handled by line management and that may jeopardize the achievement of the Project's objectives.
- For staff expected to perform on-call, shift hours, or other work outside ITER Organization reference working hours, including nights, weekends, and public holidays, the possession of a driving license valid in France is required. No commuting vehicle will be provided by the ITER Organization.