Job Title: Electrical Engineers IO0370/IO0828/IO0390/IO0573

Requisition ID **7460** - Posted - (France, 13067 St Paul Lez Durance Cedex) - **Construction and Installation** - **New Posting**

Fusion, the nuclear reaction that powers the sun and the stars, is a promising long-term option for a sustainable, non-carbon emitting global energy supply.

The ITER Organization (IO), based in the southern France, welcomes best talents who can together prepare the way to this new energy in a truly multi-cultural work environment.

We offer challenging assignments in a wide range of areas and encourage applications from candidates will all levels of experience. Applications from under-represented ITER Members' nations and women candidates are strongly encouraged, as IO strongly believes that a diversified, equitable, and inclusive workplace is crucial in solving one of the most complex scientific and engineering projects in the world today.

As the IO attracts and retains people coming from a vast array of different backgrounds and cultures, discrimination and exclusion cannot be tolerated. The IO believes it is our diverse perspectives and background 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.

ITER CARE Values (Collaboration / Accountability / Respect / Excellence):
We perform our work with care, we care for the well-being of colleagues, our families and ourselves, and we care about the health of the planet for generations to come. CARE drives our work and our behaviors at ITER.

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

Application Deadline: 07/07/2024

Department: ITER Construction Project

Division / Program: Electrical Systems Program

Job Family: Construction

Job Role: Engineer – 2 -3

Job Grade: P2/P3

Language Requirements: Fluent in English (written & spoken)

Contract Duration: Up to 5 years

*The ITER Organization is opening multiple vacancies. The selection process will be conducted with the objective of filling **the five below vacant positions** with also the purpose of drawing up a reserve list of rostered candidates for future vacant positions. The reserve list initially remains valid for two years, with the possibility of extension at the Director General's discretion.*

Table 1: Vacant Positions and their Associated Areas of Proficiency:

Job title *and assignment*	***Required background knowledge and professional experience for the areas of proficiency***
1.a - Power Electronics Engineer *Responsible Engineer for VS3 power supply of ICPS Project.*	The ideal candidate must have a solid background knowledge with deep understanding of semiconductor devices, thermal management, electromagnetic compatibility, and the theory and operating principles of current source converters, voltage source

	converters, power converters with active front-end, reactive power compensators (SVC and STATCOM) and power systems. Key background knowledge and professional experience shall also include designing power circuitry, power conversion topologies equipment protection function, incorporating devices connected either in parallel or in series, simulating system performance, optimizing designs for reliability and efficiency, and integrating new technologies into existing power systems, and the testing of power electronic components to ensure they meet operational and safety standards. Proven experience in designing and troubleshooting power electronic systems, production of tender technical specification, coupled with a solid understanding of digital control of converters and inverters, is highly desirable.
1.b - Power Electronics Engineer *Responsible Engineer for stage 2 Main Coil Power Supply of ECPS Project.*	
1.c - Power Electronics Engineer *Engineer for HVDC power supply of ECH project*	
2.a - Electrical Engineer *Design, develop and procure the test set-ups and test-benches, and plan the testing and qualification of electrical components within MFC Project.*	The ideal candidate must have a solid background knowledge with deep understanding of both electrical and mechanical systems, including the theory and operating principles of transformers, rotating machine, switchgear and controlgear, to effectively design and integrate and improve operations across various plant systems. The candidate shall also be capable of conducting thorough analyses of existing systems, proposing innovative solutions for system enhancements, and leading the execution of complex projects from conceptualization through to completion, including the design, execution and witnessing of Type Tests, Factory Acceptance Tests and Site Acceptance Tests. Proven experience in a similar role, demonstrating a capacity for problem-solving and project management, is essential.
2.b - Electrical Engineer *Coordinate and execute the testing of electrical components within MFC Project, including the production of the test reports. Responsible for the maintenance and operation of the test facility.*	

While candidates with professional experience have much to offer, we're equally excited about the fresh, innovative ideas that new graduates can bring to our team. Therefore, if you have an outstanding academic record and a passion for designing and developing unique power supply systems, we encourage you to apply.

Overview

Do you have an interest in the whole lifecycle engineering activities of large DC current high voltage (up to 80 kV) or high current (up to 70 kA) and high power (up to 60 MVA) voltage source and current source power converters, and power distribution system (ranging from 400 V to 400 kV), including analyses, simulations and electrical tests for ITER plant?

Depending on your educational background and professional experience, you will join the Construction Project, for contributing to the missions and electrical engineering activities, covering the engineering design, testing/qualification & prototyping as required, procurement, installation and commissioning of all components and systems, as well as the support to the integrated commissioning with the Tokamak coil systems ***within the following areas of proficiency (***The list of areas of expertise mentioned in this job description is not exhaustive. Opportunities for electrical engineers with other specializations may be available in the future)***:***

1. ***Power Conversion, Reactive Power Compensation and Power Systems, to be responsible for design, procurement, installation and commissioning of special current source or voltage source power converters, incorporating devices connected either in parallel or in series;***
2. ***Generalist in Electro-mechanical Engineering, including Electrical Machinery, Switchgear and Controlgear, to be responsible for Design, plan, coordinate and execute the testing and qualification of electrical components within Magnetic Field Compatibility (MFC) Project.***

Success in fulfilling the duties and responsibilities of positions described in Table 1 includes:

- **For all positions:**
  - *Demonstrated good background knowledge and relevant professional experience in the area of proficiency associated with the vacant position (s), see Table 1;*
  - *Demonstrated strong problem-solving skills in Engineering and Technology, with particular emphasis on the applied area of proficiency;*
  - *Excellent analytical skills, attention to detail, and the ability to work collaboratively with multidisciplinary teams are required.*

- **Specifically for the Power Electronic Engineers (positions 1)**
  - *Effectively works as Responsible Engineer to manage and perform the conceptual design of, to manage technical requirements and interfaces, to prepare call-for-tender documents for a successful placement of the procurement contract within defined schedule;*
  - *Effectively manages the procurement contract both on the contractual side and on the technical side as the Contract Responsible Officer;*
  - *Effectively contributes to the design, manufacturing, installation and the commissioning of current source and voltage source power converters, incorporating devices connected either in parallel or in series.*

- **Specifically for the Electrical Engineer (positions 2):**
  - *Effectively establishes the service provision of Static Magnetic Field (SMF) test facility for the ITER Plant Systems whose equipment or instrumentations are to be qualified for operation in the presence of Static Magnetic Field;*
  - *Effectively develops and implements the testing plans satisfying the test and qualification demands for all the equipment to be tested, within the defined quality and schedule;*
  - *Efficiently performs and delivers supportive engineering analysis for the planning, design verification of SMF test facility and the equipment under test.*

Key Duties, Scope, and Level of Accountability

- **Primary Responsibilities (**Responsibilities pertain to the assignments for which the job holder is accountable, as detailed in Table 1)**:**
  - Contributes to the engineering design, manufacturing supervision, construction, testing, commissioning and system integration of electrical components and systems;
  - Proposes and implements actions required to resolve technical and engineering issues;
  - Develops plans and procedures for the activities to be performed;
  - Performs the analysis of components and integrated system engineering and develops the procedures for the required Type and Factory Acceptance Tests;
  - Provides engineering support (analyzing system requirements, including managing interfaces, producing study reports, producing conceptual or engineering drawings) for the plan, design and procurement of the electrical components and systems;
  - Produces Technical Specifications for procurement contracts;
  - Performs engineering analysis with relevant simulation tools;
  - Performs supervision and engineering support of the components testing and installation, including the development of installation and testing sequences.
- **Additional Responsibilities:**
  - Collects all required information to submit access request(s) on time and in accordance with internal regulations, as requested;
  - Implements the Quality Assurance (QA) & Quality Control (QC) requirements and standards for components and systems, in close relation with the Quality Assurance & Assessment (QAA) Division;
  - Maintains a strong commitment to the implementation and perpetuation of the ITER Safety Program, values and ethics;
  - Witnesses Type and Factory Acceptance Tests;

- Supervises and follows up the on-site contractor for installation, on site testing and commissioning activities;
- Produces progress reports, outlining problems areas and proposing corrective measures;
- Ensures that lessons learned and engineering solutions are well propagated within the team and implemented to mitigate future issues;
- Monitors, guides on and implements nuclear safety requirements in the engineering outputs.

Experience & Profile

- ***Demonstrated experience and technical competencies in the field of large installations and/or construction environments:***
  - **At P3 level:**At least Master's degree, or equivalent in the Electrical Engineering field or other relevant discipline, and minimum 8 years' experience in engineering, fabrication, construction, commissioning, operation, maintenance & project management;
  - **At P2 Level,**At least Master's degree, or equivalent in the Electrical Engineering field or other relevant discipline, and minimum 5 years' experience in engineering, fabrication, and/or construction, commissioning, and/or operation, and/or maintenance.
  - **For new graduates with little or no professional experience,**the employment category and Level will be determined upon successful completion of the selection process, also based on academic curricula that cover subjects relevant to at least two of the areas of proficiency listed below. Evidence of such competencies must include university transcripts, thesis copies, internship reports, and reference letters**(merged within one unique PDF file together with the cover).**
- **Language requirements:**
  - Fluent in English (written and spoken).
- **Essential competencies and experience required for success in the role:**
  - *Designing, testing and operating high power switching-mode or phase-control power conversion (mega-watts level);*
  - *Preparing technical specifications of large power supplies for procurement purpose and managing the contract execution of the "turn-key" contracts;*
  - *Developing test plans and performing infield tests of electrical equipment and instrumentations;*
  - *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.*
- **Advantageous competencies and experience:**
  - Experiences in multi-national and cross-cultural working environments;
  - **Specific to Power Electronics engineers**: experiences in the coil power supply systems of Magnetic Confinement Fusion (MCF) devices or experience in the Power Supplies for Electron Cyclotron Heating and Current Drive;
  - **Specific to Electrical Engineers**:
    - experiences in electrical testing centers/facilities or similar;
    - knowledges in IEC standards related to electrical tests.

Background information on the key facts and figures of the ITER main Electrical Systems:
The Ex-Vessel Coil Power Supply System, consists of the following main subsystems:
- *2.2 GVA, total installed power converters to supply the ITER superconductive magnets;*
- *1 GVA, total installed power, Reactive Power Compensators and Harmonic Filters;*
- *High current (up to 70 kA) and high voltage (up to 12 kV) DC busbar and switches system;*
- *Instrumentation and Control systems.*

The In-Vessel Coil Power Supplies consist of one VS3 power supply (to drive the VS3 coil) and 27 ELM power supplies (to drive 27 separate ELM coils).

The VS3 power supply includes a front-end rectifier (a few MW continuously rated), a large energy storage capacity bank, an 80kA/2.4kV IGBT inverter operating in pulsed mode, high current mechanical safety switches, cooling, and electronics controls.

The Power Supply of the Electron Cyclotron Heating and Current Drive Systems consist of power converters based on the pulse step modulation topology which includes special transformers with several secondary windings and several AC/DC modules connected in series and based on IGBT devise, to produce controlled output power up to 80 kV, 110 A DC, one quadrant.

The Electrical Power Distribution consists of:
- *A 400 kV substation and a large 66 kV switchyard;*
- *Seven large steps down transformers 400 kV/66kV/22kV with a total installed power of about 1.2 GVA;*
- *Alternative Current power distribution systems at 66 kV, 22 kV, 6.6 kV and 400 V;*
- *Emergency Power generators (total installed power about 18 MW), UPS (total installed power about 5 MW) and associated distribution system;*
- *Site and building earthing systems.*

The following items apply to all jobs and job holders for the duration of tenure at ITER Organization:

- **The CARE Values are a framework of principles that guide our actions and define the culture and spirit of the ITER Project:**

Collaboration: We collaborate with commitment and flexibility using the power of teamwork, building partnerships, and working with others to reach shared objectives;

Accountability: We are accountable for the whole project - we take responsibility for our specific actions and are transparent in our daily work, holding self (ourselves) and others accountable to meet commitments;

Respect: We treat each other with respect and dignity at all times, knowing that all of us belong here. We appreciate the value that our multicultural and diverse community brings to the ITER Project;

Excellence: We are driven by excellence; we are agile and innovative while maintaining the highest standards of safety, quality and integrity;

- **ITER Core Technical Competencies**:

1) **Nuclear Safety, Environment, Radioprotection and Pressured Equipment**

2) **Occupational Health, Safety & Security**

3) **Quality Control & Quality Assurance Processes**

- **Knowledge of these competencies may be acquired through on-board training at basic understanding level for all ITER staff members;**
- Implements the technical control of the Protection Important Activities, as well as their propagation to the entire supply chain;
- May be requested to perform other duties in support of the project as defined by your line manager, and when relevant upon the request of the matrix manager;
- May be requested to work outside the ITER Organization reference working hours, including nights, weekends and public holidays, due to business needs - this may include on-call, shift work, etc.
- May be requested to be part of any of the project/construction teams and to perform other duties in support of the project;
- 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.

- Informs management of any important and urgent issues that cannot be handled by line or matrix management and that may jeopardize the achievement of the Project’s objectives;

The ITER Organization (IO) is an Equal Opportunity organization committed to diversity and inclusive in the workplace.