

Power Systems Engineer

ROLE OVERVIEW

As a marine power system engineer you will apply power system engineering knowledge to offshore and near-shore projects. Your job duties range from conducting power system studies to testing wind turbine components.

You will work with wind turbines manufacturers, electric utility companies, or wind owners/developers. Your responsibilities will include providing advanced and independent management and power system modelling and analysis oversight.

In this position, you will need to provide leadership in developing proposed modelling best practices. Power system engineers manage, organize, and analyze interconnection studies, providing feedback and recommendations to project managers. You generally work on all parts of a power system to increase its efficiency and help the company for which you work to achieve their goals as assigned. You also have duties and responsibilities in project development, as you help the project manager determine the best locations for new utility projects like wind turbines or substations. As a power systems engineer, you also determine the best places within these locations for controls.

There will be the opportunity to contribute to onshore and offshore integration of renewable energy, non-wire alternatives, and energy storage systems. The objective of power system studies is to have a safe, efficient, and reliable power system for an electricity system or facility. Most of these operations will be related or directly tied to renewable energy production and its integration into the grid.

The level of seniority will determine whether you will work independently with a team or if you will manage and coordinate several teams. The likelihood of these positions requiring employees to live in coastal areas is high, although navigation skills or experience on vessels is not a requirement.

STRATA LEVEL: 3B – Technical Specialist

Also Known as:

- Electrical Power Engineer
- Electrical Interconnection Engineer
- Electrical Design Engineer

Education and Experience:

- Bachelor’s degree in electrical engineering or electrical power system engineering but could also qualify for civil, industrial, mechanical, or construction management degree; with valuable practical experience.
- Master’s degree in Electrical Engineering.
- Certifications as a professional engineer (PE) or achieving this certification might be required.

Associated NOC(s):

- **9241** – Power Engineers and Power Systems Operators



TECHNICAL



Engineering Review and Analysis

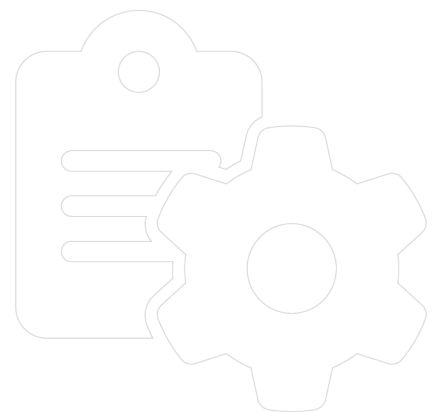
Reviews and analyses relevant information pertaining to technical designs and complex systems to develop appropriate solutions.

- Defines the engineering-related problem or opportunity and potential risk and benefits of project proposal[s] to senior management and stakeholders so that the project proposal can be approved and implemented.
- Recommends appropriate technical designs or process changes to improve efficiency, quality, or performance.
- Evaluates the precision and accuracy of equipment, facilities, structures, and systems to formulate a corrective action plan.

Short Circuit Study

Determines the threshold capacity of components in an electrical system to withstand and/or interrupt the system current during an electrical fault, to ensure the safety of the system.

- Tabulates the data used to model the system components and imports data to online diagrams for analysis.
- Evaluates operating scenarios to determine most optimal system to support future assessments and log outcomes.
- Identify the most useful operating scenarios used to evaluate equipment short-circuit current rating for a comprehensive report.
- Conducts short circuit studies to collect tabulations of equipment short-circuit current ratings versus available fault duties.
- Identifies the percentage of rated short circuit current to document equipment with insufficient ratings.



Power System Software

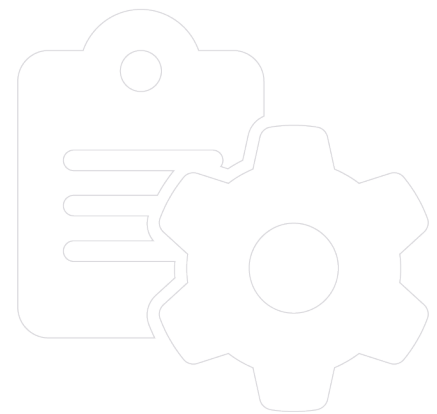
Ability to operate power system software tools required for performing power system engineering studies to meet project/product commitments.

- Uses electrical network modelling and simulation software tools to create an electrical digital twin system to analyze electrical power system dynamics, transients, and protection.
- Conducts analysis to design software for fault calculations, load flow, coordinator, arc flash hazard, and more to provide power system analysis and evaluation.
- Uses relevant software to test and ensure the safe operation of power systems by designing, analyzing, and monitoring electrical power systems.

Power System Assessment

Performs calculations and simulations to verify power system and components are accurately calibrated to perform as intended, withstand expected stress, and be protected against failures.

- Assess power systems to ensure international standards and local regulations are followed to ensure appropriate system response, equipment performance, and personnel safety.
- Schedules power system analyses to ensure they are carried out in all project phases, adapting the level of detailing and accuracy according to the operational phase.
- Reviews power system transient and sub-transient analyses for medium and large power system networks for grid expansion analysis.
- Evaluates power systems technologies/models to propose an effective solution to enhance system efficiency and reliability.



Protection Coordination Study

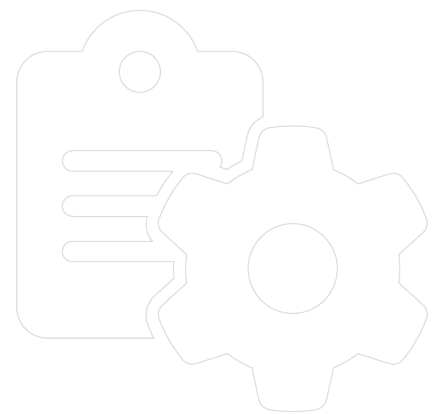
Determines the risks and faults in an electrical system to ensure faults in the equipment are limited to where the fault occurs.

- Determines protective device types, characteristics, settings, or ampere ratings to provide selective coordination, equipment protection, and current interrupting ratings for the full range of available short circuit currents at points of application.
- Determines protective device types, characteristics, setting, or ampere ratings to permit ranges of non-coordination of overcurrent protective devices to identify which may be compromised and maximize coordination of overcurrent protective devices.
- Gather the information from a coordination study to create a system one-line diagram along with time-current curves, selective coordination ratios of fuses, or selective coordination tables of circuit breakers to demonstrate the coordination of overcurrent protective devices to the scope.

Arc-Flash Hazard Analysis

Determines the arc-flash incident energy levels and flash-protection boundary distances of electrical equipment based on results found in short-circuit and coordination studies.

- Performs analysis of worst-case arc-flash conditions for all modes of operation and provide an analysis of all possible operating scenarios to verify proposed or completed additions to the subject system.
- Analyzes the availability of energy in an electrical system and the expected clearing time of protective devices to understand the distances and calculate the incident energy at each fault location.
- Analyze the information gathered to determine the arc-flash hazard PPE category and the flash protection boundary for the calculated incident energy level.



Load Flow Studies

Analyzes the active and reactive power, voltage, current and power factor throughout an electrical system to provide an analysis of all possible scenarios and identify overloaded equipment.

- Analyze tabulations from the load flow study to determine the power and current flow versus equipment ratings to identify the percentage of rated load and note any overloaded equipment.
- Analyze tabulations from the load flow study to determine system voltages versus equipment ratings and identify the percentage of rated voltage and note the voltage levels that fall outside the ranges recommended.
- Analyze tabulations from load flow study to determine the real and reactive power losses and note areas of concern and offer recommendations.

Project Team Management

Apply relevant processes, methods, skills, knowledge, and experience to achieve power system project objectives according to specific criteria within agreed parameters.

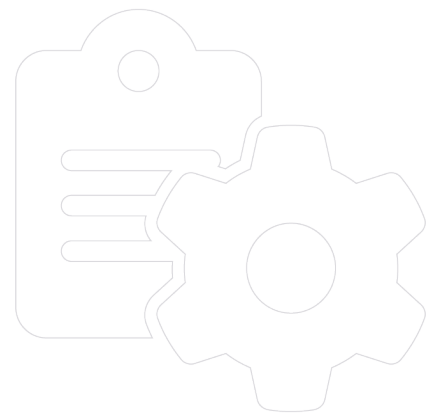
- Provides direction and supervision to engineers, technicians, and technologists in the design and development process to ensure clear and effective communication channels across all departments.
- Monitors and controls the allocation of resources and reassigns staff as needed to support project deliverables.
- Sets clear accountability targets for supervised personnel to achieve project deliverables.
- Manage tasks and projects according to approved scopes of work to deliver quality reports on schedule and within budget.



Data Administration

Stores, organizes, and maintains data to ensure that information is available and accessible to the organization to facilitate research and decision making.

- Uses appropriate software to maintain organized and up-to-date information logs.
- Contributes to developing protocols for database management to ensure regulatory compliance.
- Collates information from a range of sources to produce a single comprehensive document.



PERSONAL AND PROFESSIONAL



Communication

Positively directs outcomes by delivering communication that better understands goals and objectives, captures interest, and gains support for immediate action.

- Provide power systems design and communicate relevant supporting information to development and construction teams working on projects.
- Produce and/or review the quality of technical reports and presentations for both internal and external audiences.
- Conduct effective client and agency presentations to provide information on offshore power system findings and provide informed advice.
- Contribute to writing and editing technical reports to provide accurate offshore development advice and support other staff.
- Advise construction firms or government agencies on power systems for offshore developments.

Collaboration

Engages in professional collaborative efforts with members of the team, including sharing information and expertise, utilizing input from others, and recognizing others' contributions to work towards common goals.

- Provides operational expertise and technical direction as appropriate to ensure harmonious and efficient operations.
- Shares relevant and useful knowledge, experience, or expertise to aid team members accomplish their objectives more efficiently or effectively.
- Works cooperatively with multiple stakeholders, demonstrating a willingness to consider alternative approaches, ideas, or insights.
- Provides team members with constructive feedback and perspective to aid in the completion of a task or goal.
- Advise operation crews or supervising agencies on construction, land use, or resource management to provide information for use in regional development, site selection or development.



Attention to Detail

Reviews completed work by monitoring and checking information, efficiently organizing tasks and resources, or all areas involved in achieving an objective.

- Scrutinizes models, tests, and simulation results to ensure validity and accuracy in results or findings.
- Routinely expresses concern that procedures and standards are followed thoroughly to complete a task[s].
- Double checks the accuracy of the information and work to provide accurate and consistent work.
- Catches and corrects own errors or omissions, where applicable, to ensure efficiency and safety.



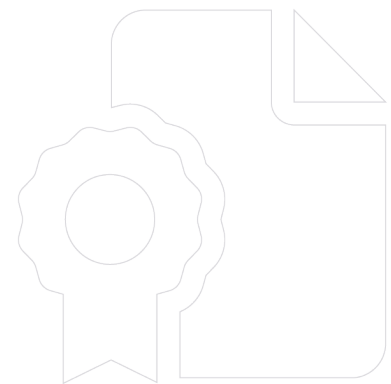
LEGAL, REGULATORY, AND POLICY



Regulatory Compliance

Adheres to specific regulations, codes, and legislation within a defined jurisdiction to ensure the health and safety of others and the environment.

- Demonstrate knowledge of provincial and federal offshore legislation and regulatory agencies.
- Provide oversight on provincial and federal regulatory requirements associated with operating in and around water and wildlife habitats.
- Provides relevant information for the submission of offshore resource power system development licences and permits.
- Execute power system analyses following the compliance requirements of North American Electric Reliability Corporation (NERC) and Federal Energy Regulatory Commission (FERC).
- Oversee activities and practices to ensure activities meet OSHA and NFPA 70E regulations and arc flash safety program requirements.
- Ensure the reliability of the power system to prevent outages interference, poor power quality.
- Ensure the quality of the power system to ensure standards are maintained and prevent excessive arc flash from causing any loss or personal injuries.



ENVIRONMENTAL



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