POWER ENGINEERING COMPETENCY FRAMEWORK FOR POWER ENGINEERING PROFESSIONALS IN PUBLIC SERVICE
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT

TSC Category	Maintenance Management					
TSC Title	Electrical Maintenance Management					
TSC Description	Manage the maintenance, troubleshooting, repair and overhaul of electrical equipment, systems and networks					
TSC Proficiency Description	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
		<Insert TSC Code>	**<Insert TSC Code>**	**<Insert TSC Code>**	**<Insert TSC Code>**	
		Conduct the maintenance, troubleshooting, repair and overhaul of electrical equipment, systems and networks	Oversee maintenance of electrical infrastructure and interpret designs, technical specifications, and maintenance procedures	Review maintenance plans and procedures to drive high quality and reliability of electrical infrastructure	Formulate or approve maintenance strategies to improve quality and reliability of electrical infrastructure	
Knowledge		• Operation and maintenance principles of electrical generators, switchgear, equipment and systems • Types of components and parts of electrical systems and sub-systems • Electrical safety principles and practices • Electrical protection and control principles • Electrical standards and codes of practice applicable to electrical equipment and systems • Earthing and bonding principles and techniques • Minor electrical equipment selection and maintenance methods • Electrical drawing standards	• Operation and maintenance principles of electrical generators, switchgear, equipment and systems • Electrical safety principles and practices • Electrical equipment design and modification methods • Electrical protection and control principles • Electrical standards and codes of practice applicable to electrical equipment and systems • Earthing and bonding principles and techniques • Technical specifications and maintenance procedures • Electrical equipment maintenance strategies	• Operation and maintenance principles of electrical generators, switchgear, equipment and systems • Local and international electrical safety standards and regulations • Electrical protection and control principles and electrical system study methodologies • Methods for reviewing parameters and relay operation settings of protection and control systems • Local and international standards and best practices on earthing and bonding • Local and international standards and best practices on maintenance of electrical generators and switchgears	• Local and international electrical systems safety standards, regulations and best practices • Electrical protection and control principles and electrical system study methodologies • Protection and control system settings determination methods • Local regulations and international standards for electrical generators, switchgear, equipment and systems • Local regulations on earthing and bonding as well as lightning protection earthing • Electrical equipment maintenance strategies and evaluation methodologies for asset management decisions • Evaluation methods for condition monitoring system selection	

				• Implementation strategies for electrical plant and equipment maintenance • Methods of interpreting condition monitoring system data		
Abilities		• Conduct diagnostic tests and inspections on plants, equipment and systems assigned • Inspect the condition and serviceability of electrical systems • Perform or oversee repairs on plants, equipment and systems assigned in accordance with maintenance procedures • Observe organisational requirements related to maintenance procedures when performing repairs • Ensure compliance with industry standards, regulatory and project requirements	• Interpret and oversee standard updates to electrical designs, technical specifications, modification of designs, and maintenance procedures • Contribute to the development, review and application of the organisation's electrical safe working procedures • Review low voltage (LV) and high voltage (HV) system designs, sizing and fault ratings of switchgears, cable sizes • Suggest design modifications for electrical systems and equipment, considering the load, contingency and future needs • Oversee maintenance of electrical protection and control systems, including revision of settings and parameters • Review compliance with industry standards, regulatory and project requirements	• Manage resources required for corrective maintenance activities • Review electrical designs, technical specifications, modification designs, and maintenance procedures • Manage the development and implementation of the organisation's electrical safe working procedures • Manage the maintenance of power systems • Review the quality and reliability of electrical infrastructure • Verify modifications to electrical protection and control systems, including revision of settings and parameters • Review, validate or revalidate temporary electrical installations for overhauls or major maintenance works • Manage compliance with industry standards, regulatory and project requirements	• Evaluate technical specifications, modification of designs, and maintenance procedures • Review and approve annual maintenance plans for electrical generators, switchgear, equipment and systems • Prescribe relevant electrical safety standards • Review and approve the organisation's electrical safe working procedures • Review and approve maintenance works and modifications of main electrical systems and power distribution • Review and approve electrical system studies required to verify system designs and equipment selection, and the effectiveness of maintenance on electrical protection and control systems • Propose new and/or enhanced electrical systems maintenance work instructions in reference to Original Equipment Manufacturer (OEM) technical recommendations	

					• Drive compliance with industry standards, regulatory and project requirement	
Range of Application		Range of application includes, but is not limited to: • Electrical installations and power systems in buildings, facilities and infrastructure, including but not limited to: Building electrical systems e.g. transformers, switchboards and wiring systems, battery systems, fire protection systems, security systems, uninterruptible power supply (UPS) systems, standby power generation, lighting systems, lightning protection systems, relay and protection systems, air-conditioning and mechanical ventilation systems, lightings, lifts and escalators, amusement rides, and building management systems • Electrical installations and power systems in water treatment plants and waste-to-energy plants, including but not limited to: Environmental compaction systems (ECS), conveyor belts, baghouse filters, high-tension power equipment including power transformers, switchgears, generators, distributed control system and field instruments, refuse crane system, motors and variable speed drives, pumps, air-conditioning system, fire alarm system, actuators, lightings, incinerator-boilers, turbo-generators and power distribution network, and control and monitoring systems • Electrical installations and power systems in railway and air traffic management systems, including but not limited to: High voltage power systems, railway traction power systems, aircraft ground power supply systems, AC/DC and DC/AC converters, and signalling, communication and control systems and equipment, airfield lighting systems, and public announcement systems • Renewable and distributed energy resources, including but not limited to: Solar photovoltaic installations, microgrids and energy storage systems • Systems used in transmission network system planning, control and management, including but not limited to: energy management systems, information technology (IT) and operational technology (OT) systems, substation remote control unit (RCU) systems, interruptible load monitoring system, distributed generator monitoring system, flexible AC transmission systems (FACTS), and supervisory control and data acquisition (SCADA) systems			