

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

TSC Category	Energy Operations Management					
TSC Title	Power Plant Operations Management					
TSC Description	Manage power plant operations to ensure the efficient generation of reliable and stable electricity in accordance to standard operating procedures and organisational requirements					
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>	<Insert TSC Code>
		Follow power plant operational guidelines, and safety and regulatory requirements	Oversee power plant operations according to operational guidelines, and safety and regulatory requirements	Manage power plant operations according to operational guidelines, and safety and regulatory requirements	Review power plant operations procedures, and safety and regulatory requirements against industry best practices	Formulate power plant operations strategies and plans to achieve optimal performance of the power plants, auxiliaries and ancillaries
Knowledge		<ul style="list-style-type: none"> Standard Operating Procedures (SOPs) for power plant operations Fundamental principles of fluid mechanics and thermodynamics Methods on generation of power Factors affecting power generation efficiency, quality, safety and pollution Layout of power plant equipment Lockout-tagout system procedures Shift handover and takeover procedures Power plant equipment operational indicators and data interpretation Specialised testing procedures and result analyses Fundamentals of single line and wiring diagrams Equipment isolation and restoration procedures Types of fuel used for power plant equipment 	<ul style="list-style-type: none"> Standard Operating Procedures (SOPs) for power plant operations Principles of fluid mechanics and thermodynamics Organisation's internal requirements related to plant operations Lockout-tagout system procedures Shift handover and takeover procedures Critical components of plants and equipment Layout of power plants and operational practices of equipment Common causes of leaks, trips or emissions that can occur in power plants Equipment operational indicators and data interpretation Specialised testing procedures and result analyses Isolation and restoration procedures for power plant equipment, auxiliaries and ancillaries 	<ul style="list-style-type: none"> Standard Operating Procedures (SOPs) for power plant operations Relevant requirements in Electricity Act, generation licence, market rules and relevant manuals issued by power system operators Principles of fluid mechanics and thermodynamics Organisational requirements related to plant operations Impact of construction, layout and equipment of the plant can impact power generation processes Operating principles and practices of plants, equipment and systems Non-routine power plant problems Power plant equipment operational indicators and data interpretation Fault investigation, root cause analysis and diagnosis methods 	<ul style="list-style-type: none"> Standard Operating Procedures (SOPs) for power plant operations Relevant requirements in Electricity Act, generation licence, market rules and relevant manuals issued by power system operators Principles of fluid mechanics and thermodynamics Unusual or complex problems that can occur in power plants Organisational requirements related to plant operations Root cause analysis methods Organisational policies and strategies Local and international industry best practices Concepts on fuel composition Shift handover and takeover procedure planning Evaluative methods for the effectiveness of 	<ul style="list-style-type: none"> Standard Operating Procedures (SOPs) for power plant operations Relevant requirements in Electricity Act, generation licence, market rules and relevant manuals issued by power system operators Organisational requirements related to plant operations Local and international industry best practices Fuel consumption patterns Evaluation methods for the effectiveness of operational strategies and plans Methods to integrate processes and drive enhancements Production target setting Target and performance monitoring process development

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			<ul style="list-style-type: none"> • Types of fuel used for power plant equipment • Routine test procedures on quality and composition of fuel 	<ul style="list-style-type: none"> • Types of high voltage electrical equipment in the power plant • High voltage electrical equipment isolation and restoration procedures • Fuel composition and blending 	procedures and guidelines	
Abilities		<ul style="list-style-type: none"> • Follow power plant operations and emergency operations according to SOPs • Monitor power plant equipment and ancillaries for abnormalities • Determine possible area of faults during operational abnormalities • Assist in specialised testing of equipment • Operate electrical and control systems • Identify the types of fuel for power plant equipment 	<ul style="list-style-type: none"> • Oversee power plant shift operations and emergency operations, including safe shutdown of the plants, equipment and systems • Oversee safe isolation of plant equipment using lockout-tagout procedures • Validate that SOPs have been carried out by the shift operation teams safely and efficiently • Perform routine checks on plants, equipment and systems • Perform first-line investigations and troubleshooting by collecting and analysing data on possible areas of plants, equipment or system fault • Analyse data and submit ad-hoc reports on operational and technical issues • Perform specialised testing of equipment for assigned areas • Supervise fuel loading operations for equipment and/or systems in accordance to SOPs • Perform routine tests on fuel quality and composition 	<ul style="list-style-type: none"> • Lead shift operation teams to ensure the safe and smooth operation of power plants, including running up and shutting down of power generating units and emergency operations during the shift • Review and recommend enhancements of SOPs to optimise operational efficiency and safety • Review and recommend enhancement of Permits-to-Work scheme and lockout-tagout system procedures • Lead investigations and diagnosis on possible areas of plants, equipment and system faults • Plan safe isolation and restoration of plant equipment • Plan specialised testing protocols to ensure effectiveness and high operational reliability • Lead high voltage switching • Adapt fuel composition concepts to propose new mixture of fuels for optimal plant performance • Perform fuel blending for operation requirements in accordance to SOPs 	<ul style="list-style-type: none"> • Review power plant shift operations and emergency operations according to operational guidelines, safety and regulatory requirement • Review and recommend lockout-tagout procedures and guidelines • Review and recommend SOPs for plant operations • Provide direction on investigations of complex or unanticipated issues for fault diagnosis • Review analysis on technical issues and faults through interpretation of reports and data and decide or recommend appropriate actions • Refine specialised testing protocols to ensure effectiveness and high operational reliability • Formulate fuel composition concepts to develop new mixture of fuels for optimal plant performance • Supervise and perform fuel blending for operation requirements in accordance to SOPs 	<ul style="list-style-type: none"> • Lead the operations team to achieve optimal performance of the power plants, auxiliaries and ancillaries in accordance to production targets, schedule, safety requirements, and operation procedures • Drive organisational goals through power plant operations • Adopt industry best practices to enhance plant performance and safety • Approve the actions and/or plans based on the review analysis report's recommendation • Recommend and propose solutions to senior management on operation related matters • Review operation fuel consumption patterns

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<p>Range of Application</p>		<p>Range of application includes, but is not limited to:</p> <ul style="list-style-type: none"> • Plant operations systems: <ul style="list-style-type: none"> ○ Co-generation systems, heat recovery steam generator (HRSG), , steam turbine, boiler, programmable logic controller (PLC), distributed control systems, including valves, transmitters, meters and transformers, supervisory control and data acquisition (SCADA), , generator, plant electrical equipment • Plant operations auxiliaries or ancillaries: <ul style="list-style-type: none"> ○ Water treatment plant, waste treatment plant, waste-water recovery system, fuel preparation systems, feed water flow system, lubricant oil system, barring gear, air compressors • Multi-utility systems: <ul style="list-style-type: none"> ○ Water desalination plant, de-mineralisation plant, steam recovery systems, programmable logic controller (PLC), distributed control systems, water, steam analysers • Multi-utility auxiliaries or ancillaries: <ul style="list-style-type: none"> ○ Fuel preparation systems, oil system, cooling towers
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