



Australian Government

UEPOPS060 Monitor and coordinate the operation of a combined cycle gas turbine unit

Release: 1

UEPOPS060 Monitor and coordinate the operation of a combined cycle gas turbine unit

Modification History

Release 1. This is the first release of this unit of competency in the UEP Electricity Supply Industry - Generation Sector Training Package Release 2.0.

Application

This unit involves the skills and knowledge required to simultaneously operate and monitor combined cycle power generation plant. It involves the safe and effective management of energy production to meet demand using a combined cycle gas turbine unit.

Combined cycle plant consists of a gas turbine and associated generator, heat recovery steam generator (HRSG), steam turbine and associated generator. Combined cycle power plant uses both the gas and steam turbines together to produce more electricity from the same fuel.

Competency in this unit requires the ability to plan for plant operation, operate HRSG, operate generator and excitation system, control generation of electrical energy, coordinate unit operations, monitor system/plant, test system/plant operation, analyse system/plant faults and complete all documentation. Individuals will, in general, work as an operator, in a power generation facility.

Power generation plant operators are trained and authorised to isolate, prepare plant and issue permits to work.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

UEPOPS095 Operate and monitor fuel firing plant - gas or oil

UEPOPS101 Operate and monitor HRSG hot gas control system

UEPOPS059 Operate and monitor gas turbine unit

UEPOPS073 Operate and monitor a steam turbine

Competency Field

Operations

Unit Sector

Electricity generation

Elements and Performance Criteria

ELEMENTS

PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1 Plan for plant operation

- 1.1 Work health and safety (WHS)/occupational health and safety (OHS) regulations, legislative requirements, codes of practice, manufacturers' recommendations and specifications, environmental requirements and workplace procedures are identified, applied and monitored
- 1.2 Work and resource requirements are identified from relevant personnel and documentation in accordance with workplace procedures
- 1.3 Preoperational checks are carried out on combined cycle plant in accordance with workplace procedures

2 Operate HRSG

- 2.1 Gas turbine exhaust, gas flow and power output are adjusted to achieve required steam flow and conditions in accordance with manufacturers' recommendations and specifications, and workplace procedures
- 2.2 Supplementary firing system is placed into and out of service to maintain steam flow and steam conditions in accordance with workplace procedures
- 2.3 Combined cycle plant is operated within limits of design in accordance with workplace procedures
- 2.4 Combined cycle plant is operated, monitored and observed to detect deviations from required operating conditions in accordance with workplace procedures
- 2.5 Corrective action is taken to rectify abnormalities in combined cycle plant in accordance with manufacturers' recommendations and specifications, and workplace procedures

3 Operate generator and excitation system

- 3.1 Generator and excitation system is operated in accordance with manufacturers' recommendations and specifications, and workplace procedures
- 3.2 Synchronising requirements are assessed, evaluated and implemented to ensure generator and excitation system stability in accordance with workplace procedures

- | | | |
|--|------------|---|
| | 3.3 | Generator and excitation system is monitored and observed to detect deviations from normal operating conditions in accordance with workplace procedures |
| 4 Control generation of electrical energy | 4.1 | Generator output is adjusted to meet demand in accordance with operating requirements and workplace procedures |
| | 4.2 | Reactive power generation and voltage regulation requirements are assessed to ensure the generator and excitation system is controlled to achieve output in accordance with workplace procedures |
| | 4.3 | Generator stabilities and operating limits are assessed, and the generator and excitation system are controlled to maintain those limits in accordance with manufacturers' recommendations and specifications, and workplace procedures |
| | 4.4 | Generator cooling systems and limits are monitored and assessed, and excitation system is controlled to maintain those limits in accordance with manufacturers' recommendations and specifications, and workplace procedures |
| 5 Coordinate generator and excitation system operations | 5.1 | Generator and excitation systems are operated in accordance with power generating plant limitations and workplace procedures |
| | 5.2 | Generator and excitation systems are monitored and observed to detect deviations from normal operating conditions in accordance with workplace procedures |
| | 5.3 | Causes of abnormal generator and excitation system operating conditions are identified by analysing technical, operational data and information in accordance with workplace procedures |
| | 5.4 | Generator and excitation system integrity, personnel safety and continuity of supply are maintained in accordance with workplace procedures |
| | 5.5 | Consultation with relevant personnel is undertaken in accordance with workplace procedures |
| | 5.6 | Generator and excitation system is operated at efficiency in accordance with workplace procedures |
| 6 Monitor system/plant | 6.1 | Generator and excitation system and combined cycle |

	plant to be monitored is physically identified in accordance with workplace procedures
	6.2 Generator and excitation system and combined cycle plant are monitored for normal operation to detect deviations in accordance with workplace procedures
	6.3 Relevant personnel are notified when defects and abnormal operating conditions are detected in accordance with workplace procedures
7 Test system/plant operation	7.1 Operational tests are performed in accordance with workplace procedures
	7.2 Generator and excitation system and combined cycle plant is observed for correct operational response in accordance with workplace procedures
	7.3 Generator and excitation system and combined cycle plant are returned to operational status on completion of testing in accordance with workplace procedures
8 Analyse system/plant faults	8.1 Causes of abnormal generator and excitation system operating conditions are identified by analysing technical and operational information in accordance with workplace procedures
	8.2 Generator and excitation system and combined cycle plant integrity and personnel safety are maintained in consultation with relevant personnel, technical and operational documentation in accordance with workplace procedures
	8.3 Relevant personnel are organised for investigation of identified operational abnormalities in accordance with workplace procedures
9 Complete documentation	9.1 Combined cycle plant problems, movements and status are reported in accordance with workplace procedures
	9.2 Documentation is updated in accordance with workplace procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEP Electricity Supply Industry - Generation Sector Training Package Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UEPOPS442 Monitor and coordinate the operation of a combined cycle gas turbine unit.

Links

Companion Volume implementation guides are found in VETNet -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=1715b9fa-e7bd-441c-bb8d-cf22c9c825a8>

Assessment Requirements for UEPOPS060 Monitor and coordinate the operation of a combined cycle gas turbine unit

Modification History

Release 1. This is the first release of this unit of competency in the UEP Electricity Supply Industry - Generation Sector Training Package Release 2.0.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements and performance criteria on at least two separate occasions and include:

- analysing generator and excitation system and combined cycle plant for faults using data analysis techniques and tools
- applying work health and safety (WHS)/occupational Health and Safety (OHS) requirements, including
 - emergency procedures
 - risk control measures
 - safe working practices
- communicating with personnel
- controlling power generation operations of combined cycle plant and equipment
- coordinating operation of interacting generator and excitation systems
- identifying combined cycle plant status
- implementing regulations, legislative requirements, codes of practice, manufacturers' recommendations and specifications, and environmental requirements
- interpreting manuals
- maintaining generator unit integrity
- monitoring generator and excitation system and combined cycle plant
- operating heat recovery steam generator (HRSG)
- organising resources
- planning for combined cycle plant operation
- preparing combined cycle plant and equipment for operation
- responding to abnormal combined cycle plant operating conditions
- testing generator and excitation system and combined cycle plant operation using diagnostic and testing techniques
- working with permit to work system.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the

requirements of the elements and performance criteria and include knowledge of:

- arrangements of power production plant
- combined cycle plant and equipment, location and operating parameters
- combined cycle plant status
- combined cycle system components and interactions, including generator and system stability
- manuals
- permit to work system
- potential resources
- regulations, legislative requirements, codes of practice, manufacturers' recommendations and specifications, and environmental requirements
- steam and gas turbines and generators
- types and characteristics of HRSG
- WHS/OHS requirements, including
 - emergency procedures
 - risk control measures
 - safe working practices
- workplace documentation
- workplace policies and procedures.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=1715b9fa-e7bd-441c-bb8d-cf22c9c825a8>

