



Australian Government

UEPOPS442 Monitor and coordinate the operation of a combined cycle gas turbine unit

Release: 1

UEPOPS442 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 Generation Training Package.

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 typically 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 heat recovery steam generator, 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 typically 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.

Note: Workplace practice

The application of the skills and knowledge described in this unit may require a licence or training permit to practice in the workplace where work is carried out on gas and electrical installations. Additional conditions may apply under state and territory legislative and regulatory licensing requirements.

Pre-requisite Unit

UEPOPS314 Operate and monitor fuel firing plant (gas or oil)

UEPOPS333 Operate and monitor HRSG hot gas control system

UEPOPS336 Operate and monitor gas turbine unit

UEPOPS340 Operate and monitor a steam turbine

Competency Field

Operations

Unit Sector

Electricity generation

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

PERFORMANCE CRITERIA

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

1 Plan for plant operation	1.1	Safety issues, including Work, Health and Safety (WHS)/Occupational Health and Safety (OHS) regulations, are identified, in accordance with workplace procedures and site requirements
	1.2	Work, combined cycle plant and resource requirements are identified from relevant information and documentation, in accordance with workplace procedures
	1.3	Preoperational checks are carried out on combined cycle plant, in accordance with workplace procedures and site requirements
2 Operate heat recovery steam generator	2.1	Gas turbine exhaust, gas flow and power output are adjusted to achieve required steam flow and conditions, in accordance with workplace procedures and operating requirements
	2.2	Supplementary firing system is placed into and out of service, as required, in accordance with workplace procedures, to maintain steam flow and steam conditions
	2.3	Combined cycle plant is operated within limits of its design, in accordance with workplace procedures and site requirements
	2.4	Combined cycle plant is operated, monitored and observed, in accordance with workplace procedures, to detect deviations from required operating conditions
	2.5	Corrective action is taken to rectify abnormalities in combined cycle plant, in accordance with

- manufacturers' specifications and workplace procedures
- 3 Operate generator and excitation system**
- 3.1** Generator and excitation system is operated, in accordance with workplace procedures and manufacturer's operating recommendations
- 3.2** Synchronising requirements are assessed, evaluated and implemented, in accordance with workplace procedures, to ensure generator and excitation system stability
- 3.3** Generator and excitation system is monitored and observed, in accordance with workplace procedures, to detect deviations from normal operating conditions
- 3.4** Corrective actions are taken to rectify generator and excitation system abnormalities, in accordance with workplace procedures and manufacturers' recommendations
- 4 Control generation of electrical energy**
- 4.1** Generator output is adjusted to meet demand, in accordance with workplace procedures, whilst observing operating requirements
- 4.2** Reactive power generation and voltage regulation requirements are assessed, in accordance with workplace procedures, to ensure the generator and excitation system is controlled to achieve desired output
- 4.3** Generator stabilities and operating limits are assessed and the generator and excitation system is controlled to maintain those limits, in accordance with workplace procedures and manufacturers' recommendations
- 4.4** Generator cooling systems and limits are monitored and assessed, and excitation system is controlled to maintain those limits, in accordance with workplace procedures and manufacturers' recommendation
- 5 Coordinate generator and excitation system operations**
- 5.1** Generator and excitation systems are operated, in accordance with workplace procedures, to meet workplace requirements whilst observing power generating plant limitations
- 5.2** Generator and excitation systems are monitored and observed, in accordance with workplace procedures, to detect deviations from normal operating conditions
- 5.3** Causes of abnormal generator and excitation system operating conditions are identified by analysing technical and operational data and information, in

accordance with workplace procedures

5.4 Corrective action is taken to rectify generator and excitation system abnormalities, in accordance with workplace procedures and site requirements

5.5 Generator and excitation system integrity, personnel safety and continuity of supply are maintained, in accordance with workplace procedures

5.6. Consultation with appropriate personnel is undertaken, in accordance with workplace procedures and site requirements

5.7 Generator and excitation system is operated at optimum 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 is monitored for normal operation to detect deviations, in accordance with workplace procedures

6.3 Corrective action is taken, in accordance with workplace procedures

6.4 Appropriate personnel are notified, in accordance with workplace procedures, when defects and abnormal operating conditions are detected

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 Corrective action is taken, in accordance with workplace procedures, when response does not meet documentation, combined cycle plant and generator and excitation system integrity or personnel safety requirements

7.4 Generator and excitation system and combined cycle plant is returned to required operational status, in accordance with workplace procedures, upon completion of testing

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| 8 Analyse system/plant faults | <p>8.1 Causes of abnormal generator and excitation system operating conditions are identified, in accordance with workplace procedures, by analysing technical and operational information</p> <p>8.2 Corrective actions to rectify faults are determined, in accordance with workplace procedures</p> <p>8.3 Generator and excitation system and combined cycle plant integrity and personnel safety are maintained, in accordance with workplace procedures, and in consultation with appropriate personnel and technical and operational documentation</p> <p>8.4 Appropriate personnel are organised, in accordance with workplace procedures for investigation of identified operational abnormalities</p> |
| 9 Complete documentation | <p>9.1 Combined cycle plant problems, movements, and status are reported, in accordance with workplace procedures</p> <p>9.2 Documentation is updated, in accordance with workplace procedures</p> |

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 Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UEPOPS442B 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 UEPOPS442 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 Generation Training Package.

Performance Evidence

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

- analysing generator and excitation system and/or 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 legislation, industry standards, codes of practice and regulations
- interpreting manufacturers' specifications and manuals
- maintaining generator unit integrity
- monitoring generator and excitation system and/or combined cycle plant
- operating heat recovery steam generator
- organising resources
- planning for combined cycle plant operation
- preparing combined cycle plant and/or equipment for operation
- responding to abnormal combined cycle plant operating conditions
- testing generator and excitation system and/or 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, performance criteria and range of conditions and includes

knowledge of:

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

Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

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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.

Assessment must occur in workplace operational situations. Where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

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 currently used in industry
- applicable documentation including workplace procedures, industry standards, equipment specifications, regulations, codes of practice and operation manuals.

Links

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