Australian Government

Department of Education, Employment and Workplace Relations

UEPOPS336B Manage, operate and monitor a gas turbine unit

Release: 1

UEPOPS336B Manage, operate and monitor a gas turbine unit

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the management of an in-service gas turbine unit.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.
Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.
There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Pre operational checks are carried out on plant according to manufacturer recommendations and site requirements
		1.4	Where appropriate the teams and individuals roles and responsibilities within the team are identified, and where required, assist in the provision of the on-the-job training
2	Operate plant	2.1	Output is adjusted to achieve required gas turbine operating conditions and demand, observing operatic requirements
		2.2	Plant is operated within limits of plant design, enterprise or site requirements
		2.3	Plant is monitored and observed to detect deviations from required operating conditions
		2.4	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	System and plant is observed for correct operational response
3		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test

ELEMENT		PERFORMANCE CRITERIA	
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		4.4	Appropriate personnel are notified when defects are detected
5	Monitor plant	5.1	Plant to be monitored is identified
		5.2	Plant is monitored for normal operation or to detect deviations
		5.3	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.
Evidence shall show that knowledge has been acquired of conducting single energy source isolation procedures.
All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.
The extent of the Essential Knowledge and Associated Skills required follows:
KS01-PO336B A gas turbine unit
Evidence shall show that knowledge has been acquired for safe working practices of:
T1 Relevant Environmental, Occupational Health and Safety legislation and regulations
T2 Enterprise procedures
T3 Plant drawings and manufacturers manuals
T4 Introduction to and typical arrangements of power production plant
T5 Relevant plant and equipment, its location and operating parameters
T6 Electric motor types and characteristics
T7 Pump and compressor types and characteristics
T8 Valve, damper and actuator types and characteristics
T9 Switchgear types and characteristics
T10 Electrical protection types and characteristics
T11 Relevant state and territory regulations
T12 Gas turbine principle of operation
T13 Air intake, types and characteristics
T14 Air inlet cooling and heating systems, types and characteristics
T15 Exhaust, types and characteristics
T16 Lubrication systems, types and characteristics
T17 Control oil systems, types and characteristics
T18 Water wash systems, types and characteristics
T19 Cooling systems, types and characteristics
T20 Water/steam injection systems, types and characteristics
T21 Combustion system, types and characteristics
T22 Generator, types and characteristics
T23 Generator excitation system, types and characteristics
T24 Electrical fundamentals
T25 Plant status
T26 Enterprise recording procedures
T27 Control and data acquisition systems
T28 Computers and software
T29 supervisory, alarm, protection equipment
T30 Fire protection control system, types and characteristics
KS02-PO336B A gas turbine unit
Specific skills needed to achieve the Performance Criteria:
T1 Interpret plant drawings and manufacturers manuals
T2 Apply relevant state and territory regulations

REQUIRED SKILLS AND KNOWLEDGE

T3 Apply enterprise recording procedures
T4 Identify plant status
T5 Prepare plant/equipment for operation
T6 Organise resources
T7 Operate gas turbine plant and equipment
T8 Apply diagnostic and testing techniques
T9 Identify and respond to abnormal plant operating conditions
T10 Plan and prioritise work
T11 Use relevant hand tools
T12 Communicate effectively
T13 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.
The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.
Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being

assessed.
The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment. Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.
Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of gas turbine plant/equipment
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Knowledge of the system components and their interaction;
  - Knowledge of gas turbine operational processes
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.
Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.
In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.
Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.
Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.
Plant and equipment may include; electrical supply switchboard(s) and transformers; gas turbine and auxiliary plant; fuel and fuel delivery system plant; fuel management system; flame detection equipment; air inlet, cooling systems, fuel conditioning, turning gear, water wash system, starter systems plant, gas turbine temperature control plant; electric motors (a.c. and d.c., high and low voltage); electricity distribution system (a.c. and d.c. transformers); diesel engine driven auxiliary plant; station water distribution systems; hydraulic power oil system; compressed air systems; computers with equipment control functions; supervisory, alarm, protection and control equipment.
Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, electricity workers act, national standards for plant.
Information and documentation sources may include verbal or written communications; enterprise isolation documentation; site operating instructions; plant limit book; equipment and alarm manuals; crippled plant book; daily log book; dedicated computer equipment; documented enterprise instructions, local and general.
Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers, alarms (visible and/or audible).
Communications may be by means of telephones, two way radios, pagers, facsimiles, computers (electronic mail), operating logs (written or verbal).
Tests may include loss of major auxiliary controls response checks, stand-by plant “cut-in” tests, dampers/valves operating checks, performance tests.
Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent; other coordinators of energy production or equivalent; technical and engineering officers or equivalent; maintenance staff; other operating staff; contractor staff.
Operating environment may be remote from plant and equipment being operated; operation is assisted by remote indicators of plant status and other parameters monitored; wet/noisy/dusty/hot areas, continuous operation.
Plant operations (systems requirements) may include normal operating/generating mode.
Faults and abnormal operating conditions may include loss of a major auxiliary; loss of electrical supply to switchboard(s), motors; operating limits exceeded; control system malfunctions; high temperatures, exhaust (back end), motor, fan, pump bearings and lubricating oil, motor windings; fuel preparation and delivery systems fires; fuel system malfunction; excessively high heating/cooling rates; high dp’s on oil/air filters and strainers; failed field devices; failed/malfunctioning actuators/dampers/valves; gas turbine protection operation and gas turbine surging.
Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.