



Australian Government

PMAOPS290 Operate a biotreater

Release: 1

PMAOPS290 Operate a biotreater

Modification History

Release 1. Supersedes and is equivalent to PMAOPS290B Operate a biotreater

Application

This unit of competency covers the skills and knowledge required to operate a biotreater.

Biotreaters use aerobic, anaerobic and/or facultative microorganisms at close to ambient temperatures for the reduction of biochemical oxygen demand (BOD) in an aqueous waste stream.

This unit of competency applies to operators who are required to operate all components of the biotreater system, identify and rectify operational problems, predict the potential impact of feed changes and facilitate feed changes to meet requirements.

In a typical scenario, a plant produces an aqueous waste stream which has a high BOD/is contaminated with organic material. This waste stream is treated using a biotreater to produce a clean, low BOD effluent which is acceptable for discharge either to the sewer (as trade waste) or to a receiving waterway where it is within the environmental regulations/license conditions.

This competency does not require the operation of a central control panel.

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

Pre-requisite Unit

Nil

Competency Field

Operations

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

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

- | | | | |
|---|-------------------------|-----|---------------------------------|
| 1 | Prepare for work | 1.1 | Receive and give shift handover |
| | | 1.2 | Identify work requirements |
| | | 1.3 | Identify and control hazards |

- 1.4 Coordinate with appropriate personnel
 - 1.5 Check for recent work undertaken on plant item
 - 1.6 Note any outstanding/incomplete work
 - 1.7 Check operational status of biotreater
- 2 **Monitor and control the biotreater processes**
 - 2.1 Get information relevant to the operation of the biotreater
 - 2.2 Complete routine checks, logs and paperwork taking appropriate action on unexpected readings
 - 2.3 Keep feed as consistent as possible
 - 2.4 Check performance of ancillaries, such as agitation
 - 2.5 Recognise and interpret trends in biotreater data/appearance
 - 2.6 Recognise the signs of potential and actual problems
 - 2.7 Identify the consequences to the biotreater processes of the identified changes, trends and problems
 - 2.8 Take appropriate action to minimise the impact of potential and actual problems
- 3 **Ramp performance up/down**
 - 3.1 Anticipate significant changes in feed
 - 3.2 Breed up/down biomass to prepare for change in feed by changing variables
 - 3.3 Ramp changed feed at a rate suitable for the biotreater
 - 3.4 Establish stable operation for new feed conditions
- 4 **Maintain effectiveness of biotreater system**
 - 4.1 Monitor biotreater frequently and critically throughout shift using measured/indicated data and senses as appropriate
 - 4.2 Identify impacts of any changes upstream and downstream

- 4.3 Recognise situations which may require action
 - 4.4 Resolve routine problems
 - 4.5 Take actions on other abnormal situations to make safe and have the situation resolved
 - 4.6 Predict impact of a change in the processing plant on the biotreater and take appropriate action
 - 4.7 Test trips and alarms as required in liaison with the panel operator
- 5 **Manage impact of shutdowns on biotreater system**
 - 5.1 Identify type of shutdown required/occurring
 - 5.2 Identify impact of type of shutdown on biotreater
 - 5.3 Liaise with appropriate people for shutdown
 - 5.4 Arrange to maintain adequate feed to biotreater for a short plant shutdown
 - 5.5 Arrange to preserve adequate seed stock of microorganisms for long plant shutdown or shutdown of biotreater
- 6 **Isolate and de-isolate biotreater**
 - 6.1 Complete any required pre-start checks
 - 6.2 Start up/shut down biotreater according to the biotreater plant type and duty in liaison with other personnel
 - 6.3 Isolate biotreater or components
 - 6.4 Make safe for required work
 - 6.5 Check biotreater is ready to be returned to service
 - 6.6 De-isolate and prepare biotreater/components for return to service

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

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

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Regulatory framework

The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used, and include one or more of the following:

- legislative requirements, including work health and safety (WHS)
- industry codes of practice and guidelines
- environmental regulations and guidelines
- Australian and other standards
- licence and certification requirements

All operations to which this unit applies are subject to stringent health, safety and environment (HSE) requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Procedures

All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, include one or more of the following:

- emergency procedures
- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant

Hazards

Hazards include one or more of the following:

- electricity
- gas
- gases and liquids under pressure
- structural hazards
- structural collapse
- equipment failures
- industrial (machinery, equipment and product)
- equipment or product mass
- noise, rotational equipment or vibration
- plant services (steam, condensate and cooling water)
- limited head spaces or overhangs
- working at heights, in restricted or confined spaces, or in environments subjected to heat, dusts or vapours
- flammability and explosivity
- hazardous products and materials
- unauthorised personnel
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- extreme weather
- other hazards that might arise

Routine problems

Routine problems must be resolved by applying known solutions.

Routine problems are predictable and include one or more of the following:

- sudden changes in feed (rate, composition and concentration)
- handling a plant shutdown without allowing the microorganisms to die
- control of degree of agitation
- settling/removal/recycling of biosolids

Known solutions are drawn from one or more of the following:

- procedures
- training
- remembered experience

Non-routine problems must be reported according to according to relevant procedures.

Biotreater system	This unit of competency includes all such items of equipment and unit operations which form part of the biotreater system, including as appropriate to the facility: • pumps (feed and dosing pumps) • utilities and services, such as air • agitators • air/gas supply/removal • other equipment integral to the operation of the biotreater system
Actions on other abnormal situations	Actions on other abnormal situations includes the following: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person
Key variables	Key variables include the following: • feed rate • feed composition • feed concentration • rapid changes in feed characteristic
Biomass variables	Biomass variables include the following: • nutrient dosing • aeration rate (if appropriate) • agitation rate

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=9fc2cf53-e570-4e9f-ad6a-b228ffdb6875>

Assessment Requirements for PMAOPS290 Operate a biotreater

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria, and include the ability to:

- start up and shut down the biotreater
- monitor and adjust process variables to meet specifications
- recognise early warning signs of equipment/processes needing attention or with potential problems
- determine the most likely cause of routine problems
- take appropriate action to ensure a timely return to full performance
- distinguish between causes of problems/alarm/fault indications, including:
 - feed variations
 - instrument failure/wrong reading
 - electrical failure
 - mechanical failure
 - operational problem
- isolate and de-isolate equipment
- identify hazards and apply hazard control procedures.

Knowledge Evidence

Evidence must be provided that demonstrates knowledge of:

- all items on a schematic of the biotreater system and the functions of each
- the nature/condition of materials entering and leaving each stage of the process, the changes which have occurred in that stage and why they have occurred
- the biochemical changes which are occurring in each stage and the methods of controlling them
- methods of ramping up/down in response to feed changes and the advantages and disadvantages of each
- hierarchy of control
- hazards that may arise in the job/work environment, and:
 - their possible causes
 - potential consequences
 - appropriate risk controls.

Assessment Conditions

- The unit should be assessed holistically and the judgement of competence based on a holistic assessment of the evidence.
- The collection of performance evidence:
 - should occur over a range of situations which include typical disruptions to normal, smooth operation of an operating plant
 - will typically include a supervisor/third-party report or other evidence, focusing on consistent performance and problem recognition and solving. A supervisor/third-party report must be prepared by someone who has a direct, relevant, current relationship with the person being assessed and who is in a position to form a judgement on workplace performance relevant to the unit of competency
 - must include the use of an appropriate industrial item of equipment requiring demonstration of operation, start-up and shutdown procedures and responding to problems
 - may use industry-based simulation for part only of the unit where safety, lack of opportunity or significant cost is an issue.
- Assessment should occur in operational workplace situations. Where this is not possible, or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment reflecting realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Assessment in a simulated environment should use evidence collected from one or more of:
 - walk-throughs
 - pilot plant operation
 - demonstration of skills
 - industry-based case studies/scenarios
 - ‘what ifs’.
- Knowledge evidence may be collected concurrently with performance evidence (provided a record is kept) or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept).
- 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.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.

- In addition, the assessor or anyone acting in subject matter expert role in assessment must demonstrate both technical competency and currency. If the assessor cannot demonstrate technical competency and currency they must assess with a subject matter expert who does meet these requirements.
- Technical competence can be demonstrated through one or more of:
 - relevant VET or other qualification/Statement of Attainment
 - appropriate workplace experience undertaking the type of work being assessed under routine and non-routine conditions
 - appropriate workplace experience supervising/evaluating the type of work being assessed under routine and non-routine conditions
- Currency can be demonstrated through one or more of:
 - being currently employed undertaking the type of work being assessed
 - being employed by the organisation undertaking the type of work being assessed and having maintained currency in accordance with that organisation's policies and procedures
 - having consulted/had contact with an organisation undertaking the type of work being assessed within the last twelve months, the consultation/contact being related to assessment
 - conducting on-the-job training/assessments of the type of work being assessed
 - being an active member of a relevant professional body and participating in activities relevant to the assessment of this type of work.

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