



Australian Government

Department of Education, Employment and Workplace Relations

PMAOPS290B Operate a biotreater

Revision Number: 1

PMAOPS290B Operate a biotreater

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the operation of a biotreater which is typically used for the reduction of BOD in an aqueous waste stream.
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Application of the Unit

Application of the unit	<p>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.</p> <p>This unit includes the operation of all associated pumps, dosing pumps, agitation, aeration and similar equipment which is integral to the operation of the biotreater. The unit applies to any waste treatment facility using microorganisms to clean an aqueous stream. It includes biotreaters which use aerobic, anaerobic and/or facultative microorganisms</p> <p>This unit does not apply to other waste treatment equipment (such as filtration or chemical dosing) which would be covered by the relevant OPS unit. The significant factor with this unit is not that it is treating waste, but that it is using microorganisms to perform the treatment at ambient temperatures. For temperature controlled microorganism based processes see <i>PMAOPS390B Operate a biochemical process</i></p> <p>The plant technician would:</p> <ul style="list-style-type: none"> • identify and rectify operational problems • predict the potential impact of feed changes • facilitate feed changes <p>This unit does not require the operation of a control panel - see relevant unit.</p>
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
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Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Monitor and control the biotreater processes	1.1. Get information relevant to the operation of the biotreater 1.2. Identify changes in key variables 1.3. Keep feed as consistent as possible 1.4. Check performance of ancillaries such as agitation 1.5. Recognise and interpret trends in biotreater data/appearance 1.6. Recognise the signs of potential and actual problems 1.7. Identify the consequences to the biotreater processes of the identified changes, trends and problems 1.8. Take appropriate action to minimise the impact of potential and actual problems.
2. Ramp performance up/down.	2.1. Anticipate significant changes in feed 2.2. Breed up/down biomass to prepare for change in feed by changing variables 2.3. Ramp changed feed at a rate suitable for the biotreater 2.4. Establish stable operation for new feed conditions.
3. Maintain effectiveness of biotreater system.	3.1. Frequently and critically monitor biotreater system throughout shift 3.2. Use measured/indicated data and smell, sight, sound and feel as appropriate 3.3. Identify critical equipment and processes 3.4. Identify issues likely to impact on the whole plant performance and take appropriate action 3.5. Predict impact of a change in the biotreater system on other plant units/areas and communicate this to relevant people 3.6. Predict impact of a change in the processing plant on the biotreater and take appropriate action 3.7. Test trips and alarms as required in liaison with the panel operator.
4. Manage impact of shutdowns on biotreater system.	4.1. Identify type of shutdown required/occurring 4.2. Identify impact of type of shutdown on biotreater 4.3. Liaise with appropriate people for shutdown 4.4. Arrange to maintain adequate feed to biotreater for a short plant shutdown 4.5. Arrange to preserve adequate seed stock of micro-organisms for long plant shutdown or shutdown

ELEMENT	PERFORMANCE CRITERIA
	of biotreater
5. Isolate and de-isolate biotreater.	5.1. Isolate biotreater or biotreater components 5.2. Make safe for required work 5.3. Check plant is ready to be returned to service 5.4. Prepare biotreater or plant component for return to service 5.5. Ramp biotreater back to normal operation..
6. Control hazards.	6.1. Identify hazards in biotreater work area 6.2. Assess the risks arising from those hazards 6.3. Implement measures to control those risks in line with procedures and duty of care.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- observation
- interpretation
- analysis.

Competence also includes the ability to isolate the causes of problems to an item of equipment within the biotreater system and distinguish between causes of problems/alarm/fault indications such as:

- feed variations
- instrument failure/wrong reading
- electrical failure
- mechanical failure
- operational problem.

Required knowledge

Competence includes an understanding of the biotreater system and its integral equipment to the level needed to control the system and resolve problems, ie:

- identify all items on a schematic of the biotreater system and describe the function of each
- describe 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
- state the biochemical changes which are occurring in each stage and the methods of controlling them
- describe methods of ramping up/down in response to feed changes and the advantages and disadvantages of each.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	<p>Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation.</p> <p>Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.</p> <p>This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant.</p>
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster.</p> <p>Consistent performance should be demonstrated. In particular look to see that:</p> <ul style="list-style-type: none"> • early warning signs of equipment/processes needing attention or with potential problems are recognised • the range of possible causes can be identified and analysed and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognised and an appropriate contribution made to their solution. <p>These aspects may be best assessed using a range of</p>

EVIDENCE GUIDE	
	scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
<p>The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicized wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.</p>	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	<p>This unit of competency includes all such items of equipment and unit operations which form part of the biotreater system. For your plant this may include (select relevant items):</p> <ul style="list-style-type: none"> • 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.
Appropriate action	<p>Appropriate action includes:</p> <ul style="list-style-type: none"> • 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.
Procedures	<p>Procedures may be written, verbal, computer-based or in some other form. They include:</p> <ul style="list-style-type: none"> • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. <p>For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.</p>
Typical problems	<p>Typical problems for your plant may include:</p> <ul style="list-style-type: none"> • sudden changes in feed (rate, composition, concentration)

RANGE STATEMENT	
	<ul style="list-style-type: none"> handling a plant shutdown without allowing the micro-organisms to die control of degree of agitation settling/removal/recycling of biosolids.
Key variables	Key variables include: <ul style="list-style-type: none"> feed rate feed composition feed concentration rapid changes in feed characteristic
Biomass variables	Biomass variables include: <ul style="list-style-type: none"> nutrient dosing aeration rate (if appropriate) agitation rate
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State 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.

Unit Sector(s)

Unit sector	Operational/technical
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Competency field

Competency field	
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Co-requisite units

Co-requisite units		
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