



Australian Government

Department of Education, Employment and Workplace Relations

RIIPBE302A Conduct bacterial oxidation

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers the conduct of bacterial oxidation in the metalliferous mining industry. It includes planning and preparing for bacterial oxidation process, starting up equipment in sequence, operating and monitoring sequence, conducting housekeeping activities, and shutting down in sequence and/or isolating equipment. Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Relevant information must be sourced prior to application of the unit.

Application of the Unit

This unit is appropriate for those working in an operational role at worksites within:

- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

<p>Elements describe the essential outcomes of a unit of competency.</p>	<p>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.</p>
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare for bacterial oxidation process	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Receive, interprets and clarifies shift changeover details 1.3. Communicate with other personnel using approved communication method 1.4. Select personal protective equipment appropriate for work activities 1.5. Select appropriate type of auxiliary equipment for work activities 1.6. Perform equipment pre-start checks to ensure equipment is ready for operation 1.7. Identify, address and report potential risks and hazards 1.8. Identify, address and report environmental issues 1.9. Adhere to emergency procedures to ensure safety of personnel and plant
2. Start-up equipment in sequence	2.1. Carry out start-up procedures and complete start-up checks according to plant configurations and system requirements 2.2. Confirm plant is operational
3. Operate and monitor equipment	3.1. Read and interpret data from equipment indicators to determine bacterial oxidation progress 3.2. Continuously inspect and monitor plant and identify bacterial oxidation process defects and potential problems 3.3. Assess sulphuric content of ore according to bacterial oxidation parameters 3.4. Make appropriate adjustments to oxidation process to optimise targets 3.5. Adjust equipment to approved operating parameters to optimise oxidation performance, maintain efficient oxidation and to meet product quality targets 3.6. Control feed to oxidation equipment 3.7. Add required nutrients and oxygen to approved operating parameters 3.8. Carry out minor maintenance to maintain

	<p>condition of equipment</p> <p>3.9. Complete all required documentation clearly, concisely and on time</p> <p>3.10. Pass on end of shift information to oncoming shift</p>
4. Conduct housekeeping activities	<p>4.1. Clean plant to maintain condition of all equipment to ensure safe and efficient operations</p> <p>4.2. Manage and report hazards to maintain a safe working environment</p>
5. Shutdown in sequence and/or isolate equipment	<p>5.1. Shutdown or isolate equipment based on process and safety requirements</p> <p>5.2. Perform post shutdown or isolation checks</p>

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes the ability to carry out the following, as required to conduct bacterial oxidation:

- apply legislative, organisation and site requirements and procedures for conducting bacterial oxidation
- handle hazardous goods
- Identify and manage hazards
- apply lifting techniques (manual, automated)
- maintain records
- monitor operations
- report defects
- apply safe work practices
- use hand and power tools

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes knowledge of the following, as required to conduct bacterial oxidation:

- bacteria inhibitors
- bacterial oxidation plant (basic) and process
- break down procedures
- contaminants
- depressant identification and activator principles
- emergency procedures
- environmental procedures
- equipment processes, limitations and operating parameters
- equipment safety requirements
- hazardous good procedures and consequences of spills
- identifying repair requirements
- isolation procedures
- metallurgical and technical data
- nutrient types and how to use them
- OHS procedures
- operational procedures and checks
- site procedures

- types of ores and grades (basic)

Evidence Guide

<p>The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
<p>Overview of assessment</p>	
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following:</p> <ul style="list-style-type: none"> • knowledge of the requirements, procedures and instructions for conducting bacterial oxidation • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of bacterial oxidation • working with others to undertake and complete the bacterial oxidation in a way that meets all of the required outcomes • consistent timely completion of bacterial oxidation that safely, effectively and efficiently meets the required outcomes
<p>Context of and specific resources for assessment</p>	<ul style="list-style-type: none"> • This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection and use of resources for particular worksites may differ due to the site circumstances. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate

	<p>cultural diversity.</p> <ul style="list-style-type: none"> • Aboriginal people and other people from a non English speaking background may have second language issues. • Where applicable, physical resources should include equipment modified for people with disabilities. Access must be provided to appropriate learning and/or assessment support when required.
Method of assessment	<p>This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:</p> <ul style="list-style-type: none"> • written and/or oral assessment of the candidate's required knowledge • observed, documented and/or first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes • consistent achievement of required outcomes • first hand testimonial evidence of the candidate: <ul style="list-style-type: none"> • working with others to undertake and complete the bacterial oxidation
Guidance information for assessment	<p>Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.</p>

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 italicised wording, if used in the performance criteria, is detailed below. 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) may also be included.</p>	
<p>Relevant compliance documentation may include:</p>	<ul style="list-style-type: none"> • legislative, organisational and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
<p>Legislation may include Acts and regulations dealing with:</p>	<ul style="list-style-type: none"> • mining safety and health • mine inspection • OHS • explosives
<p>Auxiliary equipment may be anything that is portable and mobile that is not part of the fixed infrastructure, and may include:</p>	<ul style="list-style-type: none"> • forklift • gantry cranes and attachments • hand and power tools • hoses for water and air • loader and bobcat • pump systems
<p>Equipment pre-start checks may include:</p>	<ul style="list-style-type: none"> • availability of equipment • detection of conditions that are unusual • fluid levels • job requirements • personnel availability • work through plant
<p>Environmental issues may include:</p>	<ul style="list-style-type: none"> • drainage • emissions • flora and fauna • hazardous chemicals • noise • recycling • run-off • spills • waste management and disposal • water quality

<p>Plant may include:</p>	<ul style="list-style-type: none"> • acid pumping system • acid storage tank • agitators and gearboxes • air ducting and air sparge pipes • bacterial oxidation / leaching tanks • conditioning tanks • cooling water pipelines • counter current decantation thickeners • flocculent mixing/storage/pumping system • lime mixing/storage/pumping system • limestone ball mill • limestone storage and pumping system • neutralisation circuit tanks • nutrient hold tanks • nutrient mixing tanks • nutrient pumping systems • pumps • slurry pipelines
<p>Start-up procedures may include:</p>	<ul style="list-style-type: none"> • cameras and monitors • distribution control system (DCS) • interlocks • isolations • pipes and flanges • pumping system • valves • visual and audio warning devices and lights • water systems
<p>Indicator readings may measure:</p>	<ul style="list-style-type: none"> • air flows • concentrations (e.g. dissolved oxygen) • conductivity • current • densities • heat - temperature • levels • mass flow • pH • power • pressure • reagent flows • speed • vibrations

Bacterial oxidation methods may include:	<ul style="list-style-type: none"> • high temperature bacterial leaching • low temperature bacterial leaching
Monitoring may include the checking of:	<ul style="list-style-type: none"> • air flows • air pressure • bacteria concentration • blockages and spillages • cooling water flows • densities • dissolved oxygen • feed rates • in stream analysis (ISA) • nutrient levels • on stream analysis (OSA) • overloads • pH • power draw • pressures • reagent flow • temperatures • wear and tear
The methods used to optimise the plant may include adjustment to:	<ul style="list-style-type: none"> • air flow • mass flow • nutrient levels • pH • solids densities
Post-shutdown checks are like pre-start checks.	
Site conditions may include:	<ul style="list-style-type: none"> • weather conditions • working at heights

Unit Sector(s)

Beneficiation

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.