



Australian Government

RIINHB304E Conduct reverse circulation drilling operations

Release: 1

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Modification History

Release	Comments
Release 1	This version first released with RII Resources and Infrastructure Industry Training Package Version 5.0.

Application

This unit describes the skills and knowledge required to conduct reverse circulation drilling in the resources and infrastructure industry. It prepares individuals to inspect and maintain reverse circulation drilling equipment, drill using reverse circulation drilling methods, select and use drilling additives, take samples, respond to problems and complete equipment maintenance and housekeeping procedures.

It applies to those working in operational roles. They generally perform tasks involving a broad range of skilled applications in a wide variety of contexts, which may involve some discretion and judgement in selecting equipment, services and contingency measures.

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

Unit Sector

Drilling

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Plan and prepare for reverse circulation drilling	1.1 Obtain, interpret and confirm work requirements 1.2 Access, interpret and apply conduct reverse circulation drilling documentation, and confirm work activity is compliant 1.3 Identify and minimise environmental issues and potential hazards, and assess and address risks within scope of own role and according to workplace procedures 1.4 Select and wear personal protective equipment required for work activities

ELEMENT	PERFORMANCE CRITERIA
	1.5 Communicate with other personnel at site according to work requirements and confirm briefings and handover details are communicated and received 1.6 Obtain and interpret emergency procedures identify steps required in case of fires, accidents and other emergencies
2. Inspect and maintain reverse circulation drilling equipment	2.1 Carry out prestart and start-up procedures according to manufacturer specifications and workplace procedures 2.2 Confirm restraining devices are not damaged or worn and are correctly fitted according to safety requirements 2.3 Inspect and maintain the cyclone in safe and serviceable condition according to manufacturer specifications 2.4 Confirm mounting and security of cyclone is adequate for safe operation, particularly when down hole water may result in release of energy 2.5 Maintain dust suppression systems to ensure minimal emission of airborne dust and integrity of sample quality 2.6 Inspect pressure relief valves and confirm in required operating condition
3. Drill using reverse circulation drilling methods	3.1 Identify, select and apply rig operational controls according to work requirements and manufacturer specifications 3.2 Select and use required drill rod and drill string components given hole specification and anticipated ground conditions according to manufacturer specifications 3.3 Operate make-up and break-out equipment according to work requirements and manufacturer specifications 3.4 Select and use required type and size of in-hole tools given hole specification and anticipated ground conditions according to manufacturer specifications 3.5 Drill and open-up hole collar as required to suit given ground conditions and hole specification according to manufacturer specifications 3.6 Install drill hole collar casing and seal at the hole collar according to manufacturer specifications 3.7 Install outside hole return collar device, if required, given hole specification of open or reverse circulation drill hole according to manufacturer specifications 3.8 Operate drill rod handling equipment according to work requirements and manufacturer specifications 3.9 Add and remove drill rods or casing and other in-hole equipment according to manufacturer specifications 3.10 Monitor and adjust air pressure and other drilling

ELEMENT	PERFORMANCE CRITERIA
	parameters 3.11 Monitor and control down hole water conditions and confirm integrity of hole, drill cuttings and sample quality 3.12 Monitor and control discharge from outside hole return collar device 3.13 Calculate depth of hole
4. Select and use drilling additives	4.1 Identify ground conditions requiring the use of drilling additives 4.2 Select required drilling additives to suit ground conditions 4.3 Prepare required drilling additives according to work requirements 4.4 Use drilling additives to achieve required results
5. Take samples	5.1 Select and check sample devices to confirm client sample quantity and quality specifications are met 5.2 Clean or supervise the cleaning of sample devices according to workplace procedures 5.3 Monitor splitting, bagging, presentation, and marking of samples and confirm client specifications are met 5.4 Identify and promptly rectify sample blockages affecting or having the potential to affect sample quality 5.5 Clear sample delivery hose blockages safely 5.6 Clear outside return hole blockages of collared holes as required 5.7 Supervise drill crew and confirm all sampling tasks are carried out correctly and safely
6. Respond to problems	6.1 Monitor drill cuttings or sample quality, quantity and air return 6.2 Identify possible problems in equipment or process 6.3 Determine possible cause(s) of problems 6.4 Rectify problem(s) using appropriate solution within area of responsibility 6.5 Follow through items initiated until final resolution has occurred 6.6 Report problems outside area of responsibility to designated person
7. Complete equipment maintenance and housekeeping	7.1 Supervise the use of specified personal protective equipment when using grinders or bit sharpening equipment 7.2 Supervise the selection and correct fitting grinding disks, wheels and stones

ELEMENT	PERFORMANCE CRITERIA
	7.3 Monitor wear of in-hole tools 7.4 Check, perform maintenance on and/or replace compressed air hoses and hose fittings or clamps 7.5 Supervise the maintenance of in-hole tools 7.6 Inspect, dismantle, replace worn or damaged components and reassemble in-hole equipment according to manufacturer specifications 7.7 Carry out shutdown and secure equipment according to manufacturer specifications and workplace procedures 7.8 Confirm housekeeping activities are completed according to workplace procedures 7.9 Process records according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

SKILL	DESCRIPTION
Self-management	• Monitors and minimises own exposure to worksite hazards during activities

Unit Mapping Information

Supersedes and is equivalent to RIINHB304D Conduct air drilling.

Links

Companion Volume implementation guides is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=88a61002-9a21-4386-aaf8-69c76e675272>

Assessment Requirements for RIINHB304E Conduct reverse circulation drilling operations

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- conduct reverse circulation drilling operations on at least two occasions.

During the above, the candidate must:

- locate and apply required documentation, policies and procedures
- implement the requirements, procedures and techniques for the completion of reverse circulation drilling, including:
 - applying prescribed thread form torque parameters during make-up of down hole equipment and consumables
 - applying correct internal and external calipers, vernier, rule and or tape measure for identification of drill pipe/rod diameter wear limits, measurement of bits/shrouds and other required down hole equipment
 - applying correct measurement of drill string length
 - applying methods for calculating hole depth
- work with others to conduct reverse circulation drilling tasks that meets required outcomes, including:
 - complying with written and verbal reporting requirements and procedures
 - communicating with others to receive and clarify work instructions
 - communicating with others to determine coordination requirements prior to commencing and during work activities.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- key policies, procedures and established requirements for conducting reverse circulation drilling, including those for:

- work health and safety
- emergencies
- environmental practice
- operating drill rig
- housekeeping
- the importance to match like threads with like threads on all threaded components and make up torque requirements applicable to thread form in use
- the relationship between pressure, volume, hole diameter, rod diameter and calculation of up hole velocity
- drill rod and thread form wear limit parameters
- the need for correct hole collaring, use of casing and collar sealing techniques
- methods for complying with the tungsten carbide (TC) bit sharpening procedures
- potential problems related to inaccurate measurement and usage sequence of ground engaging consumables and related down hole components
- hazard control measures to enable safe use of compressed air
- the importance of ensuring sample quantity including the prevention of blockages
- safe procedures to clear down and up hole drill cuttings blockages within the outside hole return, down hole equipment and up hole sample system and/or hose
- the critical need for correct fitting, inspection, maintenance and replacement of restraining devices
- hazards associated with the collection of high velocity drilling cuttings
- reasons for checking inner tubes and inner tube sealing devices in RC drill rod
- hazards associated with wire-line operations and applicable control measures
- the various thread forms used in reverse circulation drilling
- the various in-hole tools and correct application given ground conditions
- the need for managing uncontaminated samples.

Assessment Conditions

Mandatory conditions for assessment of this unit are stipulated below. The assessment must:

- include access to:
 - personal protective equipment
 - equipment required to conduct reverse circulation drilling
- be conducted in a safe environment; and,
- be assessed in the context of this sector's work environment; and,
- be assessed in compliance with relevant legislation/regulation and using policies, procedures and processes directly related to the industry sector for which it is being assessed; and,
- confirm consistent performance can be applied in a range of relevant workplace circumstances.

Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated work environment* provided it is realistic and sufficiently rigorous to cover all aspects of this sector's workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.

Assessor requirements

Assessors must be able to clearly demonstrate current and relevant industry knowledge and experience to satisfy the mandatory regulatory standards as set out in the Standards for Registered Training Organisations 2015/Australian Quality Training Framework mandatory requirements for assessors current at the time of assessment and any relevant licensing and certification requirements. This includes:

- vocational competencies at least to the level being delivered and assessed
- current industry skills directly relevant to the training and assessment being provided
- current knowledge and skills in vocational training and learning that informs their training and assessment
- formal relevant qualifications in training and assessment
- having knowledge of and/or experience using the latest techniques and processes
- possessing the required level of RII training product knowledge
- having an understanding and knowledge of legislation and regulations relevant to the industry and to employment and workplaces
- demonstrating the performance evidence, and knowledge evidence outlined in this unit of competency, and
- the minimum years of current** work experience after competency has been obtained as specified below in an industry sector relevant to the outcomes of the unit.

It is also acceptable for the appropriately qualified assessor to work with an industry expert to conduct assessment together and for the industry expert to be involved in the assessment judgement. The industry expert must have current industry skills directly relevant to the training and assessment being provided. This means the industry subject matter expert must demonstrate skills and knowledge from the minimum years of current work experience after competency has been obtained as specified below, including time spent in roles related to the unit being assessed:

Industry sector	AQF indicator level***	Required assessor or industry subject matter expert experience
Drilling, Metalliferous Mining, Coal Mining, Extractive (Quarrying) and Civil Infrastructure	1	1 year
	2	2 years
Drilling, Coal Mining, Extractive (Quarrying), Metalliferous Mining and Civil Infrastructure	3-6	3 years
Other sectors	Where this unit is being assessed outside of the resources and infrastructure sectors assessor and/or industry subject matter expert experience	

Industry sector	AQF indicator level***	Required assessor or industry subject matter expert experience
	should be in-line with industry standards for the sector in which it is being assessed and where no industry standard is specified should comply with any relevant regulation.	

*Guidance on simulated environments has been stipulated in the RII implementation guide located on VETNet.

**Assessors can demonstrate current work experience through employment within industry in a role relevant to the outcomes of the unit; or, for external assessors this can be demonstrated through exposure to industry by conducting a minimum number of site assessments as determined by the relevant industry sector, across various locations.

*** While a unit of competency does not have an AQF level, where a unit is being delivered outside of a qualification the first numeric character in the unit code should be considered as the AQF indicator level for assessment purposes.

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