



Australian Government

RIINHB325E Construct single aquifer bores

Release: 1

RIINHB325E Construct single aquifer bores

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 construct and complete single aquifer bores, including production and monitoring bores. It includes designing, constructing and developing single aquifer bores, disinfecting bores and equipment and decommissioning bores.

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.

Licensing, legislative and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Users must check requirements with relevant body before applying the unit.

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 design for the construction of single aquifer bores	1.1 Obtain, interpret and confirm work requirements 1.2 Access, interpret and apply single aquifer 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 Site a bore and design single aquifer bore in accordance with work and legislative requirements 1.5 Select and wear personal protective equipment required for

ELEMENT	PERFORMANCE CRITERIA
	work activity 1.6 Communicate with other personnel at site according to work requirements and confirm briefings and handover details are communicated and received 1.7 Select required drilling method for site geology
2. Construct and develop single aquifer bores in line with established requirements	2.1 Drill and isolate target production zone from other formations 2.2 Log strata encountered during drilling according to workplace procedures 2.3 Confirm or amend bore design based on testing and encountered geology 2.4 Construct bore according to confirmed or amended design using simple construction techniques 2.5 Undertake bore development until a continuous, clean supply of water is obtained, in accordance with acceptable and practical limits set by site, contractual or regulatory requirements 2.6 Estimate yield by using yield testing methodologies 2.7 Complete written bore construction record according to workplace procedures
3. Disinfect/decontaminate bore and drilling equipment in line with established requirements	3.1 Determine and monitor potential contaminants of drilling equipment 3.2 Disinfect/decontaminate bores and installed equipment constructed for potable supplies
4. Decommission bore holes in line with established requirements	4.1 Determine suitable decommissioning procedures for failed or unwanted bores and select appropriate materials 4.2 Seal the bore as per legislative requirements

Foundation Skills

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

SKILL	DESCRIPTION
Reading	Identifies and interprets information from workplace procedures, policies and documentation
Numeracy	Identifies and comprehends relevant mathematical information and formulae in relation to constructing single aquifer bores

Unit Mapping Information

Supersedes and is equivalent to RIINHB325D Construct and complete single aquifer production bores.

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 RIINHB325E Construct single aquifer bores

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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:

- construct single aquifer bores on at least three occasions, including:
 - planning and preparing for the construction of single aquifer bores, including:
 - discussing and agreeing scope of work with client, including cost structure, workmanship warranty, quantity and quality of materials, construction standards and methods to be used
 - selecting a bore site to prevent contamination and minimise interference with other bores
 - designing a single aquifer bore and determining construction method to ensure the exclusion of surface water ingress and screening the correct zone of strata for a water supply or groundwater monitoring purposes.
 - constructing and developing single aquifer bores in line with established requirements, including:
 - confirming or amending bore design based on encountered geology, using:
 - lithological logging
 - bore yield testing
 - water quality testing
 - selecting likely water entry mechanism from the formation to the bore including stainless steel screens, filter packs, slotted casing, and open hole
 - calculating and making up cement grout volumes and mixing grout component quantities, including:
 - cement powder
 - water
 - bentonite
 - calculating hole and annular volumes
 - calculating grout specific gravity
 - constructing bore according to confirmed or amended design, including:

- assembling and installing casings, seals and screens
- installing filter pack
- grouting
- confirming or amending bore design based on encountered geology, using:
 - lithological logging
 - aquifer yields testing
 - water quality testing
- continuing development until a continuous, clean supply of water is obtained.
- estimating yield by using methodologies of:
 - air lifting
 - pumping
- disinfecting/decontaminating bore and drilling equipment in line with established requirements, including:
 - disinfecting bores and installed equipment using proprietary chemical solution
- decommissioning bore holes in line with established requirements
 - decommission single aquifer failed or unwanted bores as required.

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 legislation required to construct single aquifer bores
- key policies, procedures and established requirements for constructing single aquifer bores, including those for:
 - Minimum Construction Requirements (MCR)
 - contractual agreements with clients
 - workplace health and safety
 - environmental practice
 - accidents and emergencies
 - safety data sheets (SDS)
 - housekeeping
- key factors affecting multiple aquifer production bore performance, including:
 - objectives of bore development
 - properties, uses and effects of and differences between:
 - single and multiple aquifers
 - casings
 - bore water entry designs (screens, filter packs, slotted casing, open hole)
 - cement (grout) make up components
 - tremie pipe grout placement methods and procedures
 - hole preparation for cementing (grouting) operations

- calculations for:
 - volume (including tanks or bore holes of given dimensions and annulus)
 - flow rates
 - conversion from imperial to metric and vice versa
- equipment processes, technical capability and limitations
- casing strength characteristics
- ways in which sampling errors can occur
- yield testing procedures
- applications for different types of filter packs (artificial pack, natural pack) and completion techniques
- characteristics of 'good samples' required for water well construction
- types of pathogens and contaminants including bacteria
- key site information, including:
 - basic geological formations, including soil and rock classifications, which permit groundwater movement
 - bore construction reporting.

Assessment Conditions

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

- include access to:
 - bore site(s)
 - drilling rig and equipment
 - water supply
 - cement grout (cement, water, and bentonite)
 - casings, seals and screens
 - filter pack material
 - personal protective equipment
 - air compressor or pumping equipment
 - potable supply disinfectant
- be conducted in a safe environment
- be assessed in context of the sector's work environment
- be assessed in compliance with relevant legislation and regulations and using policies, procedures, processes and operational manuals directly related to the industry sector for which it is being assessed
- 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 (RTOs) 2015/AQTF 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 Construction	1	1 year
	2	2 years
Drilling, Coal Mining, Extractive (Quarrying), Metalliferous Mining and Civil Construction	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 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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