



Australian Government

RIINHB412D Construct geothermal wells

Release: 2

RIINHB412D Construct geothermal wells

Modification History

Release	Comment
1	This unit replaces RIINHB412B Construct geothermal wells
2	Required frequency and volume of evidence amended in Performance evidence. Substantial amendments made in Assessment Conditions field, including: references to Industry Sectors, assessor and subject matter expert experience requirements, how assessment should be conducted and what it should confirm.

Application

This unit describes a participant's skills and knowledge required to construct geothermal wells in Drilling.

This unit is appropriate for those working in supervisory or technical specialist roles.

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.

Unit Sector

Drilling

Elements and Performance Criteria

1. Plan and prepare for the construction of geothermal wells	1.1 Access, interpret and apply construction of the geothermal wells documentation and ensure the work activity is compliant 1.2 Obtain, read, interpret, clarify and confirm work requirements 1.3 Identify and address potential risks, hazards and environmental issues and implement control measures 1.4 Select and wear personal protective equipment appropriate for work activities 1.5 Communicate and coordinate activities with others throughout the work activity 1.6 Discuss scope of work with client to gain general agreement on drilling plan 1.7 Communicate regular up to date information on progress,
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	and/or problems encountered to client and/or other relevant parties 1.8 Provide details of the completed well to the appropriate authorities as required by the relevant state/territory legislation 1.9 Obtain and interpret emergency procedures, and be prepared for fire/accident/emergency
2. Design geothermal wells	2.1 Determine most appropriate construction methods from the reading and interpretation of all available documented information and local geographic/geological knowledge 2.2 Determine a drilling fluid program to suit the expected down-hole conditions and anticipated pressures/temperatures 2.3 Select appropriate bore/surface casing for the anticipated ground conditions and construction techniques 2.4 Ensure all necessary materials anticipated for the job are available and on site prior to commencement of construction phase
3. Construct geothermal wells	3.1 Carry out any pre-start and start up procedures 3.2 Identify, select and apply rig operational controls 3.3 Assemble and insert casing 3.4 Grout or otherwise seal surface casing 3.5 Conduct grouting operations to seal intermediate and/or production casing strings or to seal selected zones 3.6 Construct well in accordance with any applicable regulations, minimum construction requirements and the organisation's internal procedures 3.7 Maintain plumbness and alignment of the hole within the required limitations 3.8 Recognise symptoms of a formation kick and take action to control the well 3.9 Maintain adequate supplies of water on site to quench the well if required 3.10 Collect, record and label formation samples 3.11 Maintain records accurately and legibly 3.12 Accurately calculate hole, annular, grout and mud pit volumes in cubic metres or litres 3.13 Comply with relevant workplace occupational health and safety requirements for both the drilling equipment and construction materials 3.14 Maintain tool string inventories

4. Develop bore	4.1 Use development techniques with care to prevent collapsing of casing or blow outs 4.2 Develop bore hole
5. Carry out well maintenance and rehabilitation	5.1 Undertake a process of diagnosis to determine likely cause of well deterioration 5.2 Devise a program of rehabilitation to ensure that the well is restored to a reasonable condition
6. Decommission test/bore holes	6.1 Determine suitable decommissioning procedures and select appropriate materials 6.2 Carry out the decommissioning (abandonment) of test holes or wells in geothermal systems 6.3 Verify position/location of hole for future reference 6.4 Dispose of drill and other fluids safely 6.5 Carry out housekeeping requirements

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit. Further information is available in the Resources and Infrastructure Industry Training Package Companion Volume.

Unit Mapping Information

RIINHB412B Construct geothermal wells

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for RIINHB412D Construct geothermal wells

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Performance Evidence

Evidence is required to be collected that demonstrates a candidate's competency in this unit. Evidence must be relevant to the roles within this sector's work operations and satisfy all of the requirements of the performance criteria of this unit and include evidence that the candidate:

- locates and applies relevant legislation, documentation, policies and procedures
- works effectively with others to plan, prepare and conduct the construction of geothermal wells including:
 - communicating clear and timely instructions to those involved
 - preparing for and conducting briefings, toolbox and site meetings
 - maintaining clear and legible written records and the reports
- demonstrates completion of the construction of geothermal wells that safely, effectively and efficiently meets all of the required outcomes on more than one (1) occasion including:
 - determining most appropriate construction methods from the reading and interpretation of all available documented information and local geographic/geological knowledge
 - selecting appropriate bore/surface casing for the anticipated ground conditions and construction techniques
 - completing grouting operations to seal intermediate and/or production casing strings or to seal selected zones
 - maintaining plumbness and alignment of the hole within the required limitations
 - using development techniques to prevent collapsing of casing or blow outs
 - carrying out the decommissioning (abandonment) of test holes or wells in geothermal systems

Knowledge Evidence

The candidate must demonstrate knowledge in, when constructing geothermal wells through:

- work, health and safety
- environmental issues
- operating drill rig
- housekeeping
- the equipment characteristics, technical capabilities and limitations
- the basic geological formations, i.e. basic knowledge of both soil and rock classifications and various formations which permit groundwater movement and factors affecting groundwater quality for aquifer systems, including drillability and stability
- potential safety hazards and sources of contamination when siting a well
- the necessity of having a signed agreement/contract with the client
- applying Blow Out Prevention procedures and techniques
- appropriate casing materials for various applications
- managing hole preparation for cementing (grouting) operations
- effects of various cement (grout) additives
- using pressure cementing methods
- casing collapse characteristics
- applying appropriate headworks design for geothermal well applications
- types of drilling fluids
- using grout placement methods and procedures
- applying a range of numerical calculations including:
 - volume (e.g. mud pits, drums, tanks or wells of given dimensions)
 - up hole velocity
 - cement/water/additives quantities
 - flow rates (e.g. L/sec, GPM)
 - conversion from imperial to metric and vice versa
 - required mud weight to control formation fluid pressures
- appropriate fishing operations for the type(s) of drilling being undertaken
- using of materials safety data sheets (MSDS)
- being prepared for fire/accident/emergency

Assessment Conditions

- An assessor of this unit must satisfy the requirements of the NVR/AQTF or their successors; and Industry regulations for certification and licensing; and,
- this unit must be assessed in the context of this sector's work environment; and,
- this unit must be assessed in compliance with relevant legislation/regulation and using policies, procedures, processes and operational manuals directly related to the industry sector for which it is being assessed; and,

- assessment may be conducted in conjunction with the assessment of other Units of Competency; and,
- assessment must confirm consistent performance can be applied in a range of relevant workplace circumstances; and,
- assessors must demonstrate the performance evidence, and knowledge evidence as outlined in this Unit of Competency, and through the minimum years of current* work experience specified below in an Industry sector relevant to the outcomes of the unit; or,
- where the assessor does not meet experience requirements a co-assessment or partnership arrangement must exist between the qualified assessor and an Industry subject matter expert. The Industry subject matter expert should hold the unit being assessed (or an equivalent unit) and/or demonstrate equivalence of skills and knowledge at the unit level. An Industry technical expert must also demonstrate skills and knowledge from the minimum years of current work experience specified below in the Industry sector, including time spent in roles related to the unit being assessed; and,
- assessor and Industry subject matter expert requirements differ depending on the Australian Qualifications Framework Level (AQF) of the qualification being assessed and/or Industry Sector as follows:

Industry sector	AQF** 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 and Extractive (Quarrying)	3-6	3 Years
Metalliferous Mining and Civil Construction	3-6	5 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.	

*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 frequent site assessments across various locations.

**Where a unit is being delivered outside of a Qualification the first numeric character in the Unit code should be considered to indicate the AQF level

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