Unit code *Mandatory field*	RIINHB3XX
Unit title *Mandatory field*	Carry out surveying and orientation
Application *Mandatory field*	This unit describes the skills and knowledge required to conduct downhole surveying and orientation in drilling operations. It prepares individuals to set up and calibrate survey and orientation equipment, conduct and interpret downhole surveys, monitor and control drill path against drill plan and hole specification, and process and report survey and orientation data. Orientation includes orientation of the survey tool and down-hole motor and, where required, core orientation. It applies to those working in operational and driller roles across directional, guided boring, in-seam and core drilling methods. They generally perform tasks involving a broad range of skilled applications in a variety of contexts, which may involve some discretion and judgement in selecting survey and orientation equipment, methods and contingency measures.
Licensing/Regulatory Information	No licensing, legislative or certification requirements apply to this unit at the time of publication.
Pre-requisite unit *Optional field*	Nil
Competency field *Optional field*	
Unit sector *Optional field*	Drilling
Elements *Mandatory field*	**Performance criteria** *Mandatory field*
1. Plan and prepare for downhole surveying and orientation	1.1 Obtain, interpret and confirm work requirements, and determine survey and orientation requirements according to drill plan, hole specification and client requirements 1.2 Access, interpret and apply downhole surveying and orientation 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 1.5 Communicate with other personnel at site, and confirm briefings and handover 1.6 Obtain and interpret emergency procedures and identify steps required in case of fires, accidents and other emergencies

2. Set up and calibrate survey and orientation equipment	2.1 Select survey and orientation equipment according to hole specification and work requirements 2.2 Carry out prestart and start-up procedures according to manufacturer specifications and workplace procedures 2.3 Calibrate survey tool according to manufacturer specifications 2.4 Set up the orientation of the survey tool and the down-hole motor 2.5 Fit locating device to drill head and attach drill head to drill stem 2.6 Align drilling head with survey tool and survey control system 2.7 Monitor and maintain survey tool power supply and consumable items
3. Conduct surveys and monitor drill path	3.1 Take survey readings at required intervals, with regard to standpipe length and composition, and use the results to adjust the orientation of the down-hole motor 3.2 Interpret survey results, calculate hole depth, deviation and dogleg severity, and confirm survey data is consistent and reliable before use 3.2 Monitor drill path, gauge and dial readings, and drill head position and pitch to ensure the hole meets the conformance envelope and dogleg severity limits 3.3 Steer, and where required zone steer, the drill head to achieve required pitch and direction 3.4 Reorientate the down-hole motor when branching is required to achieve the required deviation of the hole 3.5 Assemble and use core orientation devices as required, and read and record survey and orientation data 3.6 Continually monitor hazards and risks, and ensure safety of self, other personnel, plant and equipment
4. Respond to problems	4.1 Identify possible problems in equipment or process 4.2 Determine possible cause(s) of problems 4.3 Rectify problem(s) using appropriate solution within area of responsibility 4.4 Report problems outside area of responsibility to designated person
5. Process survey data and complete records	5.1 Maintain drill log and plot drilling data 5.2 Download survey instrument data system and upload data to site and/or work computer system as required 5.3 Report survey and orientation data and drilling plots according to workplace and client requirements 5.4 Carry out shutdown and secure survey and orientation equipment 5.5 Process records according to workplace procedures
Foundation skills *Optional field* Where a unit of competency is a standalone unit or has high delivery as a single unit (e.g. First Aid), Jobs and Skills Councils may use this field to describe foundation skills that are essential to performance.	

Numeracy	calculates hole depth, deviation and dogleg severity from survey and drilling data to confirm conformance with the drill plan
Writing	produces and completes drill logs, survey plots and workplace reports using appropriate vocabulary, grammatical structures and conventions

Range of conditions *optional field*

Nil

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Range is restricted to essential operating conditions and any other variables essential to the work environment.

Assessment Requirements	
Performance evidence *Mandatory field*	The individual must demonstrate they have completed the elements, performance criteria and foundation skills of this unit on at least two (2) occasions, including: ▪ calibrating survey tools, and setting up and aligning survey and orientation equipment, the down-hole motor and drill head according to manufacturer specifications ▪ conducting downhole surveys, confirming the reliability of survey data, and adjusting down-hole motor orientation in response to survey data ▪ steering the drill head, including zone steering and reorientating the down-hole motor for branching, where required ▪ maintaining drill path within the conformance envelope and dogleg severity limits specified in the drill plan, including calculating deviation and dogleg severity from survey and drilling data During the above, the candidate must: ▪ identifying problems with survey and orientation equipment or process, determining their likely causes, and rectifying or reporting them ▪ completing drill logs and survey/orientation reporting according to workplace requirements
Knowledge evidence *Mandatory field*	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: ▪ workplace requirements and procedures for surveying and orientation, including: o work health and safety o environmental requirements o emergency response procedures o site communication and handover requirements ▪ the relationship between the drill plan, hole specification, client requirements and survey and orientation requirements ▪ principles of downhole surveying and orientation, including how survey and orientation equipment is used to determine and control the position and direction of the hole

	▪ types, functions and operating requirements of survey and orientation equipment, including locating devices and core orientation devices ▪ factors affecting the accuracy and reliability of survey readings and data, including survey intervals and standpipe length and composition ▪ methods for calculating hole depth, deviation and dogleg severity, and the purpose of the conformance envelope and dogleg severity limits ▪ steering and orientation techniques for monitoring and controlling the drill path, including zone steering and reorientation for branching ▪ common problems with survey and orientation equipment and processes, their likely causes and appropriate responses ▪ purpose and requirements of drill logs, drilling plots, and survey and orientation data and records
Assessment conditions *Mandatory field*	The assessment must: • include access to: o personal protective equipment o tools and equipment required to carry out downhole surveying and orientation work o workplace documentation such as, drill plans, site plans and procedures, manufacturer instructions and safety data sheets • be conducted in a safe environment • be assessed in the context of this sector's work environment • 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 • 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. *Guidance on simulated environments has been stipulated in the RII Companion Volume Implementation Guide. **Industry Experts** An industry expert engaged by an RTO to wholly or partially conduct assessment, independently or together with another assessor, or be involved in an assessment judgement, must also satisfy the assessor requirements in applicable vocational education and training legislation, frameworks and/or standards. **Assessors and industry experts** delivering training in the drilling industry sector must also have a minimum of three (3) years industry

	experience, directly relevant to the training and assessment being provided.
Unit mapping information *Mandatory field*	New unit. No equivalent unit.
Links *Mandatory field*	Link to Companion Volume Implementation Guide.