Australian Government

RIINHB307X Conduct conventional core drilling

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Release: 1

RIINHB307X Conduct conventional core drilling

Modification History

Release	Comments
1	This unit of competency was first released in RII Resources and Infrastructure Industry Training Package Release 13.0.

Application

This unit describes the skills and knowledge required to conduct conventional core drilling in the Resources and Infrastructure Industry.

It includes planning and preparing for core drilling, operating the core drill and drill fluid system, retrieving and recording core while maintaining sample sequence and quality, responding to problems, and completing equipment maintenance and housekeeping.

This unit is appropriate for those working in operational roles. They work under general supervision, use discretion and judgement within established procedures, and are responsible for the quality of their own work and the integrity of the core they produce.

Licensing/Regulatory Information

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

Pre-requisite unit(s)

No pre-requisite units

Competency field(s)

N/A

Unit sector(s)

N/A

Elements and Performance Criteria

1. Plan and prepare for conventional core drilling	1.1 Access, interpret and apply conventional core drilling documentation, work requirements, site procedures and work instructions, and confirm the work activity is compliant with requirements

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	1.2 Compare approved drilling information with physical work area conditions and report any discrepancies according to workplace procedures 1.3 Identify and address potential risks, hazards and environmental issues and implement control measures according to workplace procedures 1.4 Establish a safe work area with designated rod handling and core sample areas 1.5 Select, inspect and wear personal protective equipment appropriate for work activities 1.6 Communicate and coordinate activities with others throughout the work activity according to work requirements 1.7 Select tools and equipment, including drill rods, bits, reaming shells and core barrel components, to carry out the work activity, check for serviceability and fit, and rectify or report any faults according to workplace procedures 1.8 Obtain and interpret emergency procedures, and be prepared for fire/accident/emergency
2. Operate core drill	2.1 Carry out pre-start and start-up procedures, and identify, select and apply rig operational controls, according to manufacturer specifications and workplace procedures 2.2 Identify and use different drill rod or casing types, thread forms and thread make up parameters according to manufacturer specifications 2.3 Select drill bits and reamer shells to suit ground conditions according to manufacturer specifications 2.4 Adjust inner tube length to ensure required fluid flow around the core according to manufacturer specifications 2.5 Use rod and casing handling equipment, and add, break out and remove drill rods and pipes and down hole equipment, according to manufacturer specifications and workplace procedures 2.6 Apply rotation speed, weight on bit, drilling fluid flow rate and penetration rate to suit ground conditions according to manufacturer specifications 2.7 Measure drill string components and calculate depth of hole according to workplace procedures 2.8 Collar holes, and install casing and seal at the collar, according to manufacturer specifications
3. Operate drill fluid system	3.1 Identify hole conditions requiring the use of drilling fluid additives according to workplace procedures

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	3.2 Select, prepare, apply, test and monitor suitable fluids and additives according to manufacturer specifications 3.3 Monitor fluid return and solids content and implement control measures according to workplace procedures 3.4 Monitor fluid and cuttings specific gravity and up hole velocity to ensure required hole clearing according to workplace procedures 3.5 Monitor pressure in fluid systems and identify causes of pressure change according to workplace procedures 3.6 Select fluid pumping rate to suit hole size according to manufacturer specifications
4. Use survey and core orientation equipment	4.1 Assemble, maintain and use survey and core orientation devices according to manufacturer specifications 4.2 Read and record survey data according to workplace procedures
5. Retrieve and record core	5.1 Secure, remove and position the core barrel for safe dismantling, and extract core without avoidable loss, mixing or contamination 5.2 Place core in trays in correct sequence and install depth blocks and run identifiers according to workplace procedures 5.3 Measure and record run interval, recovered core, core loss or gain and condition, and calculate core recovery percentage according to workplace procedures 5.4 Implement control measures for minimising core loss, and identify core blockages affecting sample quality, according to workplace procedures 5.5 Clean, inspect, reset and reassemble the core barrel according to manufacturer specifications 5.6 Reconnect the core barrel and drill string, re-enter the hole and resume drilling according to workplace procedures
6. Respond to problems	6.1 Identify possible problems in equipment or process according to workplace procedures 6.2 Determine possible causes of problems and action required according to workplace procedures 6.3 Rectify problems within area of responsibility and follow through until final resolution has occurred according to workplace procedures 6.4 Report problems outside area of responsibility to designated person according to workplace procedures

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7. Complete equipment maintenance and housekeeping	7.1 Carry out shutdown and secure equipment according to manufacturer specifications and workplace procedures 7.2 Strip impregnated bits according to manufacturer specifications 7.3 Dismantle and service head assembly according to manufacturer specifications 7.4 Maintain drill string according to manufacturer specifications 7.5 Maintain bit management, record required information and store bits according to workplace procedures 7.6 Confirm housekeeping activities are completed according to workplace procedures 7.7 Process records according to workplace procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit and are described below to support training and assessment.

SKILL	DESCRIPTION
Reading	Interpret thread configuration charts, bit and reamer shell selection guides, and drilling fluid test results, beyond the general work documentation referenced in the performance criteria.
Numeracy	Interpret trends across successive fluid pressure, up-hole velocity and core recovery figures, and calculate core recovery percentage and hole depth from drill string measurement.
Oral communication	Structure a shift handover or fault report so a colleague can act on it without needing to seek clarification.
Problem solving	Distinguish between normal bit wear and an emerging core blockage or fluid-system fault from subtle changes in gauge readings, before the change affects core recovery.
Self-management	Maintain systematic decision-making and safety checks when drilling parameters or core condition change rapidly.

Range of conditions

N/A

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Assessment Requirements for RIINHB307X Conduct conventional core drilling

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:

- The candidate must complete conventional core drilling on at least two occasions, including at least one occasion involving changing ground or operating conditions requiring modification of technique.

In the course of the above, the candidate must:

- locate and apply relevant documentation, policies and procedures, and compare approved drilling information against physical work area conditions
- identify and manage hazards, risks and environmental issues relevant to the drilling context, including selecting, inspecting and wearing personal protective equipment
- select, inspect and prepare tools and equipment, including drill rods, casing, bits, reaming shells and core barrel components, to suit the drilling program and formation
- establish, operate and control conventional core drilling according to manufacturer specifications and workplace procedures, including selecting and maintaining drill string components and monitoring and adjusting drilling parameters to suit ground conditions
- prepare, monitor and use drilling fluids to control hole conditions and cuttings removal
- retrieve, handle and record core, preserving core sequence and quality, and maintaining accurate records
- monitor the drilling operation, identify and respond to problems within scope of own responsibility, and report problems outside this scope to the designated person
- complete shutdown, maintenance, housekeeping and record-keeping requirements on completion of drilling activities
- communicate and coordinate effectively with others throughout the work activity

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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:

- accessing, interpreting and applying the organisation and site requirements and procedures for:
    - emergency response procedures for fire, accident and other emergency situations
    - environmental issues
    - housekeeping
    - operating drill rig
    - work, health and safety
- drill string and component integrity
    - make-up torque requirements for the thread form in use, and the consequences of incorrect matching or torque, or inaccurate component measurement, for drill string failure or fit wear parameters for drill rods, casing and threads, and the effect of exceeding wear limits on drill string integrity and performance
- the reasons hole collaring, casing and collar sealing maintain hole integrity, and the consequences of inadequate collaring for hole stability and sample contamination
- bit selection and performance:
    - how formation hardness and abrasiveness determine bit and matrix selection, and the consequences of an unsuited bit for cutting performance and core recovery
    - the relationship between penetration rate and bit life, and the reasons impregnated bits are stripped rather than dressed conventionally
- core recovery and quality:
    - how contamination, core loss and blockages occur in core drilling, and their effect on core recovery, sample quality and the validity of geological logging and assay results
    - the effect of inner tube length and fluid flow around the core on core recovery and quality
    - the reasons accurate sequencing of depth blocks and run identifiers, and correct core barrel cleaning, inspection and reassembly, are critical to the integrity of the geological record and subsequent recovery
- the functions of drilling fluids in core drilling, including:
    - cooling and lubricating the bit,
    - transporting cuttings,
    - stabilising the hole
    - controlling formation fluids

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- the reasons drilling fluid properties, including viscosity, specific gravity and system pressure, are tested and monitored, and what a change in each indicates about hole conditions
- the relationship between hole diameter, rod diameter, pump output and cuttings specific gravity in determining up hole velocity and hole clearance
- the purpose of drill hole surveys and core orientation, common causes of hole deviation, and the consequences of deviation for hole objectives, drill string integrity and structural interpretation
- common formation types encountered in core drilling and their effect on penetration rate, core recovery, bit wear and hole stability
- indicators of changing ground conditions observable at the surface (penetration rate, fluid return, fluid pressure, rotation torque, vibration, core condition), and the effect of ground water and fluid loss zones on hole stability and core recovery

Assessment Conditions

The assessment must:

- include access to:
    - personal protective equipment
    - equipment required to conduct conventional core drilling
    - workplace documentation such as, drill plans, site plans and procedures, manufacturer instructions and safety data sheets
- 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.

*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,

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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.

Mandatory Workplace Requirements

Assessment of performance evidence may be in a workplace setting or an environment that accurately represents a real workplace.

Unit Mapping Information

Previous Code and Title	Equivalence	Comments
RIINHB307D Conduct conventional core drilling	Equivalent	Updates to application, elements and performance criteria, performance and knowledge evidence, and assessment conditions

Links

Companion volumes, including implementation guides, are found on the national training register - https://training.gov.au/training/details/RII.

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