NSQF QUALIFICATION FILE
Approved in 22nd NSQC Meeting, 19th December 2018

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Name and address of submitting body:

Infrastructure Equipment Skill Council

No 6, Avik Royale, 50 Feet Main Road,

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Name and contact details of individual dealing with the submission

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List of documents submitted in support of the Qualifications File

1. Qualification Pack
2. Model Curriculum
3. Functional Analysis
4. Occupational Map
5. Approval from the Line Ministry
6. Industry Validations
7. NSQC Summary Sheet
8. NSQC Presentation

- **SUMMARY**

1	**Qualification Title**	Borewell Drilling Machine Operator
2	**Qualification Code, if any**	IES/Q0124
3	**NCO code and occupation**	NCO-2015/ 8113.0800 Well Driller, Machine (Other than Petroleum and Gas)
4	**Nature and purpose of the qualification (Please specify whether qualification is short term or long term)**	**Nature of Qualification** - Qualification Pack **Purpose of Qualification** - To enable candidate to become a Borewell Drilling Machine Operator
5	**Body/bodies which will award the qualification**	Infrastructure Equipment Skill Council
6	**Body which will accredit providers to offer courses leading to the qualification**	Infrastructure Equipment Skill Council
7	**Whether accreditation/affiliation norms are already in place or not , if applicable (if yes, attach a copy)**	Yes, Copy Attached
8	**Occupation(s) to which the qualification gives access**	Equipment operations- Borewell Drilling Machine Operator
9	**Job description of the occupation**	A bore well drilling machine operator is responsible for setting up and operating portable drilling rig to drill wells, starting and controlling the drilling actions by lowering of well casing into the well bore
10	**Licensing requirements**	N/A
11	**Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)**	N/A
12	**Level of the qualification in the NSQF**	4
13	**Anticipated volume of training/learning required to complete the qualification**	120 hours
14	**Indicative list of training tools required to deliver this qualification**	• Operational Borewell • Other items as listed in the model curriculum
15	**Entry requirements and/or recommendations and minimum age**	Class VIII
16	**Progression from the qualification (Please show**	Senior Borewell Drilling Machine Operator

	Professional and academic progression)			
17	**Arrangements for the Recognition of Prior learning (RPL)**	Presently the industry has a large work force of operators and mechanics who are trained and experienced but not certified as per the NSQF norms. It is proposed to certify them under the RPL (Recognition of Prior Learning) program which will go a long way in facilitating their career progression		
18	**International comparability where known (research evidence to be provided)**	**UK NOS COGODR12- Support Drilling Operations** The standard is about variety of drilling operations including the preparation of the drill floor, make up and delivery of stands and the running of the shale shakers **UK NOS COGODR16- Control the drilling process** The standard is about directing the operation of drilling equipment and maintaining drilling parameters		
19	**Date of planned review of the qualification.**	26/12/20		
20	**Formal structure of the qualification** **Mandatory components**			
	Title of component and identification code/NOSs/Learning outcomes		**Estimated size (learning hours)**	**Level**
(i)	IES/N0170 Carry out Pre-operation checks on bore well drilling equipment		24	4
(ii)	IES/N0171 Carry out bore well drilling operation		54	4
(iii)	IES/N0172 Carry out maintenance and troubleshooting of the bore well drilling equipment		24	4
(iv)	IES/N7601 Comply with worksite health and safety guidelines		18	4
	Sub Total (A)		**120**	
	Optional components			
	Title of component and identification code/NOSs/		**Estimated size (learning hours)**	**Level**

	Learning outcomes		
	Sub Total (B)		

Total (A+B)	**120**	

SECTION 1
ASSESSMENT

21	**Body/Bodies which will carry out assessment:** Confederation of Indian Industries (CII))
22	**How will RPL assessment be managed and who will carry it out?** RPL program is designed to assess and certify those personnel with the requisite qualifications and experience. In the first step, individuals are screened and assessed, both through theory and practical tests, based on the same Assessment Criteria of the approved Qualification Pack. The skill gaps are thus identified and individuals undergo 'bridge training' as applicable. Then at the end of the short course they are finally assessed and certified.
23	**Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.** The emphasis is on 'learning-by-doing' and practical demonstration of skills and knowledge based on the performance criteria. The assessment papers are developed by Subject Matter Experts (SME) available with the Assessment Agency as per the performance and assessment criteria mentioned in the Qualification Pack. The assessments papers are also checked for the various outcome based parameters such as quality, time taken, precision, tools & equipment requirement etc. The assessment sets are then reviewed by IESC official for consistency. The assessments are designed so as to assess maximum parts during the practical hands on work. The technical limitations at the training centres are taken care in theory and viva to assess the conceptual understanding, Criteria such as use of lift to pick heavy objects or selection of fire extinguisher during a fire are also assessed under theory/viva. The assessment agencies are instructed to hire assessors with integrity, reliability and fairness. Each assessor shall sign a document with its assessment agency by which they commit themselves to comply with the rules of confidentiality and conflict of interest, independence from commercial and other interests that would compromise impartiality of the assessments. The assessment agencies are instructed to ideally have assessor with minimum 15 years industry experience as an ITI graduate / minimum 10 years' industry experience as diploma engineer and minimum 5 years' industry experience as graduate engineer. The assessors selected by Assessment Agencies are scrutinized and made to undergo training and introduction to IESC Assessment Framework, competency based assessments, assessors guide etc. The assessors are provided with assessors guide developed by the Subject Matter Expert of the assessment agency as per the assessment framework. The assessment guides are developed to ensure the maximum possible

	consistency in the assessment by different assessors and elaborate on the following Qualification Pack Structure Guidance for the assessor to conduct theory, practical and viva assessments Guidance for trainees to be given by assessor before the start of the assessments. Guidance on assessments process, practical brief with steps of operations practical observation checklist and mark sheet Viva guidance for uniformity and consistency across the batch. The assessment by assessment agency will be completely based on the assessment criteria as mentioned in the Qualification Pack. Each NOS in the Qualification Pack (QP) will be assigned a relative weightage for assessment based on the criticality of the NOS- unique (functional)/ common NOS for job roles at the same levels. Therein each Performance Criteria in the NOS will be assigned marks for or practical based on relative importance, criticality of function and training infrastructure. The following tools are proposed to be used for final assessment: Each NOS in the QP will be assigned a relative weightage for assessment based on the functional importance of each. Further each Performance Criteria in the NOS will be assigned marks based on relative functional importance; which is in turn divided into theory and practical assessment. Overall practical constitutes 70% and written 30% of total marks. Viva/Structured Interview: This tool will be used to assess select conceptual understandings related to practical handling of equipment and procedures with specific tasks at hand; and behavioural aspects of the job role. It will also include questions on tools & equipment; safety and environment Written Test: This tool will be used to assess general conceptual knowledge / understanding and other aspects of the job role which are either not feasible or difficult to assess practically. The written assessment will comprise of True / False Statements Multiple Choice Questions Matching Type Questions. Optical Mark Recognition (OMR)/ Online System for this will be preferred.

Please attach most relevant and recent documents giving further information about assessment and/or RPL.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

ASSESSMENT EVIDENCE

Complete a grid for each component as listed in "Formal structure of the the qualification" in the Summary.

NOTE: this grid can be replaced by any part of the qualification documentation which shows the same information – ie Learning Outcomes to be assessed, assessment criteria and the means of assessment.

24. Assessment evidences

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role Bore Well Drilling Machine Operator

Qualification Pack Code IES/Q0124

Sector Skill Council IESC

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criterion
6. To pass the Qualification Pack , trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack

Compulsory NOS **Total Marks: 100**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
1. IES/N0149 Carry out Pre-operation checks on bore well drilling equipment	PC1. check for tires-damages, wheels-loose lug bolts, bent rims, cracks and bulges and replace if required as per the set procedures	**30**	2	1	1
	PC2. check for leveling of the machine as per the slope on the ground		2.5	0.5	2
	PC3. inspect if levers and control cables are in proper working conditions		3	1	2
	PC4. check if all mounting bolts are		2.5	0.5	2

	tightened				
	PC5. check the mast for proper greasing, cracks, bolts and breaks in chain		2.5	0.5	2
	PC6. check fluid levels of engine crank case, radiator coolant and battery electrolyte levels fill up if needed		2	1	1
	PC7. check rear axle- Steer cylinders for damage, leaks, secure pivot pins, damaged hydraulic hoses etc.		3	1	2
	PC8. check if gauges, switches, joysticks, foot controls and horn are in operational condition		3	1	2
	PC9. inspect the condition of hose/pipes/clamps for normal functioning		2.5	0.5	2
	PC10. check for the availability of casing pipes and drill bits to start the process		1.5	0.5	1
	PC11. check for service brake and parking brake operation		1.5	0.5	1
	PC12. maintain a pre-operational check logbook to record all activities performed before starting the drilling operation		2	1	1
	PC13. report the defects precisely to the supervisor if beyond scope of role		2	1	1
	Total		**30**	**10**	**20**
2. IES/N0150 Carry out bore well drilling operation	PC1. inspect the site visually for any source of obstruction or for any personnel in the circumference/ check for near high raise natural or man-made structure / high voltage lines/wind pattern	**35**	2	1	1
	PC2. park the vehicle at the drilling point and pull the lever to extend the stabilizer legs to stabilize the vehicle		1	0	1
	PC3. start the engine and check the controls of operating panel for normal functioning		1	0	1
	PC4. choose the appropriate casing pipe as per the requirement		1	0	1

	PC5. attach the pipe to the gripper casing pipe and connect it to the rotate motor attached to the rig mast		1.5	0	1.5
	PC6. drill the casing pipe into the ground until it reaches the surface of the hard rock and leave the pipe inside the ground		2	1	1
	PC7. choose the appropriate drill rods and connect them to the rotator motor		2	1	1
	PC8. connect the appropriate drill bit to the hammer that is attached to the drill rod		2	1	1
	PC9. start the drilling of drill rods inside the casing pipe		1.5	0	1.5
	PC10. monitor air & hydraulic pressure gauge, engine & compressor temperature gauge		2	0.5	1.5
	PC11. monitor RPM, air discharge temperature and pressure, engine water temperature and pressure and sump pressure displayed in the compressor unit		2.5	1	1.5
	PC12. monitor hydraulic oil filter clog indicator, air filter element and compressor air filter elements		2.5	1	1.5
	PC13. provide the appropriate inputs to the machine through controls for connecting the drill rods safely to the next drill rod until the required output is achieved		2	1	1
	PC14. coordinate with junior operators at regular intervals while operating the machine for better performance		2	1	1
	PC15. change the drill bits if the drilling process slows down by monitoring the rotations per minute (RPM) levels		2	1	1
	PC16. ensure that the drill rod is removed from the ground		1.5	0.5	1
	PC17. stop the rotator motor		0.5	0	0.5
	PC18. detach the drill bits from the rotator motor		1	0	1

	PC19. take mast and stabilizer legs to the home position		1	0.5	0.5
	PC20. turn off the engine and remove the ignition key		1	0	1
	PC21. maintain a logbook to record all activities performed		1.5	0.5	1
	PC22. report the defects precisely to the supervisor if beyond scope of the role		1.5	1	0.5
	Total		**35**	**12**	**23**
3. IES/N0151 Carry out maintenance and troubleshooting of the bore well drilling equipment	PC1. determine the service requirement for the equipment as per the scheduled maintenance	**20**	1.5	0.5	1
	PC2. replenish coolants, lubricants and fluids as per the running of the machine or as per the operational manual		1.5	0.5	1
	PC3. service lubrications system, electrical service system, and stabilizing system of the bore well drilling machine		1.5	0.5	1
	PC4. service mast as per the usage of the equipment		1.5	0.5	1
	PC5. check battery levels and condition of the terminals and carry out minor adjustments if required		1.5	0.5	1
	PC6. ensure all the tools are kept in the designated place after usage as per the organizational guidelines		1.5	0.5	1
	PC7. ensure the main power is turned off from panel completely before carrying out maintenance work		1.5	0.5	1
	PC8. ensure that appropriate tools are used while troubleshooting		1.5	0.5	1
	PC9. diagnose the problem and identify appropriate repair procedures		1.5	0.5	1
	PC10. report defects precisely to the supervisor if beyond scope of his role		1.5	0.5	1
	PC11. dispose waste as per the guidelines of the site/ organization		2	0.5	1.5

	PC12. complete all documentation as per the prescribed standards in a timely manner		1	0.5	0.5
	PC13. report defects precisely to the supervisor if beyond scope of role		2	1	1
	Total		**20**	**7**	**13**
4. IES/N7601 Comply with worksite health and safety guidelines	PC1. comply with safety, health, security and environment related regulations/ guidelines at the work site	**15**	1.5	0.5	1
	PC2. use Personal Protective Equipment (PPE) and other safety gear as applicable to the equipment and the worksite		2.5	0.5	2
	PC3. follow safety measures during operations to ensure that the health and safety of self or others (including members of the public) is not at risk		2	1	1
	PC4. carry out operations as per the manufacturer's and worksite related health and safety guidelines		1.5	0.5	1
	PC5. handle the transport, storage and disposal of hazardous materials and waste in compliance with worksite health, safety and environmental guidelines		1.5	0.5	1
	PC6. operate various grades of fire extinguishers, as applicable		1.5	0.5	1
	PC7. Support in administering basic first aid and report to concerned team members, as required, in case of an accident		1.5	0.5	1
	PC8. respond promptly and appropriately to an accident/ incident or emergency situation, within limits of role and responsibility		1.5	0.5	1
	PC9. record and report details related to operations, incidents or accidents, as applicable		1.5	0.5	1
	Total		**15**	**5**	**10**
Grand Total			**100**	**34**	**66**

SECTION 2
25. EVIDENCE OF LEVEL

Title/Name of qualification/component: Borewell Drilling Machine Operator			**Level: 4**
NSQF Domain	**Key requirements of the job role**	**How the job role relates to the NSQF level descriptors**	**NSQF Level**
Process	Borewell Drilling Operator is expected to conduct pre-operation checks on Borewell drilling equipment, select the appropriate attachment for the job, run the equipment as per the job and do basic maintenance	The activities identified are the ***familiar and routine activities*** for him as these activities are independent of job and worksite he is deployed on. For e.g.: conducting pre-operational checks before starting the equipment, checks on mounting bolts, conditions of hose pipes, etc. Considering the outcomes the job roles is pegged at level 04	4
Professional knowledge	Operator is expected to have ***knowledge of the functioning and operation*** of the Borewell Drilling equipment. ***Feature/specifications*** of the various attachment used and ***knowledge of drilling components, pre-operation checklist and routine maintenance***	Considering the in-depth **professional and factual knowledge**, which a Borewell Drilling Operator has for drilling operation and maintenance such as basics of engine and motors, types of raw materials, method of lubricating, compressor maintenance etc. this QP is pegged at Level 4.	4
Professional skill	Borewell Drilling Operator ***identifies the appropriate attachment*** for various job like choosing the appropriate case pipe, drill rods, attaching the pipes. He ***checks the borewell drilling equipment for operation readiness*** using pre-operation checklist and ***conducts***	He is ***practically engaged*** in the borewell drilling operation and maintenance. The major skills required of the borewell drilling operator are selection of appropriate case pipes and rods, comprehension of sign symbols, communication, etc. Therefore the QP is set at level 4	4

Title/Name of qualification/component: Borewell Drilling Machine Operator			Level: 4
NSQF Domain	**Key requirements of the job role**	**How the job role relates to the NSQF level descriptors**	**NSQF Level**
	the routine maintenance covering lubrication, oil levels, coolant, air filters, motors, tyre, body structure and keep the records as per the operations manual & standard operating procedures.		
Core skill	Operator is expected to be read and understand the various instrument panel, fluid levels and other indicators for pre-operation checks and routine maintenance. He has to monitor pressure gauge, engine and compressor temperature. All of this requires ***application of basic arithmetic principles.***	Operator has to continuously give and receive instruction and guidance from co-workers on-site for starting the drilling equipment hence they are expected to be good in ***communication skills***. Jobholder is expected to conduct themselves in ways, which show a basic understanding of the ***social and professional environment of working at construction, mining or other sites***	4
Responsibility	The jobholder is responsible to: • Conduct pre-operation checks • Carry out borewell drilling operations • Conduct routine maintenance • Comply with worksite health and safety For each work site there can be variations in usage and operation of the borewell drilling equipment. So the jobholder based on his ***own***	Jobholder is majorly responsible for his own job and self-learning process which justifies the pegging of the QP at level 4 and not directly responsible for learning and work of others (which is a requirement for Level 5). In his routine activity he is free from supervision (which is a requirement of level 3).	4

Title/Name of qualification/component: Borewell Drilling Machine Operator			Level: 4
NSQF Domain	**Key requirements of the job role**	**How the job role relates to the NSQF level descriptors**	**NSQF Level**
	learning and experience, identify appropriate attachment and operation process to maximize the productivity efficiently. He is continuously engaged in the ***self-learning process*** and he has the ***responsibility for own*** work.		

SECTION 3
EVIDENCE OF NEED

26 **What evidence is there that the qualification is needed? What is the estimated uptake of this qualification and what is the basis of this estimate?**

The job roles have been formulated based on 'occupational mapping and functional analysis' involving manufacturers and customers/ end users of the infrastructure equipment sector products. Further these have been validated by all segments of the industry i.e. small, medium and large customers. The methodology / questionnaire and certificates in support for all have been enclosed.

The Occupational Analysis Report in support of these job roles has taken into account the industry growth and expected demand over the coming years. These statistics and other details have been covered in depth under the relevant sections of the same.

Validations have been received from 32 stakeholders including end- user companies, associations and dealers of the equipment.

Basis	In case of SSC	In case of other Awarding Bodies (Institutes under Central Ministries and states departments)
Need of the qualification	The SSC would undertake market study and would enclosed demand forecast for the proposed job role both on short-term and long-term basis to substantiate the requirement of the Qualification proposed. The SSC can produce the data from primary or authorized secondary sources as well.	The Submitting Body would produce any reputable and reliable research reports, such as labour market information reports; occupational mapping or similar research carried out by Ministry/State/Any other authentic source forecasting the demand for the proposed qualification
Industry Relevance	The SSC would undertake validation of the job roles with actual end-user industry where such employment are	The Submitting Body would submit the list of industry participation while preparation of the curriculum/ course

		going to be generated and absorbed instead of generic validation of industry. The SSC would submit the endorsements from users/intended users of the qualification clearly supporting or otherwise the need for trained people against specific job role.(*The industry validation format to be used*)	content of the qualifications. These could include minutes of the meeting/ reports of these consultations
	Usage of the qualification	The SSC would submit details of the employment generated (wherever applicable) and realised by virtue of training in the Qualifications of the sector earlier submitted for NSQF alignment. In case of unorganized sector, case studies or evidences may be given	The submitting body would submit the details of trained and placed data in the proposed qualification (if an existing qualification is being proposed for NSQF alignment) Information about the success of the qualification should be given (eg. uptake figures, examples of use in recruitment and placement rates (if known) should be given. However, many of the bodies that do not have placement tracking mechanism established in place would provide necessary endorsements by the state/ ministry stating that a tracking mechanism would be institutionalized and placement records shall be provided annually or later ,

			depending on length of qualification.
	Estimated uptake	The SSC would submit the estimated uptake of the qualification and What steps were carried out to test the likely uptake of the qualification? The basis of this estimate should include data about the number of jobs or places in courses of learning which will be available to people who are awarded the qualification.	The Submitting Body should submit the estimated uptake by reflecting the number of the takers for this qualification for at least two years from submission of the qualification
27	**Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences** Letter Attached		
28	**What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Give justification for presenting a duplicate qualification** • NSDC list of Approved and Under-Development QPs was checked prior to commissioning the work • Consultations with Skill Councils for Construction and Mining Sector • NSDC QRC team also confirmed the same		
29	**What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated? Specify the review process here** • Employer feedback will be sought post-placement • A formal review is scheduled in three years time		

Please attach most relevant and recent documents giving further information about any of the topics above.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

SECTION 4
EVIDENCE OF PROGRESSION

30	**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?** ***Show the career map here to reflect the clear progression*** While designing the national occupational standards, occupational mapping was done on a large sample size and validated across the country. The career progression for roles in each occupation was also analysed and decided, based on industry validation across the country. The current challenges faced by the industry, at large, was also kept in mind. **Borewell Drilling Machine Operator (Level 4) > Senior Borewell Drilling Machine Operator (Level 5) > Master Operator/Trainer Operator (Level 6) > Supervisor (Level 7)** **Level= NSQF level*

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Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.