भारत हेवी इलेक्ट्रिकल्स लिमिटेड
(भारत सरकार का उपक्रम)
BHARAT HEAVY ELECTRICALS LIMITED
(A Govt. of India Undertaking)

**TCN - 03**

Ref: PSER:SCT:RKL-M1779:TCN-03 Date: 04-11-2016

| | | |
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| Sub | TCN-03 | |
| Job | DESIGN, ENGINEERING, MANUFACTURING, SUPPLY, ERECTION & COMMISSIONING OF INDUCED DRAFT COOLING TOWER (IDCT) FOR 1X250 MW NSPCL, PP-II EXPANSION, ROURKELA, ODISHA. | |
| Ref | 1.0 | Tender no PSER:SCT: RKL-M1779:16 |
| | 2.0 | BHEL's NIT, vide reference no PSER:SCT:RKL-M1779:5264, Dated 17-10-2016. |
| | 3.0 | BHEL's TCN-01, vide reference PSER:SCT:RKL-M1779:TCN-01, dated 26-10-2016. |
| | 4.0 | BHEL's TCN-02, vide reference PSER:SCT:RKL-M1779:TCN-02, dated 28-10-2016. |
| | 5.0 | All other pertinent issues till date. |

With reference to above, following points/ documents, relevant to tender, may please be noted and complied with while submitting offer.

1.0 Introduction of Technical specification, RKL-IDCT-VOLUME-II-TS-6-R-00.

2.0 The clarifications to bidders queries are attached at Annexure-A.

3.0 Extension of due date of submission of offer from 07-11-2016 to **10-11-2016** (15:00 hrs).

4.0 Revised `No deviation certificate' as per enclosed Annexure-2. Bidder shall submit no deviation certificate as per enclosed format only.

5.0 All other terms & conditions shall remain unchanged.

Thanking you,

Yours faithfully,
for BHARAT HYEAVY ELECTRICALS LTD

SR ENGR (SCT)

Encl : As above.

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय)
POWER SECTOR EASTERN REGION, DJ-9/1, SECTOR-II, SALT LAKE CITY, KOLKATA - 700 091
फैक्स/Fax : (033) 23211960 फोन/Phone : बोर्ड/EPABX : 23211691, 23211798, 23211796

| ANNEXURE-A to TCN- 03 | | | | | |
|---|---|---|---|---|---|
| DESIGN, ENGINEERING, MANUFACTURING, SUPPLY, ERECTION & COMMISSIONING OF INDUCED DRAFT COOLING TOWER (IDCT) FOR 1X250 MW NSPCL, PP-II EXPANSION, ROURKELA, ODISHA. | | | | | |
| Tender no PSER:SCT: RKL-M1779:16 | | | | | |
| S.No. | Ref. clause of Tender Document | | SUBJECT | BIDDER'S QUERY | BHEL'S CLARIFICATION |
| | Section | Cl.no | | | |
| 1 | NIT | | | Reverse auction process is not acceptable to us. | As per tender. |
| 2 | ITB | 1.0 | Submission of Tender | As specified in the NIT clause 1 sr. no. v, we understand this is an e-tender and submission of offer will have to be made online only. Please confirm.<br><br>However, please clarify whether hard copy of the same needs to be also submitted offline as mentioned in the ITB.<br><br>Please clarify the submission process of original documents, if any. | As stipulated in tender, bidder to respond by submitting their offer online in our e-Procurement platform at https://bheleps.buyjunction.in only.<br>Hard copy bid or bids through email/ fax shall not be accepted. |
| 3 | VOL - IA, GCC | Clause 7.0 | Statutory Variations | Any statutory variations or introduction of fresh levies / new tax both within or beyond contracttual period will be to Purchaser's account. Kindly confirm. | As per tender. |
| 4 | VOL - IA, GCC | Clause # 31.0 | Force majeure | The term “force majeure” as defined in this clause is not acceptable to us. The term “force majeure” must be used in its widest sense and must embody all unforeseen circumstances which are beyond our reasonable control. | As per tender. |
| 5 | GCC | Clause # 34.3 | Arbitration | This should be by joint arbitration method only. | As per tender. |

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| | Section | Cl.no | | | |
| 6 | VOL - IC, SCC (Supply) | Clause 29.2.3 | Form - C for claiming concessional sales tax…. | We understand C-Form will be issued by Purchaser for claiming concessional sales tax. Also confirm that road permit will be furnished by Purchaser to enable us charge concessional rate of CST. | BHEL will arrange to provide/ issue Way Bill for bringing the materials outside Odisha state. |
| 7 | VOL - IC, SCC (Supply) | Clause # 39 | Guarantee period & latent Defect | The cooling tower components will be guaranteed against defects in materials, workmanship and deficiency in performance for a period of 12 months from the date of commissioning of cooling tower or 18 months from the date of receipt of last major consignment at site, whichever is earlier.<br>As a company policy, we do not accept latent defect liability clause. Please delete this stipulation. | As per tender. |
| 8 | VOL - ID, SCC (Service) | Clause 37.2 | Deduction of Orissa VAT | Since all civil construction work is excluded from our scope, this clause is not applicable for this tender. Please confirm. | As per tender. |
| 9 | VOL - ID, SCC (Service) | Clause 37.11 | Service Tax | We presume that service tax applicable on Design & Engineering, Transportation and Checking of Civil Work will be reimbursed by Purchaser at actuals. Kindly confirm. | As per tender. |

| S.No. | Ref. clause of Tender Document | | SUBJECT | BIDDER'S QUERY | BHEL'S CLARIFICATION |
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| | Section | Cl.no | | | |
| 10 | Vol IC & ID | Clause 5.4 of Common Special Conditions of Contract (Supply & Service) | The evaluation rates for reinforcement steel and concrete shall be as given below:<br>a. Concrete: Rs. 6,560/- per cum<br>b. Reinforcement Steel (supply & erection): Rs.44,730/- per MT | We understand that the guaranteed quantities of concrete (RCC, grade M30) and reinforcement steel should include only cooling tower superstructure and CW basin and CW outlet channel upto specified terminal point. Civil quantities for pipe encasement, roads, drains, pavements, etc and all miscellaneous PCC requirement (applicable within our scope limits) are not to be included in the same. Please confirm. | Guaranted quantities of concrete and reinforcement does not include the pipe encasement, and roads. However, all other concrete and reinforcement works (within the scope of bidder) are included in the guranteed quantities of concrete and reinforcement. |
| 11 | Vol ID; SCC (Service) | Clause 29.1 | … scope of work shall be completed within 14 (Fourteen) months from the date of LOI. | In order to meet the specified completion period, competed RCC cooling tower superstructure and cold water basin should be hander over to the contractor within 8 months of date of receipt of clear LOI. | As per tender. |
| 12 | Price Schedule; Rev - 00 | | Editable Copy | Please furnish editable soft copy of the price schedule for convenience. | Soft Copy (excle file) of Price Schedule is available at https://bheleps.buyjunction.in |
| 13 | Price Schedule; Rev - 00 | Preamble | Item Rate | Since this is a Lumpsum package contract we are ignoring all such stipulations referring to an Item rate contract. Please confirm. | Noted |
| 14 | Price Schedule; Rev - 00 | Schedule - I; Sr. no. 2 | Total loading value for concrete & reinforcement steel.<br>(@ Rs 6,560 per MT for concrete & @ Rs 44,730 per MT for reinforcement steel). | As specified in the referred clause and Clause no. 22.7.1.1 of SCC (service), price loading rate of concrete has been wrongly mentioned in weight basis (per MT basis), however, elsewhere in the tender documents the same rate has been correctly specified in volume basis (per Cu. M). Please issue corrected documents. | Total loading value for concrete & reinforcement steel.<br>(@ Rs 6,560 per CuM for concrete & @ Rs 44,730 per MT for reinforcement steel). |

| S.No. | Ref. clause of Tender Document | | SUBJECT | BIDDER'S QUERY | BHEL'S CLARIFICATION |
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| | Section | Cl.no | | | |
| 15 | Technical Specifications of Cooling Towers | Sub-section - IA; Clause 1.0; Exclusion from Bidder's scope | Civil Works | We understand that all civil construction work for cooling tower and other associated works like site preparation, leveling, excavations, construction of roads, drains etc. including supply of construction materials for the same are excluded from bidder's scope. Please confirm. | Civil construction work for cooling tower and other associated works like site preparation, leveling, excavations, construction of roads, drains including supply of construction material & form work excluded from scope of bidder. However, supply of formwork as per clause no 1.00.00 of PE-TS-427-165-N001 Section-I of Subsection-IA are in bidder scope. |
| 16 | Technical Specifications of Cooling Towers | Sub-section - IA; Clause 4.03.00 | Thermal design criteria for Counter Flow Cooling Tower | i) There is no guideline specified in Kelly's handbook to determine recovery in Fan stack. Same will be calculated as per bidder's own calculations. Please confirm.<br><br>ii) Fulkerson's paper includes fill characteristics for Film type fill only. Hence, L/G of splash/trickle/turbo splash/modular fill can not be determined from Fulkerson's paper. Hence, please confirm that for fill characteristics, bidder can use fill manufacturer's curves for calculating design L/G and for obtaining fill pressure drop figure. Pressure drop through inlet, drift eliminators & plenum can be determined from the Fulkerson's paper. Please confirm. | Technical specification is clear. Bidder to follow technical specification requirement. |
| 17 | Technical Specifications of Cooling Towers | Sub-section - IA; Clause 4.03.00 | Colour of fill | Modular splash / trickle grid fills are available in black colour only. Hence, please delete the stipulation "Dark/Black colored fills are not acceptable" from this clause. | Technical specification is clear. Bidder to follow technical specification requirement. |

| S.No. | Ref. clause of Tender Document | | SUBJECT | BIDDER'S QUERY | BHEL'S CLARIFICATION |
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| | Section | Cl.no | | | |
| 18 | Technical Specifications of Cooling Towers | Sub-section - IA; Clause 7.00.00 | PERFORMANCE TESTING AT SITE | We understand that the PG test of the cooling tower can be carried by bidder's own testing team. Please confirm. | Technical specification is clear. Bidder to follow technical specification requirement. |
| 19 | Annexure - A to Technical Specifications of Cooling Towers | Clause 9.2; a; ii<br><br>and Cl. No. 7.12 of Datasheet - A | Hot water distribution pipe : FRP or A.C pressure pipes conforming to IS: 1592 for counterflow tower or RCC/ Precast open trough for cross flow | Main internal hot water distribution header in case of Couter flow design is of RCC construction while branch arms / laterals will be of PVC. FRP internal distribution headers are not applicable in our design for RCC structured Cooling towers. | Noted |
| 20 | Datasheet - A | Clause 7.9 | Handrail : coat of zinc chromatic primer and two coats of synthetic enamel paint. | Handrail will be of GI construction, hence, painting is not applicable. | Noted |
| 21 | Datasheet - A | Clause 9.13 | All testing instruments by supplier : Yes | Testing instruments required for performance testing of the cooling tower will be supplied on loan basis and will remain contractor's property. Same will taken back after completion of performance testing. | Bidder to supply all testing instruments as per technical specification (cl. no. J, page 23 of 425). |
| 22 | Datasheet - A | Clause 11 & Clause 6.5 | As per terminal point drawing enclosed (Refer Annexure-1). CW return piping in BHEL scope (2300 NB) shall be terminated buried below ground. Further buried piping and its division into risers with isolating B.F. Valves shall be in bidder's scope. | We understand that isolation BFV valves at each division of HW are not applicabe in case of a cross flow cooling tower and also in case of an in-line counter flow cooling tower. Moreover, butterfly valves on hot water distribution risers for each cell are not applicable for a cross flow cooling tower. In case of cross flow cooling tower, we will provide butterfly type flow control valves (2 nos. per cell) at fan deck level. Please confirm. | Technical specification is clear. Bidder to follow technical specification requirement. |

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| | Section | Cl.no | | | |
| 23 | Section - I; Sub-section - IA | Datasheet-A; Clause 8.2 | Buried pipe shall be concrete encased. The concrete encasement shall be of minimum 500mm thick with square shape outside. M20 ….. | Since all civil works are excluded from bidder's scope, we understand that excavation, encasing and backfilling for underground header will be done by others. Moreover concrete requirement for encasing work is not included in the guaranteed concrete quantity. Please confirm. | Excavation, encasing and backfilling for underground header & pipe encasing is excluded from bidder scope. |
| 24 | Section - I; Sub-section - IA | Clause 10 of Datasheet-A | Mandatory Spares : NA | We presume there is no mandatory spares to be considered / included in our scope. Please confirm. | Noted |
| 25 | Section - I; Sub-section - IA | Clause 9.00.00 | Performance Guarantee and liquidated damage | The rates for L/D mentioned in this clause are highly disproportionate to the size and price of the cooling tower on offer.<br><br>We can accept L/D @ 1% of the contract value (excluding taxes, duties and freight) per 1% shortfall in capacity as established by the performance test, co-related to design temperature and guaranteed fan power consumption and subject to maximum 10% of the contract value (excluding taxes, duties and freight).<br><br>L/D for fan power is irrelevant as the performance will be co-related to guaranteed power. | Technical specification is clear. Bidder to follow technical specification requirement. |

| S.No. | Ref. clause of Tender Document | | SUBJECT | BIDDER'S QUERY | BHEL'S CLARIFICATION |
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| | Section | Cl.no | | | |
| 26 | | Geotechnical Investigation Report and Civil Specifications | Documents not available | Please furnish the following minimum data to enable us estimate the guaranteed civil quantities correctly.<br>(a) Detailed geotechnical investigation report for the cooling tower location<br>(b) Safe soil bearing capacity with founding level<br>(c) Bore log data in the cooling tower area<br>(d) Detailed civil specifications<br>(e) Civil design codes to be followed | For point no. a),b) & c) refer doc. GEO-TECHNICAL INVESTIGATION & FOUNDATION SYSTEM and for point d) refer doc. PE-TS-427-999-C002. Point no (e ) for civil design codes refer doc. PE-TS-427-999-C002 SECTION-C SUB SECTION-C1 clause 2 |
| 27 | SPECIFIC TECHNICAL REQUIREMENTS (C&I) INDUCED DRAFT COOLING TOWER section C | Page no 5 of 122 Clause no 1.8 | All instruments shall be terminated on JB/LCP in field and both instrument and JB/LCP are in bidder scope | As field mounted weatherproof FRP IP 65 Junction boxes shall be provided , no separate Local Control Panel will be required. Please confirm. | Specification requirement is clear. Bidder to follow specification requirement. |
| 28 | SPECIFIC TECHNICAL REQUIREMENTS (C&I) INDUCED DRAFT COOLING TOWER | Section C page no 5 of 122 Clause no 1.10 | Bidder to provide mandatory spares as per mandatory spares list | No such list is available in the enquiry document. We understand that there is no Mandatory spares envisaged for this tender. Please confirm. | Specification requirement is clear. Bidder to follow specification requirement. C&I Mandatory spares are not envisaged. |
| 29 | SPECIFIC TECHNICAL REQUIREMENTS (C&I) INDUCED DRAFT COOLING TOWER | Section C Clause no 1.22 | Redundancy of sensors shall be provided by bidder<br>(i) Triple redundancy for all analog and binary inputs required for protection of system/drives.<br>(ii) For all other control functions dual redundancy of the sensors shall be provided by the bidder | Our understanding is that for tripping purpose (Vibration switch & Low Oil Level Switches), 3 nos of field instruments shall be considered for each point of measurement. Out of these 3 instruments 2 nos of field instruments shall be considered for each point of measurement for indication purpose. Please confirm. | Specification requirement is clear. Bidder to follow specification requirement. |

| S.No. | Ref. clause of Tender Document | | SUBJECT | BIDDER'S QUERY | BHEL'S CLARIFICATION |
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| | Section | Cl.no | | | |
| 30 | SPECIFIC TECHNICAL REQUIREMENTS (C&I) INDUCED DRAFT COOLING TOWER | Section C page no Clause no 1.23 | Use of process actuated switches shall be avoided unless unavoidable | This clause is contradicting with clause no 1.22, clause no 1.2 ix) . If in place of Level Switches/Vibration switches Level transmitter and Vibration transmitter are required to be supplied then shall the redundancy clause be applicable for the same also? Please clarify. | Use of process actuated switches shall be avoided unless unavoidable. |
| 31 | SPECIFIC TECHNICAL REQUIREMENTS (C&I) INDUCED DRAFT COOLING TOWER | Section C Clause no 1.14,Clause no 1.3 xi) | Type of instruments | The referred clauses are contradictory to each other. In case temperature transmitters are dual input remote mount type then the temperature transmitters cannot be rack mounted type. Please clarifty and confirm. | Specification requirement is clear. Bidder to follow specification requirement. |
| 32 | | STD. SPECIFICATION NO. PES-165-09 REV. NO. 0 DATE : 05.08.2016 SHEET 4 of 12 clause no 4.8.11 , SUB-SECTION – ID DATASHEET-A page 2 of 4 clause no 6.4 | | The referred clauses are contradictoty to each other. This will also clarify the ambiguity of SPECIFIC TECHNICAL REQUIREMENTS (C&I) INDUCED DRAFT COOLING TOWER section C Clause no 1.22. Also Book 1 of 2, page no 24/446 indicates clause no 9.4 indicates supply of Low oil level switches and vibration cut off switches. Please clarify the exact requirement. | Specification requirement is clear. Bidder to follow specification requirement. Please refer clause no. 1.25 / page 48 of 425 for vibration switch |
| 33 | SPECIFIC TECHNICAL REQUIREMENTS (C&I) INDUCED DRAFT COOLING TOWER | Section C Clause no 1.11 | Electrical Actuators with integral starter (with plug in connector) shall be provided for all on/off and inching type valves along with necessary interface units for linking to corresponding Control System as applicable, typical Hook_up diagram of drives is included for reference | We understand that butterfly type isolation valves (applicable in our scope) will be manually operated. Hence electrical actuators are not applicable. | Specification requirement is clear. Bidder to follow specification requirement. |

| S.No. | Ref. clause of Tender Document | | SUBJECT | BIDDER'S QUERY | BHEL'S CLARIFICATION |
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| | Section | Cl.no | | | |
| 34 | Doc. no. E-TS-427-165-N001 | Page 2 of 446 | TECHNICAL SPECIFICATION FOR COOLING TOWERS (TOTAL 2 BOOKS) BOOK 1 OF 2 | Book 2 of 2 - Civil Specifications is not available in the contract document. Please furnish the same. | Already furnished as per TCN 02 Dtd. 28.10.16 (RKL-IDCT-VOLUME-II-TS-5-R-00) |
| 35 | Volume II | page 54 of 446 | Hand held calibrator shall be provided for adjustment/calibration/maintenance of the HART compatible transmitters …….. | Our understanding is 1 number HART Communicator shall be required to be supplied for the SMART, HART 4-20 mA output Dual input type temperature transmitters. Please confirm | Specification requirement is clear. Bidder to follow specification requirement. |
| 36 | Volume II | page 51 of 446 to page 54/446 | | Our understanding is that the following field instruments are not included in bidder's scope.<br>Pressure Transmitter, DP Transmitter, DP Type Flow, Level transmitters. Please confirm | Specification requirement is clear. Bidder to follow specification requirement. |
| 37 | SPECIFIC TECHNICAL REQUIREMENTS (C&I)<br><br>INDUCED DRAFT COOLING TOWER | clause no 1.25 | Vibration Monitoring System is envisaged for Cooling Tower Fan/Motor which is in BHEL scope. However, for mounting of vibration sensors/probe, vendor to provide vibration pad (of dimension of 80 mm*80mm*10mm each) for mounting of sensors and a notch/slot for mounting of key phasor. | We understand that cables and Junction boxes for purchaser's Vibration Monitoring System will be arranged by Purchaser only. Since complete vibration monitoring system will be arranged by BHEL, vibration pad should also be arranged by BHEL as per standard practice. In addition mounting of Purchaser's vibration sensors / probe should be also excluded from vendor's scope. | Specification requirement is clear. Bidder to follow specification requirement. For mounting of vibration sensors/probe, vendor to provide vibration pad (of dimension of 80 mm*80mm*10mm each) for mounting of sensors and a notch/slot for mounting of key phasor. For Cable scope also bidder to follow specification requirment. |
| 38 | Standard Electrical scope between BHEL and VENDOR (For EPC Projects) Rev-0 | Annx –I, Sl No 12, | Aviation lighting | Aviation lighting is not applicable for IDCT. | Noted |

| S.No. | Ref. clause of Tender Document | | SUBJECT | BIDDER'S QUERY | BHEL'S CLARIFICATION |
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| | Section | Cl.no | | | |
| 39 | Standard Electrical scope between BHEL and VENDOR (For EPC Projects) Rev-0 | Annx –I | Lighting | For Cooling tower area , only normal AC lighting system to be provided. Emergency AC lighting and DC lighting system are not required. Please confirm. | Noted.<br>However, Bidder shall ensure provision of ELU's at strategic exit points for safety of personnel. |
| 40 | Volume II | Page 42 (DESIGN AND CONSTRUCTION REQUIREMENTS) | Bidder shall provide spare cell(s) in each cooling tower to facilitate maintenance without affecting the tower performance. Number of spare cells per tower shall be two numbers in case of double air inlet cells and shall be two nos. in case of single air inlet cells. | Kindly confirm nos. of spare cell shall be 01 no. or 02 no. | Number of spare cell for cooling tower shall be 1 no. |
| | Volume II | Page 1 of 4 of DATA SHEET – A | No. of Cells: No. of working Cells + (01 no.) spare cell | | |
| 41 | Volume II | Page 1 of 4 of DATA SHEET – A | Maximum Cooling tower flow capacity to be considered for design of hot water distribution and cold water channel is 120 % of design Cold water Flow. | Kindly confirm Hot water Piping from terminal point to Cooling Tower also shall be design for 120 % of design Cold water Flow or only Hot Water RCC duct & PVC distribution pipe with nozzles and Cold Water Channel shall be design for 120 % of design Cold water Flow. | Complete Hot water distribution system shall be designed for 120 % of Design flow. |
| 42 | Volume II | Page 1 of 4 of DATA SI | Fan motor shall have at least 15% margin over the maximum continuous power requirement of gear box. | We understand that Fan Motor shall have at least 15 % margin over the Power consumption at Motor shaft. | Technical specification is clear. Bidder to follow technical specification requirement. |

| S.No. | Ref. clause of Tender Document | | SUBJECT | BIDDER'S QUERY | BHEL'S CLARIFICATION |
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| 43 | Volume II | Page 3 of 4 of DATA SI | Hot water distribution pipes: FRP or A.C pressure pipes conforming to IS: 1592 for counterflow tower | PVC distribution pipe shall also be acceptable for counterflow tower. | Noted |
| 44 | Volume II | Page 2 of 4 of DATA SI | Isolation BFV valves at each division of HW | Isolation Butterfly Valves at each division of Hot water pipe are not applicable for inline cell arrangement as there is no division of Hot water pipe. | Technical specification is clear. Bidder to follow technical specification requirement. |
| 45 | Volume II | Sheet 4 of 11 of TS | Thermal design criteria for Counter Flow Cooling Tower by Fulkerson Methodology. | Fulkerson methodology applicable for Counterflow Cooling Tower with Film Fill. As Proposed Cooling Tower is Counterflow Cooling Tower with Splash Fill, thus thermal design by Fulkerson methodology shall not be applicable. Kindly confirm. | Technical specification is clear. Bidder to follow technical specification requirement. |
| 46 | Prequalification criteria Annexure – 1 Sl No 2 | | RCC construction | As per the tender, the civil construction is excluded from our scope. Hence pre qualification with RCC construction is not really required. Hence request you to amend the pre q without RCC construction. | As per tender. |

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| 3.00.00 | **GEO-TECHNICAL INVESTIGATION & FOUNDATION SYSTEM** |
| 3.01.01 | BHEL had carried out detailed geo-technical investigation in the proposed cooling tower site. The sub-strata details encountered at various bore holes (BH-24, 29 & 44) in the cooling tower area are enclosed as Annexure-1 The geotechnical data attached shall be solely for the purpose of guidance to the bidder. BHEL/owner does not take any responsibility about the accuracy and applicability of the geo-technical data furnished herewith. The onus of correct assessment/interpretation and understanding of the existing sub-strata conditions is on the bidder. Any variation in the data between the one furnished and to that found during execution of the work at site shall not constitute a valid reason in affecting the terms & conditions of this bid and the bidder shall note that nothing extra will be payable on this account. The bidder shall fully satisfy himself about the nature of sub-strata expected to be encountered including the type of foundation, ground water table and construction methodology to be adopted etc prior to the submission of the bid. |
| 3.01.02 | Detailed geo-technical Investigation report shall be made available to the successful bidder during contract engineering stage. If the bidder desires to carry out additional geo-technical investigation he/she may do so with prior information/permission of BHEL/owner at no extra cost to BHEL/owner. No extension in time schedule shall be permitted on this account. The bidder shall obtain approval on the agency for conducting geo-technical investigation work, field and laboratory testing schedule proposed by the bidder etc from BHEL/owner before undertaking the geo-technical investigation work. However, the net safe bearing capacity (SBC) of shallow foundation to be adopted for the design of foundations during detailed engineering shall be limited to the values mentioned elsewhere in the specification and any value of net SBC higher than the one indicated shall not be accepted. However, bidder shall note that the net safe bearing capacity and foundation depth/ safe load carrying capacity of pile to be adopted for design during detailed engineering stage shall be got approved by BHEL/owner. |
| 3.02.00 | **Foundation System** |
| 3.02.01 | General Requirements<br><br>a. All equipments/structures shall be supported on suitable open foundation along with any special requirements/remedial measures/treatment called for subsoil/foundations as approved by BHEL/owner. |

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| | b. All foundations shall be designed in accordance with the provisions of relevant part of the latest revision of Indian Standards.<br><br>c. No foundation shall rest on filled up soil/Loose soil<br><br>d. No foundation shall rest on expansive soil.<br><br>e. A combination of open and pile foundations shall not be permitted under the same structure.<br><br>f. Foundations shall be designed to resist loading derived from environmental loads including loads due to wave, current, wind or seismic, gravity loads, construction loads, static and moving loads and any other loads as applicable and as specified elsewhere in the specification.<br><br>g. Foundation shall be designed for worst combination of loads as described elsewhere in the specification. |
| 3.02.02 | **Open foundations**<br><br>In case shallow/open foundations are adopted then the following shall be strictly adhered to. |
| | i. Minimum width of foundation shall be 1m.<br><br>ii. Minimum founding level shall be as mentioned in Table-1.<br><br>iii. The net safe bearing capacity (SBC) of shallow/open foundations at different founding level shall be limited to the values as mentioned in the following Table-1 and any value of net SBC higher than the one indicated shall not be accepted. However, bidder shall note that the net safe bearing capacity and depth of foundation to be adopted for design during detailed engineering stage shall be got approved by BHEL/owner. |

**Table-1**

**Net Safe Bearing Capacity**

| Unit | Type of Foundation | Founding Level (m) | Net Safe Bearing capacity (T/sq.m) | Finished Ground Level (FGL) (m) | Remarks |
|---|---|---|---|---|---|
| 1 | Isolated/Raft | (+)212.00 | 22 | R.L (+)216.00 | Minimum founding level shall be RL(+) 212.00M |
| 2 | Isolated/Raft | (+)211.00 | 30 | | |
| 3 | Isolated/Raft | (+)210.00 | 40 | | |

iv. It shall be ensured that all foundations of a particular structure/building/equipment shall rest on one bearing stratum.

v. The permissible settlement as mentioned under para “permissible settlement of foundations” or permissible settlement from functional requirement which ever more stringent shall be adopted for the design.

vi. The permissible total settlement and differential settlement of foundation resting on soil mass shall be governed by IS : 1904 and from functional requirements whichever is more stringent. Unless otherwise mentioned, the total settlement of cooling tower foundation resting on soil shall be restricted to 25 mm.

vii. Analysis and proportioning of footings to minimize differential settlements shall be carried out for all major foundations and the same shall be submitted for BHEL/owner’s approval.

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| | viii. In case any soft soil/loose stratum is met with at the founding level or below during execution, the same shall be completely removed and filled back with PCC of grade M 7.5.<br>ix. Expansive soil shall not be used for filling/back filling around foundation<br><br>x. No foundation shall be resting on expansive soil.<br><br>**Pile foundations**<br><br>In case pile foundations are adopted, then the following shall be strictly adhered to<br><br>a. Pile foundation shall be bored cast-in-situ RCC pile as per IS: 2911 part-1 section-2. Flushing of pile bore shall be done as per IS-2911 part-1, section 2 to ensure proper cleaning. The construction methodology to be adopted shall be suitable to ensure proper termination of pile in the desired strata and to ensure pile bore free from spoils. |
| 3.02.02 | b. Only RCC pile shall be provided.<br><br>c. Minimum diameter of pile shall be 600 mm.<br><br>d. Minimum length of pile shall be 16m below cut off level. Cut off level shall be at least 4m below ground level.<br><br>e. The allowable load carrying capacity of the pile in vertical compression shall be limited to its structural capacity. However, the pile capacity to be adopted for design shall be the least of the estimated design value and that obtained from the pile load test. Maximum permissible lateral deflection at pile head shall be 5mm.<br><br>f. Only straight shaft piles shall be used.<br><br>g. Minimum cover to main reinforcement in the pile shall be 75mm.<br><br>h. The piling work shall be carried out in accordance with the provisions of IS: 2911 (relevant part) and approved construction methodology. Minimum grade of concrete shall be M-25 with cement content not less 400 Kg/cu.m. |

i. The actual length of pile shall in no case be less than the design length. However, the safe load carrying capacity of pile shall be limited to the following Table-2.

**Table-2**

**Safe Load Carrying Capacity of Bored Cast-in-situ RCC Piles**

| SL. No | Pile dia (mm) | Pile capacity in vertical compression (MT) | Pile capacity in lateral (MT) | Pile capacity in Uplift (MT) |
|---|---|---|---|---|
| 1 | 600 | 140 | 7 | 35 |
| 2 | 760 | 220 | 10.5 | 50 |

j. Bidder shall furnish the design of piles (in terms of rated capacity, length, diameter, termination criteria to locate the founding level for construction of pile, reinforcement for job piles and test piles etc.), construction methodology/ specification for construction of piles and scheme of initial pile load tests in vertical, lateral and uplift load carrying capacities for BHEL/owner's approval.

k. Regular quality assurance checks for density of circulation mud, con tamination mud and samples from pile bore bottom, slump of concrete, pile concrete integrity etc. shall be done by the bidder

3.02.03 **Pile Load Tests**

Bidder shall install piles for initial load test. Minimum number of initial load tests to be performed for each diameter and rated capacity of pile shall be as under.

1. Vertical (compression) 2
2. Lateral (horizontal) 2
3. Uplift (tension) 2

The initial pile load test shall be conducted up to a maximum test load of two

| | |
|---|---|
| | and half times the estimated safe load carrying capacity of pile. In case of compression test, the method of loading shall be cyclic as per IS: 2911 (relevant part).<br><br>The routine load test on pile shall be conducted upto a maximum test load of one and half times the allowable pile capacity as per relevant Indian Standards. Number of routine pile load tests to be performed for each diameter/ allowable capacity of pile in vertical compression and lateral load shall be at least 1.5% of total number of job piles in each case. Piles for routine load test shall be approved by BHEL/owner.<br><br>Testing of piles and interpretation of pile load test results shall be carried out as per IS: 2911, Part-4. Bidder shall ensure that all equipments/ instruments are properly calibrated at a reputed laboratory/institution prior to their use and the calibration test certificates shall be submitted to BHEL/owner.<br><br>A report on the pile load tests shall be submitted for BHEL/owner's approval. In case, pile has not achieved the desired capacity after routine pile load test or piles have been rejected due to any other reason, then the bidder shall install additional pile(s) as required at his/her own cost and accordingly pile cap design shall also be reviewed and modified (if required) at no extra cost to BHEL/owner. |
| 3.02.04 | **Pile Integrity Test:**<br><br>Low strain pile integrity test shall be conducted on all job/test piles. The testing shall confirm to relevant ASTM. |

ANNEXURE-1

**Project : Geotechnical Investigation Work at 1x250 MW NSPCL Rourkela TPP-III, Odisha.** CETEST

**Job No : 3766** | **Created by : SKD** | **Created on : 30/08/2016** | **Sheet No:**

# BORE LOG DATA SHEET

## BORE HOLE NO.24

Co-ordinates E=1214 N=261

| Field Test | Nos | Samples | Nos |
|---|---|---|---|
| Penetrometer (SPT) | 16 | Undisturbed (UDS) | 2 |
| Cone (Pc) | | Penetrometer (SPT) | 16 |
| Vane (V) | | Disturbed (DS) | 8 |
| | | Water Sample (WS) | 1 |

Commencement Date : 26/08/2016
Completion Date : 28/08/2016
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 216.532 m.
Water Struck At :
Standing Water Level : 0.60 m.

| DESCRIPTION | SYMBOL | N-VALUE (EACH DIVN. = 15cm) | SAMPLES Ref. No | SAMPLES Depth (m) |
|---|---|---|---|---|
| 0.00m<br>Filled up soil consists of brownish grey, silt, sand, brick bats etc. | | | DS-1<br>WS-1 | 0.50<br>0.60 |
| 1.00m<br>Stiff, greyish yellow, silty clay with traces of kankar. Observed rusty spots. | | 8 4 5 — 9 | SPT-1<br>UDS-1 | 1.00-1.45<br>2.00-2.45 |
| 3.00m<br>Very stiff, greyish yellow, silty clay with traces of kankar. Observed rusty spots. | | 6 11 14 — 25 | SPT-2 | 3.00-3.45 |
| 4.00m<br>Hard, brownish grey, silty clay with decomposed rock. | | 12 16 28 — 44 | *UDS-2<br>SPT-3 | 4.00-4.06<br>5.00-5.45 |
| | | 100 / 40 cm — Refusal Pentn. | *SPT-4 | 5.85-5.89 |
| 6.00m<br>Completely weathered, light brownish grey, fine grained, decomposed & disintegrated rock. | | 100 / 30 cm — Refusal Pentn. | *SPT-5<br>R1 | 6.00-6.03 **6.00**<br>**CR=15%**<br>**RQD=Nil** |
| | | 100 / 30 cm — Refusal Pentn. | *SPT-6<br>R2 | 6.75-6.78 **6.75**<br>**CR=16%**<br>**RQD=Nil** |
| 7.50m<br>Completely weathered, light brownish grey, decomposed & disintegrated rock particles collectes as sludge. | | 100 / 30 cm — Refusal Pentn. | *SPT-7<br>R3<br>DS-2 | 7.50-7.53 **7.50**<br>**CR=Nil**<br>**RQD=Nil** |
| | | 100 / 40 cm — Refusal Pentn. | *SPT-8<br>R4<br>DS-3 | 8.25-8.29 **8.25**<br>**CR=Nil**<br>**RQD=Nil** |
| | | 100 / 40 cm — Refusal Pentn. | *SPT-9<br>R5<br>DS-4 | 9.00-9.04 **9.00**<br>**CR=Nil**<br>**RQD=Nil** |
| | | 100 / 40 cm — Refusal Pentn. | *SPT-10<br>R6<br>DS-5 | 9.75-9.79 **9.75**<br>**CR=Nil**<br>**RQD=Nil** |
| | | 100 / 30 cm — Refusal Pentn. | *SPT-11<br>R7<br>DS-6 | 10.50-10.53 **10.50**<br>**CR=Nil**<br>**RQD=Nil** |
| | | 100 / 40 cm — Refusal Pentn. | *SPT-12<br>R8<br>DS-7 | 11.25-11.29 **11.25**<br>**CR=Nil**<br>**RQD=Nil** |
| | | 100 / 30 cm — Refusal Pentn. | *SPT-13<br>R9<br>DS-8 | 12.00-12.03 **12.00**<br>**CR=Nil**<br>**RQD=Nil** |
| 12.60m | | **NX rotary drilling from 6.00m to 25.00m** | | |

BH-24/Sheet-1

| Project : Geotechnical Investigation Work at 1x250 MW NSPCL Rourkela TPP-III, Odisha. | | | CETEST |
|---|---|---|---|
| Job No : 3766 | Created by : SKD | Created on : 30/08/2016 | Sheet No: |

# BORE LOG DATA SHEET

## BORE HOLE NO.24

Co-ordinates E=1214 N=261

| Field Test | Nos | Samples | Nos |
|---|---|---|---|
| Penetrometer (SPT) | 16 | Undisturbed (UDS) | 2 |
| Cone (Pc) | | Penetrometer (SPT) | 16 |
| Vane (V) | | Disturbed (DS) | 8 |
| | | Water Sample (WS) | 1 |

Commencement Date : 26/08/2016
Completion Date : 28/08/2016
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 216.532 m.
Water Struck At :
Standing Water Level : 0.60 m.

| DESCRIPTION | SYMBOL | N-VALUE (EACH DIVN. = 15cm) | SAMPLES Ref. No | SAMPLES Depth (m) |
|---|---|---|---|---|
| 12.60m / 12.75m: Completely weathered, light brownish grey, decomposed & disintegrated rock particles collectes as sludge. | | 100 Refusal | *SPT-14 | 12.75-12.78 |
| | | 30 cm Pentn. Refusal | R10 | CR=13% RQD=Nil |
| Completely weathered, light brownish grey, fine grained, decomposed & disintegrated rock. | | 100 30 cm Pentn. Refusal | *SPT-15 | 13.50-13.53 |
| | | | R11 | CR=9% RQD=Nil |
| 14.25m: Highly weathered, light brownish grey, fine grained, decomposed & disintegrated rock. | | 100 30 cm Pentn. | *SPT-16 | 14.25-14.28 |
| | | | R12 | CR=39% RQD=16% |
| 15.00m: Moderately to slightly weathered, light grey, fine grained, moderately to slightly fractured rock. Observed water stain. | | | R13 | CR=53% RQD=33% |
| | | | R14 | CR=63% RQD=52% |
| | | | R15 | CR=67% RQD=40% |
| | | | R16 | CR=72% RQD=49% |
| | | | R17 | CR=56% RQD=19% |
| | | | R18 | CR=69% RQD=21% |
| | | | R19 | CR=67% RQD=23% |
| | | | R20 | CR=53% RQD=24% |
| | | | R21 | CR=68% RQD=32% |
| | | | R22 | CR=71% RQD=38% |
| | | | R23 | CR=70% RQD=35% |
| | | | R24 | CR=75% RQD=28% |
| | | | R25 | CR=78% RQD=40% |
| 25.00m: N.B. - '*' means sample could not be recovered. | | | | |

12.75
13.50
14.25
15.00
15.75
16.50
17.25
18.00
18.75
19.50
20.25
21.00
21.75
22.50
23.25
24.00
25.00

| Project : Geotechnical Investigation Work at 1x250 MW NSPCL Rourkela TPP–III, Odisha. | | | CETEST |
|---|---|---|---|
| Job No : 3766 | Created by : SKD | Created on : 22/08/2016 | Sheet No: |

# BORE LOG DATA SHEET

## BORE HOLE NO.29

Co-ordinates E=1162 N=259

| Field Test | Nos | Samples | Nos |
|---|---|---|---|
| Penetrometer (SPT) | 7 | Undisturbed (UDS) | 2 |
| Cone (Pc) | | Penetrometer (SPT) | 7 |
| Vane (V) | | Disturbed (DS) | 1 |
| | | Water Sample (WS) | 0 |

Commencement Date : 30/07/2016
Completion Date : 02/08/2016
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 215.743 m.
Water Struck At :
Standing Water Level : 0.70 m.

| DESCRIPTION | SYMBOL | N–VALUE (EACH DIVN. = 15cm) | SAMPLES Ref. No | SAMPLES Depth (m) |
|---|---|---|---|---|
| 0.00m | | | | |
| | | | DS–1 | 0.50 |
| | | 9 11 12 — 23 | SPT–1 | 1.00–1.45 |
| Very stiff, greyish brown, silty clay / clayey silt. Observed kankar & moorum. | | | UDS–1 | 2.00–2.45 |
| | | 8 10 15 — 25 | SPT–2 | 3.00–3.45 |
| 4.00m | | | | |
| | | | UDS–2 | 4.00–4.45 |
| Hard, brownish grey, silty clay to sandy silt. Observed decomposed materials of rock. | | 48 56 — ≥100 (10.0 cm Penetn.) | SPT–3 | 5.00–5.25 |
| | | 100 for 4cm Penetn., Refusal | *SPT–4 | 5.50–5.54 |
| 5.75m | | 100 for 3cm Penetn., Refusal | *SPT–5 | 5.75–5.78 |
| | | | R1 | CR=12% RQD=Nil |
| | | Refusal | | 6.50 |
| Completely to highly weathered, light grey, fine grained, highly fractured rock. | | 100 (3.0 cm Penetn.) Refusal | *SPT–6 | 6.50–6.53 |
| | | | R2 | CR=18% RQD=Nil |
| | | 100 (3.0 cm Penetn.) | *SPT–7 | 7.25–7.28 |
| | | | R3 | CR=24% RQD=Nil |
| | | NX rotary drilling from 5.75m to 25.00m | | 8.00 |
| 8.00m | | | R4 | CR=35% RQD=13% |
| | | | | 8.75 |
| | | | R5 | CR=29% RQD=Nil |
| | | | | 9.50 |
| | | | R6 | CR=40% RQD=Nil |
| | | | | 10.25 |
| Highly to moderately weathered, grey, fine grained, fractured rock. | | | R7 | CR=42% RQD=Nil |
| | | | | 11.00 |
| | | | R8 | CR=38% RQD=22% |
| | | | | 11.75 |
| | | | R9 | CR=44% RQD=20% |
| 12.60m | | | | 12.50 |

| Project : Geotechnical Investigation Work at 1x250 MW NSPCL Rourkela TPP–III, Odisha. | | | CETEST |
|---|---|---|---|
| Job No : 3766 | Created by : SKD | Created on : 22/08/2016 | Sheet No: |

# BORE LOG DATA SHEET

## BORE HOLE NO.29

Co-ordinates E=1162 N=259

| Field Test | Nos | Samples | Nos |
|---|---|---|---|
| Penetrometer (SPT) | 7 | Undisturbed (UDS) | 2 |
| Cone (Pc) | | Penetrometer (SPT) | 7 |
| Vane (V) | | Disturbed (DS) | 1 |
| | | Water Sample (WS) | 0 |

Commencement Date : 30/07/2016
Completion Date : 02/08/2016
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 215.743 m.
Water Struck At :
Standing Water Level : 0.70 m.

| DESCRIPTION | SYMBOL | N–VALUE EACH DIVN. = 15cm | SAMPLES Ref. No | Depth (m) |
|---|---|---|---|---|
| 12.60m. | | | | |
| | | | R10 | CR=42% RQD=36% |
| | | | | 13.25 |
| | | | R11 | CR=46% RQD=Nil |
| | | | | 14.00 |
| | | | R12 | CR=42% RQD=34% |
| | | | | 14.75 |
| | | | R13 | CR=46% RQD=17% |
| | | | | 15.50 |
| | | | R14 | CR=48% RQD=35% |
| | | | | 16.25 |
| Highly to moderately weathered, grey, fine grained, fractured rock. | | | R15 | CR=45% RQD=14% |
| | | | | 17.00 |
| | | | R16 | CR=49% RQD=Nil |
| | | | | 17.75 |
| | | | R17 | CR=43% RQD=Nil |
| | | | | 18.50 |
| | | | R18 | CR=44% RQD=Nil |
| | | | | 19.25 |
| | | | R19 | CR=54% RQD=16% |
| | | | | 20.00 |
| | | | R20 | CR=47% RQD=Nil |
| 20.75m. | | | | 20.75 |
| | | | R21 | CR=38% RQD=Nil |
| | | | | 21.50 |
| | | | R22 | CR=49% RQD=Nil |
| | | | | 22.25 |
| Highly to moderately weathered, dark grey, fine grained, highly fractured rock. | | | R23 | CR=42% RQD=Nil |
| | | | | 23.00 |
| | | | R24 | CR=54% RQD=34% |
| | | | | 24.00 |
| | | | R25 | CR=44% RQD=40% |
| N.B. – '*' means sample could not be recovered. | | | | |
| 25.00m. | | | | 25.00 |

| Project : Geotechnical Investigation Work at 1x250 MW NSPCL Rourkela TPP-III, Odisha. | | | CETEST |
|---|---|---|---|
| Job No : 3766 | Created by : SKD | Created on : 31/08/2016 | Sheet No: |

# BORE LOG DATA SHEET

## BORE HOLE NO.44

Co-ordinates E=1110 N=-270

| Field Test | Nos | Samples | Nos |
|---|---|---|---|
| Penetrometer (SPT) | 6 | Undisturbed (UDS) | 2 |
| Cone (Pc) | | Penetrometer (SPT) | 6 |
| Vane (V) | | Disturbed (DS) | 2 |
| | | Water Sample (WS) | 0 |

Commencement Date : 20/08/2016
Completion Date : 22/08/2016
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 215.844 m.
Water Struck At :
Standing Water Level : 0.40 m.

| DESCRIPTION | SYMBOL | N-VALUE (EACH DIVN. = 15cm) | SAMPLES Ref. No | SAMPLES Depth (m) |
|---|---|---|---|---|
| 0.00m | | | | |
| Medium, light yellowish brown, silty clay with traces of kankar & fine sand. | | 2 3 3 (6) | DS-1 | 0.50 |
| | | | SPT-1 | 1.00-1.45 |
| 2.00m | | | | |
| Very stiff, light yellowish brown, silty clay with traces of kankar & fine sand. | | 6 8 12 (20) | UDS-1 | 2.00-2.45 |
| | | | SPT-2 | 3.00-3.45 |
| 4.00m | | | | |
| Very dense, yellowish grey to brownish grey, silty fine sand / sandy silt. Observed mica. | | 48 65 (>100) 7.0 cm Pentn. | *UDS-2 | 4.00-4.45 |
| | | | SPT-3 | 5.00-5.22 |
| | | 100 Refusal 4.0 cm Pentn. | *SPT-4 | 6.00-6.04 |
| 6.30m | | 100 Refusal 3.0 cm Pentn. | *SPT-5 | 6.30-6.33 6.30 |
| | | Refusal | R1 | CR=Nil RQD=Nil |
| | | | DS-2 | |
| | | 100 Refusal 4.0 cm Pentn. | *SPT-6 | 7.00-7.04 7.00 |
| Completely to highly weathered, brownish grey, medium grained, highly fractured rock fragments. | | NX rotary drilling from 6.30m to 25.00m | R2 | CR=28% RQD=Nil 7.75 |
| | | | R3 | CR=25% RQD=Nil 8.50 |
| 8.50m | | | R4 | CR=26% RQD=13% 9.25 |
| | | | R5 | CR=31% RQD=Nil 10.00 |
| Highly/moderately weathered, light grey, fine grained, fractured rock. | | | R6 | CR=42% RQD=17% 10.75 |
| | | | R7 | CR=40% RQD=22% 11.50 |
| 11.50m | | | R8 | CR=58% RQD=24% 12.25 |
| Moderately weathered, light grey, fine grained, fractured rock. | | | | |
| 12.60m | | | | |

| Project : Geotechnical Investigation Work at 1x250 MW NSPCL Rourkela TPP-III, Odisha. | | | CETEST |
|---|---|---|---|
| Job No : 3766 | Created by : SKD | Created on : 31/08/2016 | Sheet No: |

# BORE LOG DATA SHEET

## BORE HOLE NO.44

Co-ordinates E=1110 N=-270

| Field Test | Nos | Samples | Nos |
|---|---|---|---|
| Penetrometer (SPT) | 6 | Undisturbed (UDS) | 2 |
| Cone (Pc) | | Penetrometer (SPT) | 6 |
| Vane (V) | | Disturbed (DS) | 2 |
| | | Water Sample (WS) | 0 |

Commencement Date : 20/08/2016
Completion Date : 22/08/2016
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 215.844 m.
Water Struck At :
Standing Water Level : 0.40 m.

| DESCRIPTION | SYMBOL | N-VALUE (EACH DIVN. = 15cm) | SAMPLES Ref. No | SAMPLES Depth (m) |
|---|---|---|---|---|
| 12.60m | | | | |
| Moderately weathered, light grey, fine grained, fractured rock. | | | R9 | CR=60% RQD=28% 13.00 |
| | | | R10 | CR=56% RQD=14% 13.75 |
| 13.75m | | | R11 | CR=79% RQD=32% 14.50 |
| | | | R12 | CR=76% RQD=40% 15.25 |
| | | | R13 | CR=80% RQD=48% 16.00 |
| | | | R14 | CR=68% RQD=18% 16.75 |
| | | | R15 | CR=61% RQD=44% 17.50 |
| | | | R16 | CR=60% RQD=48% 18.25 |
| | | | R17 | CR=56% RQD=20% 19.00 |
| Moderately to slightly weathered, deep grey, fine grained, fractured rock. | | | R18 | CR=58% RQD=36% 19.75 |
| | | | R19 | CR=58% RQD=13% 20.50 |
| | | | R20 | CR=56% RQD=29% 21.25 |
| | | | R21 | CR=61% RQD=Nil 22.00 |
| | | | R22 | CR=68% RQD=40% 22.75 |
| | | | R23 | CR=68% RQD=29% 23.50 |
| | | | R24 | CR=73% RQD=36% 24.25 |
| | | | R25 | CR=80% RQD=20% 25.00 |
| N.B. – '*' means sample could not be recovered. 25.00m | | | | |

ANNEXURE-2

# FORMAT FOR NO DEVIATION CERTIFICATE
(To be submitted in the bidder's letter head)

BHARAT HEAVY ELECTRICALS LIMITED,
Power Sector - Eastern Region,
Plot no 9/1, DJ Block, Sector – II, Salt Lake City,
Kolkata – 700 091

| | | |
|---|---|---|
| Sub | No Deviation Certificate. | |
| Job | DESIGN, ENGINEERING, MANUFACTURING, SUPPLY, ERECTION & COMMISSIONING OF INDUCED DRAFT COOLING TOWER (IDCT) FOR 1X250 MW NSPCL, PP-II EXPANSION, ROURKELA, ODISHA. | |
| Ref | 1.0 | Tender no PSER:SCT: RKL-M1779:16 |
| | 2.0 | BHEL's NIT, vide reference no PSER:SCT:RKL-M1779:5264, Dated 17-10-2016. |
| | 3.0 | BHEL's TCN-01, vide reference PSER:SCT:RKL-M1779:TCN-01, dated 26-10-2016. |
| | 4.0 | BHEL's TCN-02, vide reference PSER:SCT:RKL-M1779:TCN-02, dated 28-10-2016. |
| | 5.0 | BHEL's TCN-03, vide reference PSER:SCT:RKL-M1779:TCN-03, dated 04-11-2016. |
| | 6.0 | All other pertinent issues till date. |

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer in accordance with tender instructions and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized representative of the bidder)