Annexure-F

CLAUSE NO.	PROJECT INFORMATION
1.00.00	**BACKGROUND** NSPCL has setup coal based thermal power plant of 2X250 MW capacity at BHILAI in Chhattisgarh primarily to meet captive power requirement of SAIL, NSPCL is supplying balance power to the beneficiaries in the western region. Both the units have been commissioned during 2008-09 and commercialized during 2009-10.
1.01.0	**LOCATION AND APPROACH** The NSPCL site is located at District Durg, Bhilai (East) having latitude and longitude of 21° 11' 25" N and 81°26'05" E, respectively. The nearest railhead on the Raipur- Nagpur section of South Eastern Central Railway is Bhilai which is approx. 4 km from site. The site is approachable from National Highway -6 which connects the site with both Durg and Raipur. The nearest- airport is at Raipur, about 35kms away from the site. The nearest town is Bhilai, approx. 10 km from the project site. Vicinity plan of the proposed project is placed at **Annexure-I**.
1.02.00	**LAND** Total land area for plant & dyke is 659 acres. Ash Dyke is constructed in 221 Acre land.
1.03.00	**WATER** The make- up water requirement for the plant has been met from the existing system of Bhilai CPP-1, CPP-2 and BSP i: e Maroda Tank-II, which is fed by Tandula Main Canal.
1.04.00	**Coal Quality Parameters / Fuel Oil Characteristics& Plant Water details:** (i) The coal quality parameters and Fuel oil Characteristics are indicated in Table-1 & Table-2 respectively below. (ii) Process water: Process water quality based on COC given in Table-4. (iii) Clarified water: Clarified water quality is indicated in Table-4. (iv) DM water for Equipment cooling water system. DM water quality is indicated in Table-5.
1.05.00	**STEAM GENERATOR AND ESP DATA:** Refer Table-6
1.06.00	Drawings are enclosed as per Table-7 for initial overview to the Bidder.
2.00.00	**NOT USED**
3.00.00	**Capacity** Present proposal : 2 X 250 MW
4.00.00	**Metrological Data** The metrological data from nearest observatory is placed at **Annexure-II.**

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5.00.00 CRITERIA FOR EARTHQUAKE RESISTANT DESIGN OF STRUCTURES AND

a) Steel structures : 2%

b) Reinforced Concrete structures : 5%

c) Reinforced Concrete Stacks : 3%

d) Steel stacks : 2%

EQUIPMENT

All structures and equipment shall be designed for seismic forces adopting the site specific seismic information provided in this document and using the other provisions in accordance with IS:1893 (Part 1 to Part 4). Pending finalization of Part 5 of IS:1893, provisions of part 1 shall be read along with the relevant clauses of IS:1893:1984, for embankments.

A site specific seismic study has been conducted for the project site. The peak ground horizontal acceleration for the project site, the site specific acceleration spectral coefficients (in units of gravity acceleration 'g') in the horizontal direction for the various damping values and the multiplying factor (to be used over the spectral coefficients) for evaluating the design acceleration spectra are as given at Appendix-I.

Vertical acceleration spectral values shall be taken as 2/3rd of the corresponding horizontal values.

The site specific design acceleration spectra shall be used in place of the response acceleration spectra, given at figure-2 in IS:1893 (Part 1) and Annex B of IS:1893 (Part 4). The site specific acceleration spectra along with multiplying factors specified in Appendix-I includes the effect of the seismic environment of the site, the importance factor related to the structures and the response reduction factor. Hence, the design spectra do not require any further consideration of the zone factor (Z), the importance factor (I) and response reduction factor (R) as used in the IS:1893 (Part 1 to Part 4).

Damping in Structures

The damping factor (as a percentage of critical damping) to be adopted shall not be more than as indicated below for:

CLAUSE NO.	PROJECT INFORMATION

Method of Analysis

Since most structures in a power plant are irregular in shape and have irregular distribution of mass and stiffness, dynamic analysis for obtaining the design seismic forces shall be carried out using the response spectrum method. The number of vibration modes used in the analysis should be such that the sum total of modal masses of all modes considered is at least 90 percent of the total seismic mass and shall also meet requirements of IS:1893 (Part 1). Modal combination of the peak response quantities shall be performed as per Complete Quadratic Combination (CQC) method or by an acceptable alternative as per IS:1893 (Part 1).

In general, seismic analysis shall be performed for the three orthogonal (two principal horizontal and one vertical) components of earthquake motion. The seismic response from the three components shall be combined as specified in IS:1893 (Part 1).

The spectral acceleration coefficient shall get restricted to the peak spectral value if the fundamental natural period of the structure falls to the left of the peak in the spectral acceleration curve.

For buildings, if the design base shear (V_B) obtained from modal combination is less than the base shear ($\bar{V}_B$) computed using the approximate fundamental period (T_a) given in IS:1893:Part 1 and using site specific acceleration spectra with appropriate multiplying factor, the response quantities (e.g. member forces, displacements, storey forces, storey shears and base reactions) shall be enhanced in the ratio of $\bar{V}_B / V_B$. However, no reduction is permitted if $\bar{V}_B$ is less than V_B.

Design/Detailing for Ductility for Structures

The site specific design acceleration spectra is a reduced spectra and has an in-built allowance for ductility. Structures shall be engineered and detailed in accordance with relevant Indian/International standards to achieve ductility.

APPENDIX – I

SITE SPECIFIC SEISMIC PARAMETERS FOR DESIGN OF STRUCTURES AND EQUIPMENT

The various site specific seismic parameters for the project site shall be as follows:

1) Peak ground horizontal acceleration : 0.10g

2) Multiplying factor to be applied to the site specific horizontal acceleration spectral coefficients (in units of gravity acceleration 'g') to obtain the design acceleration spectra

   a) for special moment resisting steel frames designed and detailed as per IS:800 : 0.025

   b) For special concentrically braced steel frames designed and detailed as per IS:800 : 0.019

   c) For special moment resisting RC frames designed and detailed as per IS:456 and IS:13920 : 0.015

   d) for RCC chimney, RCC Natural Draft Cooling Tower : 0.05

   e) for liquid retaining tanks : 0.03

   f) for steel chimney, Absorber tower, Vessels : 0.038

   g) for design of structures not covered under 2 (a) to 2 (f) above and under 3 below, in general (excluding special structure/ configuration/materials) : 0.025

3) Multiplying factor to be applied to the site specific horizontal acceleration spectral coefficients (in units of gravity acceleration 'g') for design of equipment and structures where inelastic action is not relevant or not permitted : 0.05

Note: g = Acceleration due to gravity

The horizontal seismic acceleration spectral coefficients are furnished in **Annexure-A**.

Annexure-A

HORIZONTAL SEISMIC ACCELERATION SPECTRAL COEFFICIENTS (In units of 'g')

Time Period (Sec)	Damping Factor (as a percentage of critical damping)		
	2%	3%	5%
0.000	1.000	1.000	1.000
0.030	1.000	1.000	1.000
0.050	1.810	1.679	1.509
0.098	3.935	3.325	2.596
0.101	3.935	3.438	2.660
0.107	3.935	3.438	2.789
0.150	3.935	3.438	2.789
0.200	3.935	3.438	2.789
0.250	3.935	3.438	2.789
0.300	3.935	3.438	2.789
0.350	3.935	3.438	2.789
0.400	3.935	3.438	2.789
0.450	3.935	3.438	2.789
0.485	3.935	3.438	2.789
0.503	3.791	3.438	2.789
0.531	3.591	3.254	2.789
0.600	3.178	2.880	2.467
0.650	2.934	2.658	2.277
0.670	2.846	2.579	2.209
0.700	2.724	2.469	2.114
0.750	2.543	2.304	1.973
0.800	2.384	2.160	1.850
0.850	2.244	2.033	1.741
0.900	2.119	1.920	1.644
0.950	2.007	1.819	1.558
1.000	1.907	1.728	1.480
1.050	1.816	1.646	1.410
1.100	1.734	1.571	1.345
1.150	1.658	1.503	1.287
1.200	1.589	1.440	1.233
1.250	1.526	1.382	1.184
1.300	1.467	1.329	1.138
1.350	1.413	1.280	1.096
1.400	1.362	1.234	1.057

Annexure-A

HORIZONTAL SEISMIC ACCELERATION SPECTRAL COEFFICIENTS (In units of 'g')

Time Period (Sec)	Damping Factor (as a percentage of critical damping)		
	2%	3%	5%
1.450	1.315	1.192	1.021
1.500	1.271	1.152	0.987
1.550	1.230	1.115	0.955
1.600	1.192	1.080	0.925
1.650	1.156	1.047	0.897
1.700	1.122	1.016	0.871
1.750	1.090	0.987	0.846
1.800	1.059	0.960	0.822
1.850	1.031	0.934	0.800
1.900	1.004	0.909	0.779
1.950	0.978	0.886	0.759
2.000	0.954	0.864	0.740
2.050	0.930	0.843	0.722
2.100	0.908	0.823	0.705
2.150	0.887	0.804	0.688
2.200	0.867	0.785	0.673
2.250	0.848	0.768	0.658
2.300	0.829	0.751	0.643
2.350	0.811	0.735	0.630
2.400	0.795	0.720	0.617
2.450	0.778	0.705	0.604
2.500	0.763	0.691	0.592
2.550	0.748	0.678	0.580
2.600	0.733	0.665	0.569
2.650	0.720	0.652	0.558
2.700	0.706	0.640	0.548
2.750	0.693	0.628	0.538
2.800	0.681	0.617	0.529
2.850	0.669	0.606	0.519
2.900	0.658	0.596	0.510
2.950	0.646	0.586	0.502
3.000	0.636	0.576	0.493
3.050	0.625	0.567	0.485
3.100	0.615	0.557	0.477

Annexure-A

HORIZONTAL SEISMIC ACCELERATION SPECTRAL COEFFICIENTS (In units of 'g')

Time Period (Sec)	Damping Factor (as a percentage of critical damping)		
	2%	3%	5%
3.150	0.605	0.549	0.470
3.200	0.596	0.540	0.463
3.250	0.587	0.532	0.455
3.300	0.578	0.524	0.448
3.350	0.569	0.516	0.442
3.400	0.561	0.508	0.435
3.450	0.553	0.501	0.429
3.500	0.545	0.494	0.423
3.550	0.537	0.487	0.417
3.600	0.530	0.480	0.411
3.650	0.522	0.473	0.405
3.700	0.515	0.467	0.400
3.750	0.509	0.461	0.395
3.800	0.502	0.455	0.389
3.825	0.496	0.452	0.387
3.850	0.490	0.449	0.384
3.900	0.477	0.443	0.379
3.950	0.465	0.437	0.375
4.000	0.454	0.432	0.370

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6.00.00	**CRITERIA FOR WIND RESISTANT DESIGN OF STRUCTURES AND EQUIPMENT** All structures shall be designed for wind forces in accordance with IS:875 (Part-3) and as specified in this document. See Annexure – B for site specific information. Along wind forces shall generally be computed by the Peak (i.e. 3 second gust) Wind Speed method as defined in the standard. Along wind forces on slender and wind sensitive structures and structural elements shall also be computed, for dynamic effects, using the Gust Factor or Gust Effectiveness Factor Method as defined in the standard. The structures shall be designed for the higher of the forces obtained from Gust Factor method and the Peak Wind Speed method. Analysis for dynamic effects of wind must be undertaken for any structure which has a height to minimum lateral dimension ratio greater than “5” and/or if the fundamental frequency of the structure is less than 1 Hz. Susceptibility of structures to across-wind forces, galloping, flutter, ovalling etc. should be examined and designed/detailed accordingly following the recommendations of IS:875(Part-3) and other relevant Indian standards. It should be estimated if size and relative position of other structures are likely to enhance the wind loading on the structure under consideration. Enhancement factor, if necessary, shall suitably be estimated and applied to the wind loading to account for the interference effects. **Damping in Structures** The damping factor (as a percentage of critical damping) to be adopted shall not be more than as indicated below for: a) Welded steel structures : 1.0% b) Bolted steel structures : 2.0% c) Reinforced concrete structures : 1.6% : As per IS:6533 & CICIND Model Code whichever is more critical.

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ANNEXURE-B

SITE SPECIFIC DESIGN PARAMETERS

The various design parameters, as defined in IS: 875 (Part-3), to be adopted for the project site shall be as follows:

a) The basic wind speed "V_b" at ten metres above the mean ground level : 44 metres/second

b) The risk coefficient "K_1" : 1.06

c) Category of terrain : Category-2

7.00.00 **FOUNDATION SYSTEM AND GEOTECHNICAL DATA**

7.00.01 Geotechnical data and foundation system for the respective project are enclosed at Annexure-III. The corresponding bore logs are enclosed at Annexure-IV.

7.00.02 The available soil data is of vicinity of proposed structures, therefore, bidder shall carryout his own detailed soil investigation for facilities under this package and shall be as per the scheme approved by owner**.** The scheme for geotechnical investigation shall be as given at Clause 7.07.00 and shall be approved by owner before execution. Geotechnical investigation work shall got executed by the Contractor through the agencies as mentioned in Clause No. 7.07.03. However, no time extension shall be given on account of soil investigation carried out by the Bidder. The geotechnical investigation report shall be prepared with detailed recommendations regarding type of foundation and allowable bearing pressure for various structures/ facilities and other soil parameters. The report shall be submitted for Owner's approval prior to commencement of design of foundation.

7.00.03 The Bidder should note that nothing extra whatsoever on account of variation between soil data collected by Owner and that found by the Bidder during geotechnical investigation by him or during execution of works, shall be payable.

7.00.04 Tank Foundations

a) The tanks shall rest on flexible tank pad foundation, resting on sand with concrete ring wall to retain sand. Base of the concrete ring wall shall not rest on the expansive soil, if any.

b) Entire loose/ soft soil inside the concrete ring wall shall be removed and shall be filled with sand. Sand for filling shall be clean and well graded conforming to IS 383 with grading Zone I to III.

c) Sand shall be spread in layers not exceeding 30cm compacted thickness over the area. Each layer shall be uniformly compacted by mechanical means like plate vibrators, small vibratory rollers, etc to achieve a relative density of not less than 80%.

d) Other requirements of tank foundations shall be as per IS 803 and as specified elsewhere in the specifications.

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7.02.00	**Foundation System** The requirements for the foundation system to be adopted are as given in subsequent clauses. Depending upon the depth of competent strata/stratum, type of structures, functional requirement of facility, extent of cutting / filling, suitable foundation, open or pile shall be adopted with approval of owner.
7.02.01	**General Requirements** a) All structures/equipment shall be supported either on suitable open foundations (isolated, combined, raft) or pile foundations depending on type of structures/facilities, sub-strata, topography etc. b) The roads, ground floor slabs, trenches, pipe pedestals, channels/drains and staircase foundation with foundation loading intensity less than 4 T / M2 may be supported on open / shallow foundations resting on virgin / controlled compacted filled up soil. c) No other foundation (other than as mentioned in (b) above) shall rest on the filled up ground / soil. d) No foundation shall rest on the black cotton soil. e) Before execution of work the bidder shall ensure that there is no obstruction to underground/overground facilities like sewer lines, pipe lines etc. Any such damage and remedial/ rectification measures shall be at the contractors cost. f) Bidder shall also ensure that there is no damage to existing nearby foundations and the foundations pertaining to this package are not placed at shallower depth than the nearby foundations. If required depth of foundation is deeper than the existing foundations, proper protection shall be provided to existing foundations. g) All foundations shall be designed in accordance with relevant parts of the latest revisions of Indian Standards. h) The water table for design purpose shall be considered at Finished Ground Level. i) A combination of open and pile foundations shall not be permitted under the same equipment / structure / building. j) Foundation for equipments on ground floor For equipments of static weight upto 1.5 T, the equipment may be supported on the ground floor slab by locally thickening the slab. Thickening of the ground floor slab shall be done upto an extent of about 0.6 m beyond the plan area of the equipment on all the sides. Further, the load intensity below the equipment shall be limited to 4T/m2. Other requirements of floor slab and compaction below the floor slab shall be adhered, as specified elsewhere in the specifications. For equipment's of static weight between 1.5 T and 20 T, the equipment may be supported on compacted sand filling with the load intensity below the equipment limited to 4T/m2. The minimum depth of foundation is 1.0m below FFL. Other requirements of sand compaction below the foundation shall be adhered, as specified elsewhere in the specifications.

For equipment of static weight more than 20 T, the equipment foundation shall be taken to the founding level or shall be built up with PCC from the level as mentioned in the Table 2. The pedestal of equipment foundation or the foundation Block shall be isolated from the adjoining floor slab by providing bitumen impregnated fiber board of minimum 50 mm thick, conforming to IS: 1838 all around the equipment pedestal for the full depth of the floor slab.

7.02.02 **Open Foundations**

In case open foundations are adopted, following shall be adhered to.

a) The minimum width of foundation shall be 1.0 m.

b) Minimum depth of foundation shall be 1.0m below Ground Level.

c) It shall be ensured that all foundations of a particular structure/ buildings/ facility shall rest on one bearing stratum.

d) Wherever the intended bearing sub-strata is virgin soil stratum but the actual stratum encountered during foundation excavation consists of filled up soil at founding level, under such cases either the foundation shall be lowered completely into the virgin stratum or the filled up soil upto the virgin layers shall be removed and built up through PCC (1:4:8) up to designed foundation level.

7.02.03 Pile Foundations –

(a.) In case piles are adopted, following shall be adhered to :

i) The pile foundation shall be of RCC, Cast-in-situ bored piles as per IS:2911. Pile boring shall be done using Rotary Hydraulic Rigs. However, conventional tripod rig may be allowed in inaccessible areas subject to site specific conditions. Two stage flushing of pile bore shall be ensured by airlift technique duly approved by the Employer.

If required, temporary or permanent MS liner may be provided for piling.

ii) The minimum diameter of pile shall be 600 mm. The allowable load capacity of the pile in different modes (vertical compression, lateral and pullout) shall be as per approved geotechnical report & as enclosed in relevant annexure:

iii) Only straight shaft piles shall be used. Minimum cast length of pile above cutoff level shall be 1.0 m.

iv) The contractor shall furnish design of piles (in terms of rated capacity, length, diameter, termination criteria to locate the founding level for construction of pile in terms of measurable parameter, reinforcement for job as well as test piles, pile load test arrangement, locations of initial test piles etc.) for Engineer's approval.

v) The piling work shall be carried out in accordance with IS:2911 (Relevant part) and accepted construction methodology. The construction methodology shall be submitted by the Contractor for Engineer's approval.

vi) Number of initial load tests to be performed for each diameter and rated capacity of pile shall be subject to minimum as under.

Vertical

Lateral Minimum of 2 Nos. in each mode.

Uplift

vii) The initial pile load test shall be conducted with test load upto three times the pile capacity. In case of vertical compression test (initial test) the method of loading shall be cyclic as per IS:2911 (relevant part).

viii) Load test shall be conducted at pile Cut-off Level (COL). If the water table is above the COL the test pit shall be kept dry throughout the test period by suitable de-watering methods. Alternatively the vertical load test may be conducted at a level higher than COL. In such a case, an annular space shall be created to remove the effect of skin friction above COL by providing an outer casing of suitable diameter larger than the pile diameter.

ix) Number of routine pile load tests to be performed for each diameter/allowable capacity of pile shall be as under :

i) Vertical : 0.5% of the total number of piles provided.

ii) Lateral : 0.5% of the total number of piles provided.

x) The routine tests on piles shall be conducted upto test load of one and half times the allowable pile capacity. Piles for routine load tests shall be approved by the Employer.

xi) In case, routine pile load test shows that the pile has not achieved the desired capacity or pile(s) have been rejected due to any other reason, then the Contractor shall install additional pile(s) as required and the pile cap design shall accordingly be reviewed and modified, if required.

xii) Testing of piles and interpretation of pile load test results shall be carried out as per IS:2911 (Part-4). Contractor shall ensure that all the measuring equipment and instruments are properly calibrated at a reputed laboratory / institute prior to their use. Settlement / movement of the pile top shall be made by Linear Variable Differential Transducers (LVDT) having a least count of 0.01mm.

xiii) The test load on initial test piles shall be applied by means of reaction from anchor piles / rock anchors alone or combination of anchor piles / rock anchors and kentledge with concrete blocks.

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xiv) Low Strain Pile Integrity test shall be conducted on all test piles and job piles. This test shall be used to identify the routine load test and not intended to replace the use of static load test. This test is limited to assess the imperfection of the pile shaft and shall be undertaken by an independent specialist agency to be approved by Engineering department of Owner. The test equipment shall be of TNO or PDI make or equivalent. The process shall confirm to ASTM.

xv) High Strain Dynamic Load Test may be carried out for routine load testing of working piles. However, at least two numbers of static routine vertical load tests shall be carried out on pile on which high strain dynamic load test has already been carried out for establishing the correlation between the two tests. In case of discrepancy if any between dynamic and static vertical load tests, then additional static routine vertical load tests shall be conducted as decided by the Engineer and the results of static routine vertical load shall prevail. Number of routine vertical pile load tests as per clause 7.02.03 (ix) shall be total of static routine vertical load test and high strain dynamic load tests.

The procedure to carry out the test shall be submitted to the Engineer. The test and equipment shall conform to ASTM D4945-00. The test shall be conducted by an experienced independent test agency approved by the owner. Field data shall be submitted to the site engineer and shall include force velocity curves, pile capacity, simulated static load test curve, net and total pile displacement, pile integrity. A (Case pile wave analysis) CAPWAP or equivalent software analysis shall be conducted on the field data for correct capacity estimation and to evaluate end bearing and skin friction components of the pile.

xvi) From load considerations, single pile may be used under a column/tower. In that case, pile shall be connected with tie beams at pile cut off level in both directions.

xvii) Contribution of frictional resistance of filled up soil if any, shall not be considered for computation of frictional resistance of piles.

xviii) Reinforcement for job piles shall be designed as following:

(a) Compression + bending piles: For these piles, the allowable safe pile capacities in compression and bending shall be considered.

(b) Tension + bending piles: For these piles, the actual pile forces to be considered. However, maximum 3 types of combinations for varying percentage of tension capacity + bending case may be designed & adopted by contractor for the entire scope of work under this package.

7.03.00 Special Requirements

7.03.01 Details of treatment for foundations / underground structures required to counteract soil / water chemical environment shall be as per detailed geotechnical investigation to be carried out by

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	contractor. Contractor shall carry out chemical analysis during detailed geotechnical investigation and required treatment shall be provided accordingly.
7.04.00	**Excavation, Filling and Dewatering**
7.04.01	For excavation works, comprehensive dewatering with well point or deep wells arrangement, if required, shall be adopted. Scheme for dewatering and design with all computations and back up data for dewatering shall be submitted for the owner's information. The water table shall be maintained at 0.5m below the founding depth.
7.04.02	Excavation for shallow foundations shall be covered with PCC immediately after reaching the founding level. In case of any local loosening of soil or any loose pockets are encountered at founding level during excavation the same shall be removed and compensated by PCC M7.5. The final layer of about 300 mm thickness above the founding level shall be excavated by suitable means, so as to avoid disturbance to founding stratum.
7.04.03	Backfilling around foundations, pipes, trenches, sumps, pits, plinths, etc. shall be carried out with approved material in layers not exceeding 300 mm compacted thickness (higher thickness of layers upto 500mm with heavy mechanical compacting equipment) and each layer shall be compacted to 90% of standard proctor density for cohesive soils and to 80% of relative density for non-cohesive soils Rock pieces having size less than 150 mm and interstices filled with soil may be used for backfilling around foundation, plinths etc. and shall be compacted to minimum of 85% of original stack of material after filling the interstices.
7.04.04	Founding level for trenches/channels shall be decided as per functional requirement. The bottom of excavation shall be properly compacted prior to casting of bottom slab of trenches / channels.
7.04.05	CBR tests for pavement/road design shall be carried out by the Contractor after earth filling (if applicable) has been completed upto the formation level.
7.04.06	The contractor shall take all necessary measures during excavation to prevent the hazards of falling or sliding of material or article from any bank or side of such excavation which is more than one and a half meter above the footing by providing adequate piling, shoring, bracing etc. against such bank or sides. Adequate and suitable warning signs shall be put up at conspicuous places at the excavation work to prevent any persons or vehicles falling into the excavation trench. No worker should be allowed to work where he may be stuck or endangered by excavation machinery or collapse of excavations or trenches.
7.05.00	**EXCAVATION IN ROCK** Excavation in rock shall be carried out by mechanical means and if blasting is required for founding of some of the structures under this package, control blasting only shall be carried out.
7.05.01	Controlled blasting shall be done by a specialised agency duly approved by Engineer. All controlled blasting shall be done by using time delay detonators (i.e. excel type).
7.05.02	a) Contractor shall engage an agency expert in blasting such as, NIRM (National Institute of Rock Mechanics), CMPDIL, Central Institute of Mining and Fuel Research Dhanbad, Dept. of Mining of Govt. Institutions etc. to design detailed blasting scheme and get the same approved from Engineer before carrying out the blasting operation. All blasting shall be done

as per the approved blasting scheme & initial blasting operations shall be done under the supervision & guidance of the representative of the blasting expert.

b) All the statutory laws, (Explosives Act etc.) rules, regulations, Indian Standards, etc. pertaining to the acquisition, transport, storage, handling and use of explosives, etc. shall be strictly followed.

c) The Contractor shall obtain Licenses from Competent Authorities for undertaking blasting work as well as for procuring, transporting to site and storing the explosives as per explosives act. The Contractor shall be responsible for the safe transport, use, custody and proper accounting of the explosive Materials.

d) The Contractor shall be responsible and liable for any accident and injury / damage which may occur to any person or property of the project or public on account of any operations connected with the storage, transportation, handling or use of explosive and blasting operations.

7.06.00 Sheeting & Shoring

The contractor shall ascertain for himself the nature of materials to be excavated and difficulties, if any, likely to be encountered in excavation while executing the work. Sheet piling, sheeting and shoring, bracing and maintaining suitable slopes, drainage, etc. shall be provided and installed by the Contractor, to the satisfaction of the Engineer.

7.07.00 Geotechnical Investigation

The Contractor shall carry out detailed geotechnical investigation in the areas under his scope for establishing the sub-surface conditions and to decide type of foundations for the structures envisaged, construction methods, any special requirements/treatment called for remedial measures for sub-soil/ foundations etc. in view of soft sub-soils, aggressive sub-soils and water, expansive/swelling soils etc. prior to commencement of detailed design/drawings. The Contractor shall obtain the approval for the field testing scheme proposed by him from the Owner before undertaking the geotechnical investigation work.

7.07.01.00 **Scheme of geotechnical Investigation**

7.07.02.01 Field test shall include but not be limited to the following:

Boreholes, Standard Penetration Test (SPT), Dynamic Cone Penetration Test (DCPT), collection of disturbed samples (DS) and undisturbed soil samples (UDS), Trial Pits (TP), Plate Load Tests (PLT), Electrical Resistivity Test (ERT), In situ field permeability tests, collection of water samples, etc.

7.07.02.02 The diameter of borehole shall be minimum 150 mm in soil and 76 mm in rock. The diameter of UDS sampler shall be 100 mm minimum. Core drilling in rock shall be done by using hydraulically feed rotary drill & double tube core barrel with diamond bit.

7.07.02.03 The minimum tests are indicated in Clause No. 7.08.00. Adequate number of tests shall be conducted up to sufficient depth for complete determination of subsoil conditions. The depth of boreholes shall be as specified in Appendix A. SPT shall be carried out in all types of soil deposits and in all rock formations with core recovery up to 20%, met within a borehole. This test shall be conducted at every 3.0 m interval or at change of strata, up to the final depth. SPT 'N' of 100 and above shall be referred as refusal. UDS shall be collected at every 3.0 m interval or at change of strata up to depth of borehole. UDS may be replaced by additional SPT, if SPT'N' value in the strata is above 50.

7.07.02.04 Laboratory tests shall be done as per relevant IS codes. The laboratory tests, not be limited to the following shall be conducted on disturbed and undisturbed soil samples, rock samples & water samples collected during field investigations in sufficient numbers.

Laboratory Tests on Soil Samples

Laboratory tests shall be carried out on disturbed and undisturbed soil samples for Grain Size Analysis, Hydrometer Analysis, Atterberg Limits, Triaxial Shear Tests (UU), Natural Moisture Content, Specific Gravity and Bulk Unit Weight, Consolidation Tests, Unconfined Compression Test, Free swell Index, Shrinkage Limit, Swell Pressure Test, Chemical Analysis test on soil and water samples to determine the carbonates, sulphates, chlorides, nitrates, pH, organic matter and any other chemicals harmful to concrete and reinforcement/ steel.

Laboratory Tests on Rock Samples

Moisture content, porosity & density, Specific Gravity, Hardness, Soundness, Slake durability index, Unconfined compression test (Both at saturated and in-situ water content), Point load strength index and deformability test (Both at saturated and in-situ water content) shall be carried out on rock samples.

7.07.02.05 Geotechnical investigation (field & laboratory) shall be carried out in accordance with the provisions of relevant Indian Standards.

On completion of all field & laboratory work, geotechnical investigation report shall be submitted for Owner's review/approval. The Geotechnical investigation report shall contain geological information of the region, procedure adopted for investigation, field & laboratory observations/ data/ records, analysis of results & recommendations on type of foundation for different type of structures envisaged for all areas of work with supporting calculations. Recommendations on treatment for soil, foundation, based on subsoil characteristics, soft soils, aggressive chemicals, expansive soils, etc.

Recommendations on foundation system and the net allowable bearing pressures and pile capacity shall be based on the conservative values of geotechnical investigation data.

7.07.03.00 Geotechnical investigation work shall be got executed by the Contractor through the following agencies.

1. C.E.TESTING COMPANY Pvt. Ltd, Kolkata
2. Cengrs Geotechnica Pvt. Ltd, New Delhi
3. KCT Consultancy Services, Ahemdabad
4. M.K. Soil Testing Laboratory, Ahemdabad

7.08.00 Geotechnical Investigation Scheme

a) **Boreholes (Minimum)**

S.No	Structure	Spacing/Number of borehole	Depth of borehole	Remarks
1	FGD	Minimum 14 Nos.	Depth of boreholes shall be 25m to 35m.	Depth of boreholes

2	Crusher House	Minimum 2 Nos.	Depth of boreholes shall be 25m to 35m.	shall be as mentioned in column "Depth of Borehole" or 5m continuous in rock with RQD > 25% whichever is earlier.
3	Gypsum and Lime storage area	Minimum 10 Nos.	Depth of boreholes shall be 15m to 25m	
4	Other Structure/Facility	Minimum 2 Nos. boreholes under each area / facility	15 to 20 m	
5	Chimney	Minimum 2 Nos.	30 to 35m	

b) Other Field Tests (Minimum)

1	Cyclic Plate Load Test (CPLT)	3 nos	Test Depth from 2 to 4 m	
2	TRIAL PIT (TP)	5 Nos.	Depth - 3 m	
3	IN SITU PERMEABILITY TEST IN BOREHOLES	In minimum 3 Nos. of boreholes	Tests shall be conducted at depths of 1.0m, 3.0m, 5.0m, 8.0m and 12.0m.	
4	ERT	Minimum 10 Nos.		

- Depth and location of Boreholes and other field tests (PLT, ERT, field permeability tests etc.) shall be approved by Owner before execution of geotechnical investigation work.
- Investigation in any other building / structure / facilities / trestles which are not mentioned above shall also be carried out, if required, by the bidder for the facilities under his scope.

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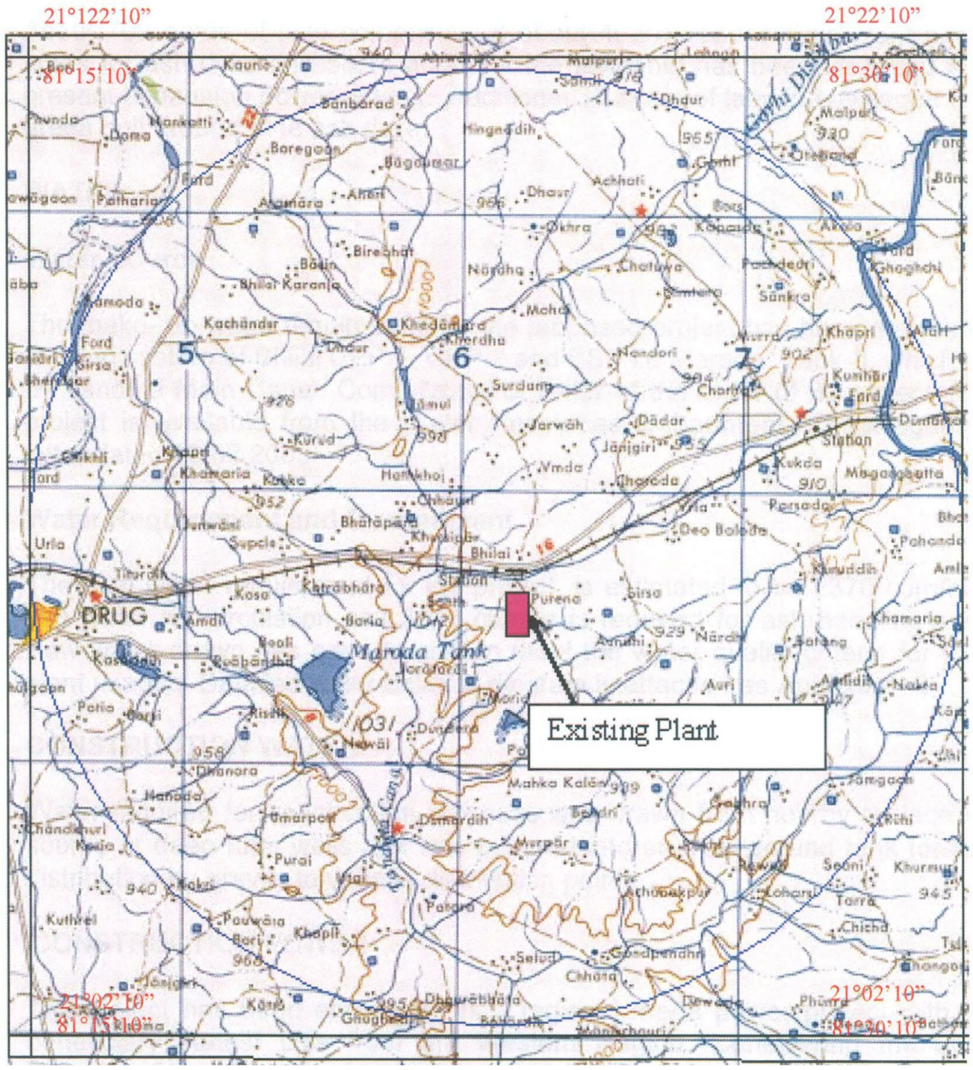
ANNEXURE-I



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PROJECT INFORMATION

ANNEXURE-II

स्टेशन : रायपुर
STATION : Raipur

अक्षांश LAT 21°14′ N देशांतर LONG 81°39′ E समुद्री तल स्तर से ऊँचाई HEIGHT ABOVE M.S.L. 298 METRES

1951 से 1980 तक के प्रेक्षण पर आधारित
BASED ON OBSERVATIONS FROM 1951 TO 1980

वायु तापमान AIR TEMPERATURE

महीना MONTH		स्टेशन का समुद्र तल पर दाब STATION LEVEL PRESSURE hPa	मध्यम MEAN: शुष्क बल्ब DRY BULB °C	मध्यम MEAN: तर बल्ब WET BULB °C	मध्यम MEAN: दैनिक अधिक DAILY MAX °C	मध्यम MEAN: दैनिक न्यून DAILY MIN °C	चरम EXTREMES: महीने में उच्चतम HIGHEST IN THE MONTH °C	चरम EXTREMES: महीने में निम्नतम LOWEST IN THE MONTH °C	चरम EXTREMES: उच्चतम HIGHEST °C	चरम EXTREMES: दिनांक और वर्ष DATE AND YEAR	चरम EXTREMES: निम्नतम LOWEST °C	चरम EXTREMES: दिनांक और वर्ष DATE AND YEAR	आर्द्रता HUMIDITY: सापेक्ष आर्द्रता RELATIVE HUMIDITY %	आर्द्रता HUMIDITY: वाष्प दाब VAPOUR PRESSURE hPa	मेघ की मात्रा CLOUD AMOUNT: समस्त मेघ ALL CLOUDS Oktas of sky	मेघ की मात्रा CLOUD AMOUNT: निम्न मेघ LOW CLOUDS Oktas of sky	वर्षा RAINFALL: मासिक योग MONTHLY TOTAL mm	वर्षा RAINFALL: वर्षा के दिनों की संख्या NO. OF RAINY DAYS	वर्षा RAINFALL: सर्वाधिक वर्षा सहित सबसे नम महीने का योग TOTAL IN WETTEST MONTH WITH YEAR mm	वर्षा RAINFALL: सर्वाधिक वर्षा सहित सबसे शुष्क महीने का योग TOTAL IN DRIEST MONTH WITH YEAR mm	वर्षा RAINFALL: 24 घंटों में सबसे भारी वर्षा HEAVIEST FALL IN 24 HOURS mm	वर्षा RAINFALL: वर्ष DATE AND YEAR
जनवरी JAN	I	982.7	17.6	13.5	27.5	13.3	30.9	9.2	35.0	22 1955	5.0	18 1908	60	12.2	1.7	0.4	6.7	0.8	134.4 1943	0.0	55.4	22 1921
	II	979.1	25.2	16.7									39	12.3	1.8	0.6						
फरवरी FEB	I	980.7	21.0	15.1	31.1	16.5	35.2	11.7	37.8	25 1899	5.0	09 1893	51	12.5	1.6	0.5	12.3	1.0	118.9 1901	0.0	57.4	04 1917
	II	976.8	29.4	18.2									30	12.0	1.8	0.8						
मार्च MAR	I	978.7	25.9	17.5	35.5	20.8	39.6	16.1	43.3	28 1892	8.3	04 1898	41	13.3	1.9	0.5	24.6	1.7	108.2 1926	0.0	55.9	17 1908
	II	974.2	33.7	19.9									24	12.0	2.2	0.9						
अप्रैल APR	I	975.5	30.9	21.0	39.6	25.3	43.2	20.1	46.1	30 1942	15.0	02 1905	39	16.9	2.2	0.5	15.7	1.6	131.1 1909	0.0	38.3	18 1908
	II	970.5	37.6	22.2									23	14.4	3.3	1.6						
मई MAY	I	971.1	33.9	23.2	42.0	28.3	45.2	23.8	47.7	10 1973	14.4	27 1904	39	19.7	2.5	0.5	18.8	1.9	147.1 1933	0.0	80.3	27 1904
	II	966.3	39.8	23.5									23	15.9	4.0	2.5						
जून JUN	I	958.1	30.2	24.4	37.4	26.5	43.6	21.9	47.2	11 1931	16.1	21 1884	64	26.0	5.5	2.1	189.8	9.3	638.1 1918	18.5 1902	197.8	11 1910
	II	964.4	33.9	24.9									51	24.2	6.3	3.8						
जुलाई JUL	I	968.1	28.4	24.5	30.8	24.0	35.4	21.7	38.9	01 1931	20.0	01 1884	85	29.2	7.0	4.0	381.0	16.0	988.8 1884	143.5 1911	228.7	02 1970
	II	965.2	28.5	25.1									76	29.1	7.1	4.4						
अगस्त AUG	I	969.0	28.1	24.4	30.2	23.9	33.4	21.9	37.5	03 1972	20.0	20 1939	87	29.3	7.0	4.0	344.7	15.7	795.3 1947	100.8 1896	370.3	04 1910
	II	966.1	28.1	25.0									78	29.1	7.1	4.3						
सितम्बर SEP	I	972.5	26.9	24.5	31.3	23.9	34.0	21.7	37.2	19 1899	18.3	28 1902	81	28.7	5.5	2.3	230.2	9.7	778.9 1960	8.4 1940	196.2	19 1960
	II	969.2	28.7	24.7									72	27.9	6.3	3.5						
अक्तूबर OCT	I	977.8	25.8	22.1	31.8	21.5	34.1	17.8	37.8	11 1899	13.9	30 1933	71	23.7	3.2	1.2	53.9	3.8	246.4 1896	0.0	148.6	08 1900
	II	974.4	28.8	22.4									55	22.0	3.9	1.9						
नवम्बर NOV	I	981.7	21.6	17.2	29.6	16.5	32.0	13.0	35.6	02 1935	8.3	22 1883	62	18.2	2.1	0.4	7.4	0.6	138.2 1924	0.0	70.4	02 1930
	II	978.2	26.4	18.8									45	15.6	2.5	0.8						
दिसम्बर DEC	I	983.2	18.1	14.0	27.3	13.2	30.2	9.7	32.3	27 1976	3.9	29 1902	61	12.7	1.7	0.2	3.7	0.4	58.6 1909	0.0	52.1	28 1909
	II	979.9	24.1	16.7									43	13.0	2.0	0.3						
वार्षिक योग या माध्य ANNUAL TOTAL OR MEAN	I	975.8	25.4	20.1	32.8	21.1	45.5	8.8	47.7		3.9		62	20.0	3.5	1.4	1288.8	62.3	2181.4	688.9	370.3	
	II	972.0	30.4	21.5									47	19.0	4.0	2.1			1884	1899		
वर्षों की संख्या NUMBER OF YEARS	I	30	30	30	30	30	30	30	100		100		30	30	30	22	30	30	100	100	100	30
	II	30	30	30									30	30	30	22						

Annexure-III

SOIL DATA AND FOUNDATION SYSTEM

Employer has carried out geotechnical investigation in vicinity to the proposed area. Logs of available boreholes for bidder's solely information in the vicinity of proposed area are enclosed with this Annexure.

The bidder is required to carry out geotechnical investigation as per Clause No 7.08.00 and ascertain the bearing capacity. The onus of correct assessment / interpretation and understanding of the existing subsoil condition / data is on the Bidder. The existing ground level (EGL) is varying as per enclosed contour/spot level drawing.

a) The foundation system to be adopted for different structures shall be as given in Table – 1 below

Table – 1: Net Allowable Bearing Pressure

STRUCTURE	TYPE OF FOUNDATION TO BE ADOPTED
FGD and related structures	Open/pile

b) Bidder is required to carry out geotechnical investigation in this area. The allowable bearing pressure shall be adopted after approval of geotechnical investigation report by owner. However, the maximum allowable bearing pressure shall be as per the approved geotechnical report and shall be limited to the values as furnished in Table-2.

Table – 2: Net Allowable Bearing Pressure

Founding Depth/ Stratum	Net Allowable Bearing PressureT/m2		
	Isolated and combined footings including raft for 25mm permissible settlement in case of soil and 12mm in case of rocky strata	Isolated and combined footings for 40mm permissible settlement in case of soil and 12mm in case of rocky strata	Rafts (width > 6m) for 75mm permissible settlement in case of soil and 12mm in case of rocky strata
	Width upto 6.0m		
In case of Soil			

2.0m below NGL	12	14	20
3.0m below NGL	15	20	25
In case of rocky strata			
0.5m embedment into rock	30	30	30
1.0m embedment into rock	35	35	35

- For NGL, topographical survey drawing along with borehole details carried out by bidder shall be referred.

The net allowable bearing pressure higher than above mentioned values shall not be permitted. At intermediate levels the bearing capacity shall be same as the net allowable bearing pressure corresponding to the immediate shallower level mentioned above.

c) Permissible Settlement of Foundations:

For open foundations, the total permissible settlement and differential settlement shall be governed by IS: 1904 and from functional requirements whichever is more stringent. However, total settlement shall be restricted to the following:

Isolated, Strip & Raft (Mill foundations/machine foundation)	25 mm
Isolated & Strip (Other than Mill foundations/machine foundation)	40 mm
Raft (widths greater than 6 m) (Other than Mill foundations/machine foundation)	75 mm
Foundations in rock	12 mm

In case the total permissible settlement is to be restricted to less than as above specified from functional requirements, then the net allowable bearing pressure shall be reduced after review in consultation with Engineer.

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PROJECT INFORMATION

Annexure-IV

M.K.SOIL TESTING LABORATORY - CAMP : BHILAI

PROFORMA FOR PRESENTING DRILLING INFORMATION

PROJECT GEOTECHNICAL INVESTIGATION OF PP2	GEOLOGICAL LOG OF DRILL HOLE	FEATURE
HOLE NO BH 31		TOTAL DEPTH : 30 MTR.
BEARING OF HOLE -	LOCATION MAIN PLANT AREA PP 2	GROUND WATER TABLE:- 1.50 MTR.SEEPAGE WATER
COLLAR ELEVATION -	CD ORDINATES X 2200 Y 9100	TYPE OF CORE BARREL USED : DOUBLE TUBE
TYPE OF USED (WITH DEPTH) DIAMOND	ANGLE WITH HORIZONAL VERTICAL	DATE OF COMPLETION 17.08.2003
STARTED 08.08.2003	GROUND RL : 296.515m.	

DEPTH IN MT FROM	TO	DATE	LITHOLOGY DESCRIPTION	LOG	PIECES WITH SIZES <10 mm	10 to 25	25 to 75	75 to > 150	STRUCTURAL LOG	STRUCTURAL DESCRIPTION	SAMPLING/TEST/RUN	RECOVERY 20	40	60	80	100	ROD(%)	RATE	CASING	WATER LOSS NO PARTIAL 25	50	75	100	COLOUR OF WASH	DESCRI	SPECIAL OBSERVATION AND INTERPRETATION
0.00	0.50	8.8.03	Reddish brown clay with organic materials and kankers								DS.															
0.50	1.50	8.8.03	Reddish brown clay with kankers and gravels.								UDS															
1.50	2.25	8.8.03	Reddish brown clay with kankers and gravels.								SPT 4,6,10 N = 16													Reddish		
2.25	3.00	9.8.03	Reddish brown clay with kankers and gravels.								DS.															
3.00	3.75	9.8.03	Reddish brown clay with kankers and gravels.								UDS/DS															
3.75	4.50	9.8.03	Yellowish brown clay with kankers and gravels.								DS.															
4.50	5.25	9.8.03	Verigated clay/lateritic clay								SPT 40,40,45 N = 85															
5.25	6.00	9.8.03	Verigated clay/lateritic clay								DS.															
6.00	6.75	9.8.03	Verigated clay/lateritic clay								UDS															
6.75	7.50	9.8.03	Verigated clay/lateritic clay								DS.															
7.50	8.25	10.8.03	Verigated clay/lateritic clay								SPT 45, N > 100 10cm.pene.															
8.25	9.00	10.8.03	Verigated clay/lateritic clay								DS.															
9.00	9.75	10.8.03	Verigated clay/lateritic clay								UDS/DS															
9.75	10.50	10.8.03	Verigated clay/lateritic clay								DS.															
10.50	11.25	10.8.03	Verigated clay/lateritic clay								SPT 50, N > 100 8 cm.pene.															
11.25	12.00	11.8.03	Redish brown clay /lateritic clay with kankers								DS.															
12.00	12.75	11.8.03	Redish brown clay /lateritic clay with kankers								UDS															
12.75	13.50	11.8.03	Redish brown clay /lateritic clay with kankers								DS.															
13.50	14.25	12.8.03	Weathered slaty shale of redish yellow colour								SPT N > 100															
14.25	15.00	12.8.03	Dark brown coloured lime stone with stromatolitic fossile								DS															THE ROCK IS SEDIMENTARY, SOFT, WEATHERED. ALSO CORE SAMPLE BREAKS FROM THE CARBONATE VEIN PART OF A SAMPLE. THERE IS ALTERNATE LAYER OF LIME STONE AND SHALE. WATER LOSS IS ENCOUNTERED AT 20 MTR. TILL END.
15.00	15.75	13.8.03	Dark brown coloured lime stone with stromatolitic fossile			2					CS CR - 21% RQD 20%						20	220								
15.75	16.50	14.8.03	Dark brown coloured lime stone with stromatolitic fossile			1	2				CS CR - 26% RQD 17%						17	220								
16.50	17.25	14.8.03	Dark brown coloured lime stone with stromatolitic fossile					1			CS CR - 25% RQD 13%						13	220								
17.25	18.00	14.8.03	Dark brown coloured lime stone with stromatolitic fossile			1	-	1			CS CR - 28% RQD17%						17	230						Yellowish		
18.00	18.75	15.8.03	Dark brown coloured lime stone with stromatolitic fossile			1	-	1			CS CR - 30% RQD NIL						-	250								
18.75	19.50	15.8.03	Dark brown coloured lime stone with stromatolitic fossile			2	2				CS CR - 32% RQD NIL						-	250								
19.50	20.25	15.8.03	Dark brown coloured lime stone with slaty shale having carborate vains.			1	-	1			CS CR - 40% RQD NIL						-	250								
20.25	21.00	15.8.03	Yellowish slaty shale with carborate vains.			3	1				CS CR - 35% RQD NIL						-	250								
21.00	21.75	16.8.03	Yellowish slaty shale with carborate vains.			3					CS CR - 36% RQD NIL						-	250								
21.75	22.50	16.8.03	Yellowish slaty shale with carborate vains.			1					CS CR - 38% RQD NIL						-	235								
22.50	23.25	16.8.03	Yellowish slaty shale with carborate vains.			1					CS CR - 40% RQD NIL						-	240								
23.25	24.00	16.8.03	Yellowish slaty shale with carborate vains.			2	3				CS CR - 34% RQD NIL						-	235								
24.00	24.75	16.8.03	Yellowish slaty shale with carborate vains.			1	2				CS CR - 36% RQD NIL						-	235								
24.75	25.50	16.8.03	Yellowish slaty shale with carborate vains.			1	-	2			CS CR - 38% RQD NIL						-	230								
25.50	26.25	16.8.03	Yellowish slaty shale with carborate vains.			1	1	1			CS CR - 40% RQD NIL						-	230								
26.25	27.00	16.8.03	Dark brown colour lime stone with stromatolitc fossile			2	-	4			CS CR - 37% RQD 16%						16	225								
27.00	27.75	16.8.03	Dark brown colour lime stone with stromatolitc fossile			2	2				CS CR - 38% RQD 18%						18	230								
27.75	28.50	17.8.03	Dark brown colour lime stone with stromatolitc fossile			3	-	2			CS CR - 42% RQD 22%						22	235								
28.50	29.25	17.8.03	Dark brown colour lime stone with stromatolitc fossile			2	3	1			CS CR - 44% RQD 24%						24	225								
29.25	30.00	17.8.03	Dark brown colour lime stone with stromatolitc fossile			1	2				CS CR - 52% RQD 16%						16	180								

CLAUSE NO.

PROJECT INFORMATION

M.K.SOIL TESTING LABORATORY - CAMP : BHILAI

PROFORMA FOR PRESENTING DRILLING INFORMATION

PROJECT GEOTECHNICAL INVESTIGATION OF PP2	GEOLOGICAL LOG OF DRILL HOLE	FEATURE
HOLE NO BH 33		TOTAL DEPTH : 30 MTR.
BEARING OF HOLE -	LOCATION MAIN PLANT AREA PP 2	GROUND WATER TABLE:- 1 MTR.SEEPAGE WATER
COLLAR ELEVATION -	CO ORDINATES X 1700 Y 9400	TYPE OF CORE BARREL USED : DOUBLE TUBE
TYPE OF USED (WITH DEPTH) DIAMOND	ANGLE WITH HORIZONAL VERTICAL	DATE OF COMPLETION 09.09.03
STARTED 03.09.2003	GROUND RL : 289.744	

MT FROM	MT TO	DATE	LITHOLOGY DESCRIPTION	LOG	PIECES WITH SIZES <10 mm	10 to 25	25 to 75	75 to >150	STRUCTURAL LOG	STRUCTURAL DESCRITPION	SAMPLING/TEST/RUN	RECOVERY 20	40	60	80	100	RQD(%)	RATE OF CASING	WATER LOSS NO PARTIAL 25	50	75	100	COLOUR OF WASH	WASH DESCRI	SPECIAL OBSERVATION AND INTERPRETATION
0.00	0.00	3.9.03	Reddish brown clay with organic materials with kankers and gravels.(Red colour)								DS												REDDISH COLOUR		
0.00	0.50	3.9.03	Reddish brown clay with kankers and gravels								UDS/DS														
0.50	1.50	3.9.03	Reddish brown clay with kankers and gravels								SPT 7,12,19 N =31														
1.50	2.25	3.9.03	Reddish brown clay with kankers and gravels								DS														
2.25	3.00	4.9.03	Reddish brown clay with kankers and gravels								UDS														
3.00	3.75	4.9.03	Reddish brown clay with kankers and gravels								DS														
3.75	4.50	4.9.03	Reddish brown clay with kankers and gravels								SPT 12,18,23 N= 41														
4.50	5.25	4.9.03	Reddish brown clay with kankers and gravels								DS														
5.25	6.00	4.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.								DS														
6.00	6.75	4.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.								DS														THE ROCK IS SEDIMENTARY SOFT AND WEATHERED. YELLOWISH GREEN SLATY SHALE IS FOUND IN THIS BORE WITH FOSSILE IMPRESSIONS AND CARBONATE VEINS. LIME STONE PATCH OF 55 CM. HAS BEEN ENCOUNTERED AT A DEPTH OF 16 MTRS. WHICH IS A PECULIAR FEATURE OF THIS BORE HOLE. IN THIS BORE HOLE ROCK HAS BEEN ENCOURED AT A DEPATH OF 7.50 MTRS.
6.75	7.50	4.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.								DS														
7.50	9.00	5.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.								CS CR - 40 RQD NIL						-	190							
9.00	10.50	5.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.								CS CR - 37 RQD NIL						-	190							
10.50	12.00	6.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.								CS CR - 36 RQD NIL						-	190							
12.00	13.50	6.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.								CS CR - 42 RQD NIL						-	180							
13.50	15.00	6.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.			3	1	-	-		CS CR - 60 RQD NIL						-	200							
15.00	16.50	6.9.03	Dark brown colour lime stone with stromatolitic fossile impression alongwith grayish slaty shale having carbonate veins.			5	8	2	-		CS CR - 80 RQD 26%						26	200					YELLOWISH COLOUR		
16.50	18.00	6.9.03	Grayish slaty shale with carbonate veins.			6	6	3	-		CS CR - 90 RQD 15%						15	190							
18.00	19.50	7.9.03	Grayish slaty shale with carbonate veins.			5	4	3	-		CS CR - 91 RQD 28%						28	190							
19.50	21.00	7.9.03	Grayish slaty shale with carbonate veins.			4	3	1			CS CR - 76 RQD 14%						14	180							
21.00	22.50	7.9.03	Grayish slaty shale with carbonate veins.			3	1	6	1		CS CR - 92 RQD 34%						34	200							
22.50	24.00	8.9.03	Grayish slaty shale with carbonate veins.			3	-	5	2		CS CR - 93 RQD 45%						45	210							
24.00	25.50	8.9.03	Grayish slaty shale with carbonate veins.			2	2	7	2		CS CR - 90 RQD 56%						56	220							
25.50	27.00	8.9.03	Grayish slaty shale with carbonate veins.			2	2	-	2		CS CR - 96 RQD 62%						62	230							
27.00	28.50	9.9.03	Grayish slaty shale with carbonate veins alongwith Dark brown colour lime stone with 55 cm. Legnth.			2	3	-	1		CS CR - 88 RQD 36%						36	220							
28.50	30.00	9.9.03	Grayish slaty shale with carbonate veins.			6	4	1	-		CS CR - 90 RQD 34%						34	200							

CLAUSE NO.

PROJECT INFORMATION

M.K.SOIL TESTING LABORATORY - CAMP : BHILAI

PROFORMA FOR PRESENTING DRILLING INFORMATION

PROJECT GEOTECHNICAL INVESTIGATION OF PP2	GEOLOGICAL LOG OF DRILL HOLE	FEATURE
HOLE NO BH 33		TOTAL DEPTH : 30 MTR.
BEARING OF HOLE -	LOCATION MAIN PLANT AREA PP 2	GROUND WATER TABLE:- 1 MTR.SEEPAGE WATER
COLLAR ELEVATION -	CD ORDINATES X 1700 Y 9400	TYPE OF CORE BARREL USED : DOUBLE TUBE
TYPE OF USED (WITH DEPTH) DIAMOND	ANGLE WITH HORIZONAL VERTICAL	DATE OF COMPLETION 09.09.03
STARTED 03.09.2003	GROUND RL : 289.744	

MT FROM	MT TO	DATE	LITHOLOGY DESCRIPTION	LOG	PIECES WITH SIZES <10 mm	10 to 25	25 to 75	75 to 160	> 160	STRUCTURAL LOG	STRUCTURAL DESCRIPTION	SAMPLING/TEST/RUN	RECOVERY 20	40	60	80	100	ROD(%)	RATE OF CASING	WATER LOSS NO PARTIAL 25	50	75	100	COLOUR OF WASH WATER	DESCRIPTION	SPECIAL OBSERVATION AND INTERPRETATION
0.00	0.00	3.9.03	Reddish brown clay with organic materials with kankers and gravels (Red colour)									DS												REDDISH COLOUR		
0.00	0.50	3.9.03	Reddish brown clay with kankers and gravels									UDS/DS														
0.50	1.50	3.9.03	Reddish brown clay with kankers and gravels									SPT 7,12,19 N =31														
1.50	2.25	3.9.03	Reddish brown clay with kankers and gravels									DS														
2.25	3.00	4.9.03	Reddish brown clay with kankers and gravels									UDS														
3.00	3.75	4.9.03	Reddish brown clay with kankers and gravels									DS														
3.75	4.50	4.9.03	Reddish brown clay with kankers and gravels									SPT 12,18,23 N= 41														
4.50	5.25	4.9.03	Reddish brown clay with kankers and gravels									DS														
5.25	6.00	4.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.									DS														
6.00	6.75	4.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.									DS														THE ROCK IS SEDIMENTARY SOFT AND WEATHERED. YELLOWISH GREEN SLATY SHALE IS FOUND IN THIS BORE WITH FOSSILE IMPRESSIONS AND CARBONATE VEINS. LIME STONE PATCH OF 55 CM. HAS BEEN ENCOUNTERED AT A DEPTH OF 16 MTRS. WHICH IS A PECULIAR FEATURE OF THIS BORE HOLE. IN THIS BORE HOLE ROCK HAS BEEN ENCOURED AT A DEPATH OF 7.50 MTRS.
6.75	7.50	4.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.									DS														
7.50	9.00	5.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.									CS CR - 40 RQD NIL					-	190								
9.00	10.50	5.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.									CS CR - 37 RQD NIL					-	190								
10.50	12.00	6.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.									CS CR - 36 RQD NIL					-	190								
12.00	13.50	6.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.									CS CR - 42 RQD NIL					-	180								
13.50	15.00	6.9.03	Yellowish green slaty shale with fossile impression and carbonate veins.			3	1	-	-			CS CR - 60 RQD NIL					-	200						YELLOWISH COLOUR		
15.00	16.50	6.9.03	Dark brown colour lime stone with stromatolitic fossile impression alongwith grayish slaty shale having carbonate veins.			5	8	2	-			CS CR - 80 RQD 26%					26	200								
16.50	18.00	6.9.03	Grayish slaty shale with carbonate veins.			6	6	3	-			CS CR - 90 RQD 15%					15	190								
18.00	19.50	7.9.03	Grayish slaty shale with carbonate veins.			5	4	3	-			CS CR - 91 RQD 28%					28	190								
19.50	21.00	7.9.03	Grayish slaty shale with carbonate veins.			4	3	1				CS CR - 76 RQD 14%					14	180								
21.00	22.50	7.9.03	Grayish slaty shale with carbonate veins.			3	1	6	1			CS CR - 92 RQD 34%					34	200								
22.50	24.00	8.9.03	Grayish slaty shale with carbonate veins.			3	-	5	2			CS CR - 93 RQD 45%					45	210								
24.00	25.50	8.9.03	Grayish slaty shale with carbonate veins.			2	2	7	2			CS CR - 90 RQD 56%					56	220								
25.50	27.00	8.9.03	Grayish slaty shale with carbonate veins.			2	2	-	2			CS CR - 96 RQD 62%					62	230								
27.00	28.50	9.9.03	Grayish slaty shale with carbonate veins alongwith Dark brown colour lime stone with 55 cm. Legnth.			2	3	-	1			CS CR - 88 RQD 36%					36	220								
28.50	30.00	9.9.03	Grayish slaty shale with carbonate veins.			6	4	1	-			CS CR - 90 RQD 34%					34	200								

Table-1

COAL AND ASH CHARACTERISTICS

S.N.	Description	Symbol	Design Coal	Worst Coal	Best Coal
A: PROXIMATE ANALYSIS (As received basis)					
1	Total Moisture	%	13	16	12
2	Ash	%	42	46	38
3	Volatile matter	%	21	18	24
4	Fixed carbon	%	24	20	27
B: ULTIMATE ANALYSIS (As received basis)					
1	Carbon	C%	32.92	27.97	39.08
2	Hydrogen	H2%	3.2	2.45	3.4
3	Nitrogen	N2%	1.28	1.08	1.19
4	Oxygen (By difference)	O2%	7.2	6.00	6.97
5	Sulphur	S%	0.4	0.50	0.36
6	Total Moisture	H2O%	13.00	16.00	11.00
7	Ash	%	42.00	46.00	38.00
8	Gross Calorific Value	KCal/Kg	3400	2800	4000
9	Hard grove index		55	50	60
C: ASH ANALYSIS					
1	Silica	(SiO2)%	58.78	61.30	55.70
2	Alumina	(Al2O3)%	28.20	28.35	27.20
3	Iron Oxide	(Fe2O3)%	7.5	6.00	10.00
4	Titania	(TiO2)%	1.50	1.00	2.00
5	Lime	(CaO)%	1.23	1.05	1.50
6	Magnesia	(MgO)%	1.55	1.35	2.05
7	Sodium Oxide(Na_2O) & Potassium Oxide (K_2O	% By Difference	1.09	0.80	1.40
8	Phosphoric Anhydride	(P2O5)%	0.05	0.05	0.05
10	Sulphuric Anhydride	(SO3)%	0.10	0.10	0.10
D: ASH FUSION RANGE (Under reducing atmosphere)					
a)	Initial Deformation Temperature (IDT)	°C	1150	1200	1100
b)	Hemispherical temperature	°C	1350	1400	1300
c)	Flow temperature	°C	1400	1400	1400

TABLE - 2
LIGHT DIESEL OIL CHARACTERISTICS
AS PER IS 1460-2000

Characteristics		LDO
1.	Pour Point (max)	21°C & 12°C for Summer and Winter respectively
2.	Kinematic viscosity in centistokes at 40 deg.C	2.5 to 15.7
3.	Sediment percent by mass (max)	0.10
4.	Total sulphur percent by mass (max)	1.8
5.	Ash percentage by mass (max)	0.02
6.	Carbon residue (Rans bottom) percent by pass (max.)	1.50
7.	Acidity in organic	Nil
8.	Flash point(Min.) - Pensky Martens	66 deg.C
9.	Copper strip corrosion for3 hours at 100°C	Not worse than No. 2
10.	Water content, % by volume(max)	0.25
11.	GCV (Kcal/kg)	10,000

TABLE - 2
FUEL OIL CHARACTERISTICS

Sl. No.	Characteristics	Heavy Furnace oil IS 1953-1971 Grade HV	Low Sulphur Heavy Stock (LSHS)	Heavy Petroleum Stock (HPS)
1.	Total Sulphur Content	4.5% Max	1.0% Max	4.5% Max
2.	Gross Calorific Value (Kcal/kg)	Of the order of 11,000	Of the order of 11,000	9,500 (min)
3.	Flash point (Min)	66deg C	75 deg C	75deg C
4.	Water content by volume (Max)	1.0%	1.0%	1.0%
5.	Sediment by weight (Max)	0.25%	0.25%	0.25%
6.	Asphaltene content by weight (Max)	2.5%	2.5%	2.5%
7.	Kinematic viscosity in centristrokes at 50 deg C (Max)	370	180	500
8.	Ash content by weight (Max)	0.1%	0.05%	0.1%
9.	Addity (Inorganic)	Nil	Nil	Nil
10.	Pour Point (Max)	-	57Deg C	72 Deg C
11.	Sodium Content	-	-	100 ppm
12.	Vanadium content	25 ppm	25 ppm	25 ppm
13.	Specific heat below pour point (Kcal/KG0C)	-	0.65	-

Table-3 NOT USED

Table-4

DESIGN CLARIFIED WATER ANALYSIS

S.No	Constituent	As	mg/l (except pH & turbidity)
1.	Calcium	$CaCO_3$	38
2.	Magnesium	$CaCO_3$	22
3.	Chloride	$CaCO_3$	20
4.	Sulphate	$CaCO_3$	17
5.	Alkalinity	$CaCO_3$	54
6.	Iron(total)	Fe	0.1
7.	Total Silica	SiO_2	07
8.	pH value	---	7.5
9.	Turbidity	NTU	02

Note: Clarified water is used for CW system as make up & the CW system is expected to operate at about 5.0 – 5.5 Cycles of Concentration (COC) with suitable chemical treatment program using acid, scale & corrosion inhibitor dozing. As CW blow down water is tapped from CW system, the water quality of CW blow down shall accordingly be arrived by the bidder.

Table-5

ANALYSIS OF DM WATER

S.N.	Characteristics	Value
1.	Silica (Max.)	0.02 ppm as SiO2
2.	Iron (Fe)	Nil
3.	Total hardness	Nil
4.	pH value	6.8 to 7.2
5.	Conductivity	Not more than 0.1 µs/cm

Table-6

STEAM GENERATOR DATA

1.	**Location**	**Outdoor**
2.	Operation	Base load
3.	Type	Pulverized coal fired
4.	Maximum Continuous Rating	790 Tonns/hr.
5.	Steam pressure at SH outlet	155 Kg/cm²(a)
6.	Steam temperature at SH outlet	540°C
7.	Oil for startup and flame stabilization	LDO
8.	Fuel oil system sizing	7.5% of Boiler MCR for start-up by LDO, 40% of Boiler MCR by HFO
9.	Pulverised coal size and 99% thru 50 mesh	Minimum 70% through 200 Mesh
10.	Type of pulveriser	Vertical spindle mills
11.	Type of oil burners	Air atomized for LDO
12.	No. of air heaters	One
13.	No. of ID Fans	Two (both working)

ESP DATA

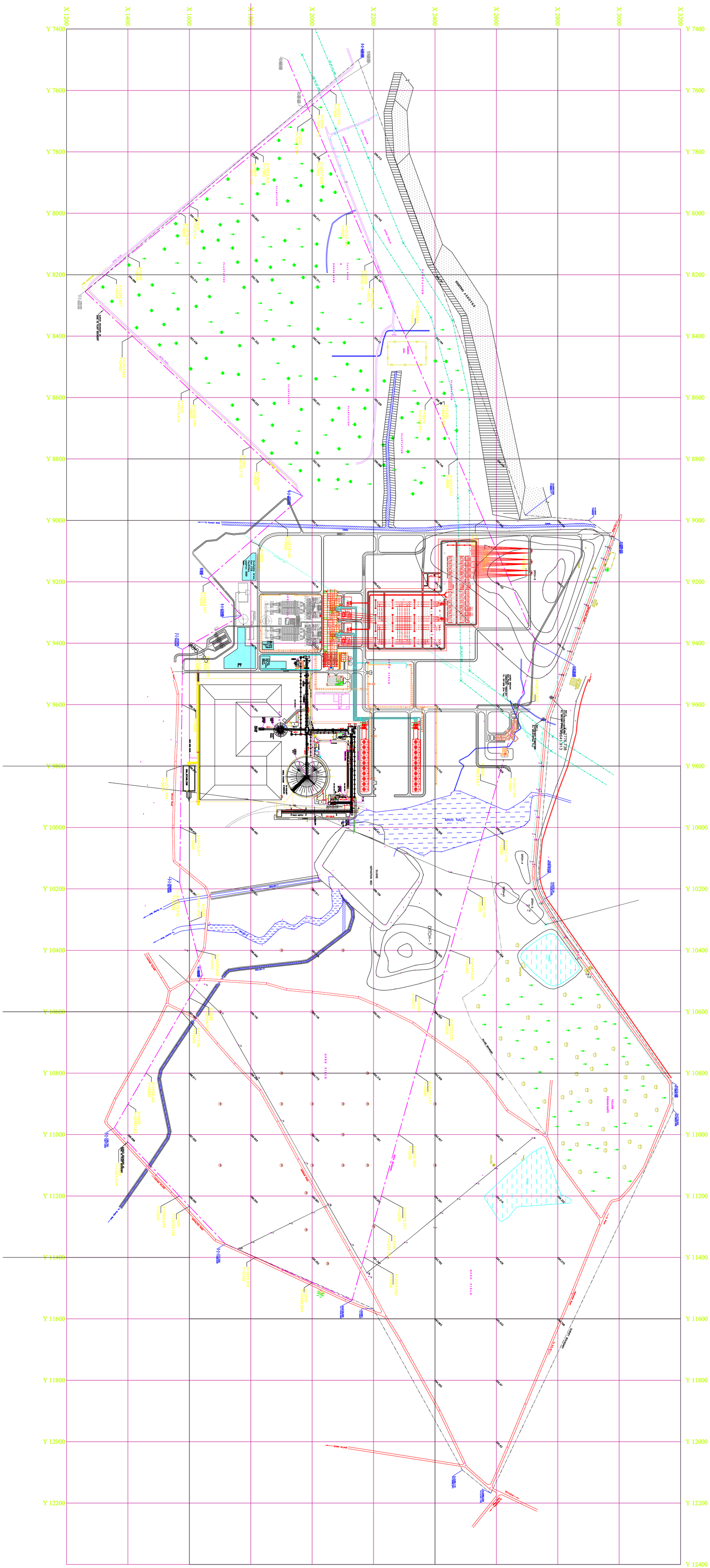
1.	Location:	Downstream side of Air preheaters
2.	Operation:	Base load
3.	Type:	Rigid Discharge frame
4.	Rapping:	Intermittent

Table-7

List of Drawings placed below in this sub section:

S.N.	Drawing Description	Drawing No.
1.	General Layout Plan	Enclosed
2.	Topography	Enclosed
3.	Contour Drawing	Enclosed
4.	Main Plant Equipment Layout	Enclosed
5.	ID system-Elevation & Plan	Enclosed
6.	Pipe Cable Trestle Layout	Enclosed
7.	Pipe Cable Trestle Foundation	Enclosed
8.	Chimney foundation details	(Unit 1&2)
	i. Chimney shell outer Diameter at ground level (m)	22.74
	ii. Chimney foundation outer diameter (m)	36.9
	iii. Type of foundation	Piled Raft Foundation
	iv. Level of Bottom of foundation (m)	RL(+)290.18
	v. Level of Top of foundation (m)	RL(+)293.5


Y -1400
Y -1200
Y -1000
Y -800
Y -600
Y -400
Y -200
X 4800
X 4600
X 4400
X 4200
X 4000
X 3800
X 3600
X 3000
X 3200
X 2800
X 2600
X 2400
X 2200
X 2000
X 1800
X 1600
X 1400
X 1200
PLANTATION
DITCH-2
DITCH-3
DITCH-12
DITCH-5
DITCH-7
DITCH-11
DITCH-8
TOWNSHIP AREA
PLANTATION
MOITRIKUNJ
Y 7400
Y 7600
Y 7800
Y 8000
Y 8200
Y 8400
Y 8600
Y 8800
Y 9000
Y 9200
Y 9400
Y 9600
Y 9800
Y 10000
Y 10200
Y 10400
Y 10600
Y 10800
Y 11000
Y 11200
Y 11400
Y 11600
Y 11800
Y 12000
Y 12200
X=2986.325
Y=9057.904
X=2900
Y=9000
X=2693.829
Y=8983.17
EXISTING ASHDYKE
PLANTATION
132 KV H.T LINE
220 KV H.T LINE
TALL WEED & DENSE BUSH
ASHDYKE AREA
PLANTATION
PLANTATION
PLANTATION
PLANTATION
X = 2150.000
Y = 7500.000
X=1920.000
Y=7500.000
X = 1970.000
Y = 8920.000
X=1660
Y=9190
X = 1770.000
Y = 9310.000
X = 1578.000
Y = 9420.000
X = 1260.000
Y = 8255.000
SURVEY BOUNDARY AS SAME AS PLANT BOUNDARY
OPEN FIELD
SLUDGE
DEPOSITION BED
DITCH-1
DITCH-2
DITCH-3
DITCH-4
MAIN NALA
NALLAH-1
NALLAH-2
NALLAH-3
POND
POND
VILLAGE
PURANA BASTI
VILLAGE BOUNDARY
SURVEY BOUNDARY
Asphalted Road
OPEN FIELD
BESCL BOUNDARY
PLANT AREA
OPEN FIELD
MORRUM ROAD
Morrum Road
ASPHALTED ROAD
PATHAN VILLAGE
To Sludge Bed
To Plant
X = 1566.800
Y = 10179.800
X = 2130.000
Y = 11540.000
X = 1717.200
Y = 11356.000
X = 1355.700
Y = 10977.900
SURVEY BOUNDARY AS SAME AS PLANT BOUNDARY
TONBA


X 1200
X 1400
X 1600
X 1800
X 2000
X 2200
X 2400
X 2600
X 2800
X 3000
X 3200
Y 7400
Y 7600
Y 7800
Y 8000
Y 8200
Y 8400
Y 8600
Y 8800
Y 9000
Y 9200
Y 9400
Y 9600
Y 9800
Y 10000
Y 10200
Y 10400
Y 10600
Y 10800
Y 11000
Y 11200
Y 11400
Y 11600
Y 11800
Y 12000
Y 12200
Y 12400
MAIN NALA
DITCH-1
DITCH-2
DITCH-3
DITCH-4
SOMA VILLAGE

38842/2020/PS-PEM-CIV

C. E. Testing Company Pvt. Ltd.

Laboratory & Godown	Coordinate	Registered Office
Sardarpara, Brahmapur Kolkata - 700 096	N: 1779 E: 9094	124-A, N. S. C. Bose Road Kolkata - 700 092

Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 01 /03

Project Geotechnical Investigation work at NSPCL Bhilai, TPP (2X 250MW)

Job No. 4376 Bore Hole No. 01 Date 23/02/2020

Made by Rupchand Ray Checked by S. Das

No. of SP Tests	09	Samples	Nos.	Commencement Date	13.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	23.02.2020
Length of Casing SX- NX-	3.50m 6.60m	Penetrometer (SPT)	03	Bore Hole Diameter	150mm / 76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	
Method of Boring	Shell, RJD	Water Sample (WS)		Water Struck At	—
				Standing Water Level	

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5 Cm Penetn)	SAMPLES Ref. No.	SAMPLES Depth (m)
			DS-01	0.50
Stiff to very stiff, Brownish-grey, silty clay		2 2 3 3 3 3 N=12	SPT-01	1.00 – 1.45
obs: Kankars			UDS-01	2.00 – 2.45
		3 3 3 4 4 5 N=16	SPT-02	3.00 – 3.45
			UDS-02	4.00 – 4.45
4.50 M		11 54 Ref 2.5 Cm Penetn	SPT-03	4.60 – 4.70
Hard, Brownish-grey, Silty clay with decomposed rock fragments		100 Ref 4 Cm Penetn N) 100	SPT-04	4.75 – 4.79 (R)
4.75 M		N) 100		
Highly to slightly weathered Brownish-grey, medium to fine grained, fractured rock	NX-Rotary drilling started From 4.75m below E.G.L		T-31min WL-Partial	4.75 R1 CR-27% RAD-NIL 5.50
			T-30min WL-Partial	R2 CR-32% RAD-NIL 6.25
			T-29min WL-Partial	R3 CR-39% RAD-19% 7.00
			T-31min WL-Partial	R4 CR-35% RAD-19 7.75
			T-37min WL-Partial	R5 CR-36% RAD-NIL 8.50

23/2/20 (DHEL)

R- Refusal, T- Time, WL- Water Loss.

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Laboratory & Godown	Registered Office
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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 02/03

Project : Geotechnical Investigation work at NSPCL Bhilai, TPP(2X250MW)

Job No. 4376 Bore Hole No. 01 Date 23.02.2020

Made by Rupchand Ray Checked by S. Das

No. of SP Tests	09	Samples	Nos.	Commencement Date :	13.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date :	23.02.2020
Length of Casing SX-	3.50m	Penetrometer (SPT)	03	Bore Hole Diameter :	150mm / 76.2mm
SPT done by (M/H) NX-	6.00M H	Disturbed (DS)	01	Level of Ground :	
Method of Boring Shell	R/D	Water Sample (WS)		Water Struck At :	—
				Standing Water Level :	

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to slightly weathered Brownish-grey, medium to fine grained, Fractured rock			T-38min WL-Partial R6 CR-28% RQD-NIL	8.50
			T-39min WL-Partial R7 CR-32% RQD-NIL	9.25
			T-40min WL-Partial R8 CR-52% RQD-NIL	10.00
			T-41min WL-Partial R9 CR-49% RQD-NIL	10.75
			T-41min WL-Partial R10 CR-60% RQD-19%	11.50
			T-42min WL-Partial R11 CR-52% RQD-22%	12.25
			T-43min WL-Partial R12 CR-49% RQD-16%	13.00
			T-45min WL-Partial R13 CR-48% RQD-13%	13.75
			T-45min WL-Partial R19 CR-74% RQD-17%	14.50
			T-46min WL-Partial R15 CR-72% RQD-36%	15.25
				16.00

S. Das 23/2/20 (BHEL)

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Laboratory & Godown	Registered Office
Sardarpara, Brahmapur Kolkata - 700 096	124-A, N. S. C. Bose Road Kolkata - 700 092

Title : **BORE LOG DATA SHEET** | DOC No. : CET/STF/01/00 | Page : 03/03

Project Geotechnical Investigation work at NSPCL Bhilai, TPP (2x 251 MW)

Job No. 4376 Bore Hole No. 01 Date 23/02/2020

Made by Rupchand Ray Checked by S. Das

No. of SP Tests	04	Samples	Nos.	Commencement Date	: 13.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 23.02.2020
Length of Casing	SX-3.5m NX-6.0m	Penetrometer (SPT)	03	Bore Hole Diameter	: 151mm / 71.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & R/D	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	:

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)	
			T-46min WL-Partial	16.00	
Highly to slightly weathered, Brownish-grey, medium to fine grained, Fractured rock			R16		CR-60% RQD-14%
17.50M			T-45min WL-Partial	16.75	
			R17		CR-64% RQD-28%
Slightly weathered, yellowish grey, fine grained, completely Fractured rock			T-45min WL-Partial	17.50	
			R18		CR-78% RQD-NIL
19.75M			T-47min WL-Partial	18.25	
			R19		CR-72% RQD-NIL
Slightly weathered, steel grey, fine grained, moderately Fractured rock			T-45min WL-Partial	19.00	
			R20		CR-68% RQD-NIL
			T-46min WL-Partial	19.75	
			R21		CR-64% RQD-NIL
			T-46min WL-Partial	20.50	
			R22		CR-72% RQD-20%
			T-47min WL-Partial	21.25	
			R23		CR-62% RQD-NIL
25.00M			T-52min WL-Partial	22.00	
The bore hole terminated As per Drawing at the depth of 25.0m below E.G.L ~~As per drawing~~.			R24		CR-68% RQD-16%
			T-50min WL-Partial	22.75	
			R25		CR-60% RQD-NIL
			T-55min WL-Partial	23.50	
			R26		CR-78% RQD-24%
			T-55min WL-Partial	24.25	
			R27		CR-64% RQD-NIL
				25.00	

For C. E. Testing (P) Ltd.

C. E. R. Roy

23/2/20 (BHEL)

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C. E. Testing Company Pvt. Ltd.

Laboratory & Godown Sardarpara, Brahmapur Kolkata - 700 096	Co-ordinate N: 1754 E: 9119	Registered Office 124-A, N. S. C. Bose Road Kolkata - 700 092
Title : **BORE LOG DATA SHEET**		DOC No. : CET/STF/01/00 Page : 01/04

Project : Geotechnical Investigation work at NSPCL TPP, Bilai (2X250MW) CG.

Job No. 1376 Bore Hole No. 02 Date 20/02/2020

Made by Sudip Das Checked by

		Samples	Nos.		
No. of SP Tests	04	Undisturbed (UDS)	02	Commencement Date	: 15/02/2020
No. of Vane (V) Test	–	Penetrometer (SPT)	03	Completion Date	: 20/02/2020
Length of Casing SX: 4.34		Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	5.75 (H)	Water Sample (WS)		Level of Ground	:
Method of Boring Shell	SN			Water Struck At	: —
				Standing Water Level	: 2.50M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm Penetration)								SAMPLES Ref. No.	Depth (m)
Very Stiff, Reddish brown, Silty clay with morrum, Kankar										DS-01	0.50
		4	3	6	7	7	8	-	-	SPT-01	1.00–1.45
← 2.50M →		N=28								UDS-01	2.00–2.45
Hard, deep grey, Silty clay. Obs. Kankar		4	6	7	7	8	8	-	-	SPT-02	3.00–3.45
		N=30								UDS-02	4.00–4.45
← 5.00M → Hard, Brownish grey Silty clay with decomposed rock.		4	6	7	30	50 for 5cm				SPT-03	5.00–5.35
		Pen. N>100									
← 5.50M →		100 for 2cm Penn.								SPT-04	5.50–5.52(R)
		N>100									
Completely to Slightly Weathered, Brownish grey medium to fine grained, Slightly fractured rock										T=20min NL=Partial	5.50 R1 CR=20% RQD=NIL 6.25
										T=25min NL=Partial	6.25 R2 CR=21% RQD=NIL 7.00
										T=28min NL=Partial	7.00 R3 CR=25% RQD=NIL 7.75
										T=30min NL=Partial	7.75 R4 CR=21% RQD=NIL 8.50
										T=35min NL=Partial	8.50 R5 CR=37% RQD=14% 9.25

Symbol column: XX Rotary Drilling Started at the Depth of 5.50M below E.G.L

(R) for Refusal Sample could not recovered, T=Time taken, NL= Water loss.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 02/04

Project : Geotechnical Investigation Work at NSPCL TPP (2×250 MW), Bhilai CG

Job No. 4376 Bore Hole No. 02 Date 20/02/2020

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No. of SP Tests	04	Samples	Nos.	Commencement Date	: 15/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 20/02/2020
Length of Casing	5×4.30M, 2×5.70M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm/96.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & RD	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.50M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
			T=36 min NL=Partial R6 CR=52%, RQD=20%	9.25
				10.60
			T=40 min NL=Partial R7 CR=53%, RQD=38%	
				10.75
			T=32 min NL=Partial R8 CR=56%, RQD=21%	
				11.50
			T=33 min NL=Partial R9 CR=58%, RQD=NIL	
				12.25
			T=36 min NL=Partial R10 CR=49%, RQD=26%	
				13.00
			T=35 min NL=Partial R11 CR=51%, RQD=NIL	
				13.75
			T=40 min NL=Slightly R12 CR=40%, RQD=18%	
				14.50

Completely to Slightly weathered, Brownish grey medium to fine grained Slightly fractured rocky.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 03/04

Project : Geotechnical Investigation Works at NSPCL (2×250 MW), Bhilai, CG

Job No. 4376 Bore Hole No. 02 Date 25/02/2020

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No. of SP Tests	04	Samples	Nos.	Commencement Date	: 15/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 20/02/2020
Length of Casing	5 X= 4.30 M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm/96.2mm
SPT done by (M/H)	4 X= 5.70 M (H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & RD	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.50 M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				14.50
			T= 31min NL: Highly R13	CR= 50%, RQD= 37%
				15.25
			T=32min NL=Highly R14	CR= 37%, RQD=19%
				16.00
			T=40min NL=Highly R15	CR= 60%, RQD=29%
				16.75
			T=42min NL=Highly R16	CR= 57%, RQD=26%
				17.50
			T=41min NL=Highly R17	CR= 69%, RQD=16%
				18.25
			T=42min NL=Highly R18	CR= 54%, RQD=44%
				19.50
Completely to Slightly weathered, Brownish grey, medium to fine grained, Slightly fractured rock.				

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 04/04

Project : Geotechnical Investigation Work at NSPCL TPP (2×250 MW), Bhilai, CG

Job No. 4376 Bore Hole No. 02 Date 05/07/2020

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No. of SP Tests	04	Samples	Nos.	Commencement Date	: 15/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 20/02/2020
Length of Casing	5×1.3M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	5×1.3M (H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.50M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Completely to Slightly weathered, Brownish grey medium to fine grained Slightly fractured rock.			T=44min NL=Partial R19 CR=66% RQD=NIL	19.00
20.50M				19.75
			T=50min NL=Partial R20 CR=53% RQD=NIL	20.50
Moderately weathered to fresh, deep grey to light grey, fine grained, completely fractured rock.			T=51min NL=Partial R21 CR=50% RQD=NIL	21.25
			T=57min NL=Highly R22 CR=57% RQD=13%	22.00
			T=48min NL=Highly R23 CR=85% RQD=14%	22.75
			T=52min NL=Highly R24 CR=68% RQD=NIL	23.50
			T=40min NL=Highly R25 CR=60% RQD=NIL	24.00
24.00M				

For C.E. Testing Co. Pvt. Ltd. Sudip Das

The Borehole terminated due to Breaking of Bit at the Depth of 24.00Mt below E.G.L

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Title : **BORE LOG DATA SHEET**		DOC No. : CET/STF/01/00 Page : 01/03

Project : Geotechnical Investigation work at N.S.P.C.L. Bhilai, TPP (2x250MW)

Job No. 4376 Bore Hole No. 03 Date 11/02/2020

Made by A. Shil Checked by S. Das

		Samples	Nos.		
No. of SP Tests	07			Commencement Date	: 04/02/2020
No. of Vane (V) Test	–	Undisturbed (UDS)	02	Completion Date	: 11/02/2020
Length of Casing	Sx= 3M NX= 7M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/ 76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell, R/D	Water Sample (WS)		Water Struck At	: –
				Standing Water Level	: 3.00M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5Cm (enth)								SAMPLES Ref. No.	SAMPLES Depth (m)
Very stiff, Reddish brown, clayey silt/ Silty clay with moorum pieces. Obs- sand mixture.	No rotary drilling Started from 6.50 M below E.G.L									DS-01	0.50
		4	6	7	6	7	7 N: 27	–	–	SPT-01	1.00 – 1.45
										UDS-01	2.00 – 2.45
		4	6	7	7	7	8 N: 29	–	–	SPT-02	3.00 – 3.45
4.00M										UDS-2	4.00 – 4.45
Very stiff, Brownish grey, silty clay. Obs- kankar		3	3	3	6	6	6 N: 21	–	–	SPT-03	5.00 – 5.45
6.00M		20	28	52 for 5 cm Penetration N>100						SPT-04	6.00 – 6.20
Hard, brownish grey, silty clay with decomposed rock fragments.		100 for 4 cm Penetration N>100								SPT-05	6.50 – 6.54 (R)
6.50M										T=32MIN WL-P	6.50 R1 CR=19% RQD=NIL 7.25
Completely to highly to moderately weathered, brownish grey fine grained, fractured rock.		100 for 4 cm Penetration N>100								SPT-06	7.25 – 7.29 (R)
										T=35MIN WL-P	7.25 R2 CR=20% RQD=NIL 8.00
		100 for 3 cm Penetration N>100								SPT-07	8.00 – 8.03 (R)
										T=34MIN WL-P	8.00 R3 CR=22% RQD=NIL 8.75

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R = Refusal, T = Time, WL = Water loss. P = Partial

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 0213

Project : Geotechnical Investigation Work at - NSPCL Bhilai TPP (2x250MW).

Job No. 4376 Bore Hole No. 03 Date 11/02/2020

Made by A. Skl Checked by S. Das

		Samples	Nos.
No. of SP Tests	07	Undisturbed (UDS)	02
No. of Vane (V) Test	–	Penetrometer (SPT)	04
Length of Casing	3M	Disturbed (DS)	01
SPT done by (M/H)	7M H	Water Sample (WS)	
Method of Boring	Shell R/D.		

Commencement Date : 04/02/2020
Completion Date : 11/02/2020
Bore Hole Diameter : 150 mm/76.2mm
Level of Ground :
Water Struck At : –
Standing Water Level : 3.00M below EGL

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Completely to highly to moderately weathered, brownish grey, fine grained, fractured, rock.			T=37MIN DL=P	8.75
				R4 CR=28%. RQD=NIL
			T=35MIN DL=P	9.50
				R5 CR=32%. RQD=NIL
			T=46MIN DL=P	10.25
				R6 CR=40%. RQD=NIL
			T=37MIN DL=P	11.00
				R7 CR=35%. RQD=NIL
			T=37MIN DL=P	11.75
				R8 CR=48%. RQD=NIL
			T=34MIN DL=P	12.50
				R9 CR=45%. RQD=NIL
			T=40MIN DL=P	13.25
				R10 CR=46%. RQD=NIL
				14.00

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T = Time, DL = Datum Loss. P = Partial

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 03/03

Project : Geotechnical Investigation Work at NSCL Bhilai, TPP (2x250MW)

Job No. 4376 Bore Hole No. 03 Date 11/02/2020

Made by A. Skil Checked by S. Das

		Samples	Nos.		
No. of SP Tests	07	Undisturbed (UDS)	02	Commencement Date	: 04/02/2020
No. of Vane (V) Test	—	Penetrometer (SPT)	04	Completion Date	: 11/02/2020
Length of Casing	SX= 3M, NX= 7M	Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	H	Water Sample (WS)		Level of Ground	:
Method of Boring	Shell, RD			Water Struck At	: —
				Standing Water Level	: 3.00 M below EGL

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				14.00
Completely to highly Weathered to moderately Weathered, brownish grey, fine grained, fractured, rock.			T=37MIN, DL=P.	R11 CR=52%, RQD=NIL
				14.75
			T=39MIN, DL=P	R12 CR=55%, RQD=NIL
				15.50
			T=58MIN, DL=P	R13 CR=52%, RQD=NIL
				16.25
16.25M			T=48MIN, DL=High	R14 CR=56%, RQD=29%
Moderately to Slightly Weathered, grey in coloured, fine grained fractured, hard, rock.				17.00
			T=49MIN, DL=High	R15 CR=68%, RQD=16%
				17.75
			T=51MIN, DL=High	R16 CR=55%, RQD=13%
				18.50
			T=56MIN, DL=High	R17 CR=63%, RQD=29%
				19.25
			T=63MIN, DL=High.	R18 CR=75%, RQD=29%
				20.00
20.00M The Bore hole terminated at the depth of 20.00 M below E.G.L				

for C.E. Testing Co (P) Ltd. S. Das

T=Time., DL= Water loss. P=Partial

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 01/05

Project : Geotechnical Investigation Work at NSPCL TPP (2x250 MW), Bhilai, CG

Job No. 4376 Bore Hole No. BH-04 Date 23/02/2020

Made by Sudip Das Checked by

		Samples	Nos.		
No. of SP Tests	04	Undisturbed (UDS)	02	Commencement Date	: 20/02/2020
No. of Vane (V) Test	—	Penetrometer (SPT)	03	Completion Date	: 23/02/2020
Length of Casing	SX > 3.20 M, NX > 5.50 M	Disturbed (DS)	01	Bore Hole Diameter	150mm/76.2mm
SPT done by (M/H)	(H)	Water Sample (WS)		Level of Ground	
Method of Boring	R/O Drilling			Water Struck At	:
				Standing Water Level	: 2.85 M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm Penetration)	SAMPLES Ref. No.	SAMPLES Depth (m)
Brownish, grey, Silty clay with kankar.	NX Rotary Drilling started at the Depth of 5.60M below E.G.L		DS-01	0.50
		2 3 3 4 4 4 - -	SPT-01	1.00-1.45
← 2.00 M →		N = 15	UDS-01	2.00-2.45
Very Stiff, Deep grey Silty clay.		3 3 5 5 6 10 - -	SPT-02	3.00-3.45
		N = 26	UDS-02	4.00-4.45
← 5.00 M →		10 10 15 29 56 for 2.4cm	SPT-03	5.00-5.32
Hard, Brownish grey, silty clay with decomposed rock piecs.		N > 100		
		100 for 2cm R	SPT-04	5.60-5.62 (R)
← 5.60 M →		N > 100		5.60
Highly to Slightly Weathered, Brownish Grey, medium to fine grained moderately fractured rock.			T = 35min, WL = Partial	R1 CR=44% RQD=NIL
				6.75
			T = 42min, WL = Partial	R2 CR = 50% RQD=NIL
				7.50
			T = 40min, WL = Partial	R3 CR = 54% RQD=NIL
				8.25
			T = 35min, WL = Partial	R4 CR = 52% RQD=NIL
				9.00

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R – For Refusal Sample could not Recover
T = Time taken, WL = Water loss.

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Title BORE LOG DATA SHEET	DOC No. CET/STF/01/00 Page 02/05

Project Geotechnical Investigation Work at NSPCL TPP (2X250MW), Bhilai, CG

Job No. 1376 Bore Hole No. BH-04 Date 23/02/2020

Made by Sudip Das Checked by

		Samples	Nos.		
No. of SP Tests	04	Undisturbed (UDS)	02	Commencement Date	: 20/02/2020
No. of Vane (V) Test	—	Penetrometer (SPT)	03	Completion Date	: 23/02/2020
Length of Casing SXS / NX	3.20m / 5.80m	Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(H)	Water Sample (WS)		Level of Ground	:
Method of Boring	R/D			Water Struck At	:
				Standing Water Level	: 2.85 below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.		SAMPLES Depth (m)
Highly to Slightly weathered, Brownish grey, medium to fine grained, moderately fractured rock.			T=42min NL-Partial	R5	9.00 – 9.75, CR=48%, RQD=NIL
			T=41min NL-Partial	R6	9.75 – 10.50, CR=33%, RQD-NIL
			T=40min NL-Partial	R7	10.50 – 11.25, CR=49%, RQD-NIL
			T=35min NL-Partial	R8	11.25 – 12.00, CR=63%, RQD=29%
			T=40min NL-Partial	R9	12.00 – 12.75, CR=65%, RQD=18%
			T=60min NL-Highly	R10	12.75 – 13.50, CR=65%, RQD-40%
			T=52min NL-Highly	R11	13.50 – 14.25, CR=61%, RQD-16%

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Title : **BORE LOG DATA SHEET** | DOC No. : CET/STF/01/00 | Page : 03/05

Project : Geotechnical Investigation work at NSPCL TPP (2X250MW), Bihar

Job No. 4376 Bore Hole No. BH-04 Date 23/02/2020

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No. of SP Tests	04	Samples	Nos.	Commencement Date	: 20/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 23/02/2020
Length of Casing	3.20M 5.80M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	R/D	Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.85M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Slightly weathered, Brownish grey, medium to fine grained, moderately fractured rock.			T=50min WL=Highly	14.25
			R12 CR=67% RQD=28%	15.00
			T=54min WL=Highly	
			R13 CR=58% RQD=24%	15.75
			T=54min WL=Highly	
			R14 CR=68% RQD=20%	16.50
			T=60min WL=Highly	
			R15 CR=89% RQD=44%	17.25
			T=62min WL=Highly	
			R16 CR=74% RQD=42%	18.00
			T=65min WL=Highly	
			R17 CR=48% RQD=NIL	18.75
			T=64min WL=Highly	
			R18 CR=60% RQD=NIL	19.50

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Title : BORE LOG DATA SHEET

DOC No. : CET/STF/01/00
Page : 04/05

Project : Geotechnical Investigation Work at NSPCL TPP (2X250MW), Bihar. (4

Job No. 1376 Bore Hole No. BH-04 Date 23/02/2020

Made by Sudip Das Checked by

No. of SP Tests	04	Samples	Nos.	Commencement Date	: 20/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 23/02/2020
Length of Casing	5X = 3.20M 6X = 5.80M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(M)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	R / D	Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.85m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Slightly weathered, Brownish grey, medium to fine grained, moderately fractured rock.			T=65min NL=Highly R19 CR=49% RQD=NIL	19.50
				20.25
			T=55min NL=Highly R20 CR=57% RQD=20%	
				21.00
			T=54min NL=Highly R21 CR=54% RQD=15%	
				21.75
			T=60min NL=Highly R22 CR=64% RQD=26%	
				22.50
			T=62min NL=Highly R23 CR=76% RQD=33%	
				23.25
			T=60min NL=Highly R24 CR=68% RQD=NIL	
				24.00
			T=54min NL=Highly R25 CR=60% RQD=NIL	
				29.75

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Title : **BORE LOG DATA SHEET** | DOC No. : CET/STF/01/00 | Page : 05/05

Project : Geotechnical Investigation Work at NSPCL TPP (2X250MW), Bhilai, CG

Job No. 4376 Bore Hole No. BH-04 Date 23/02/2020

Made by Sudip DN Checked by .....

No. of SP Tests	04	Samples	Nos.	Commencement Date	: 20/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 23/02/2020
Length of Casing	3.20M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	5.80M (H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	R / D	Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.85M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Slightly Weathered Brownish grey, medium to fine grained, moderately fractured rock.			T=60Min NL=Highly R26	24.75 CR=68% RQD=24% 25.50
25.50M			T=54Min NL=Highly R27	CR=60% RQD=24% 26.25
Slightly weathered, Brownish grey to Steel grey, fine grained, completely fractured rock.			T=50Min NL=Highly R28	CR=62% RQD=NIL 27.00
			T=48Min NL=Highly R29	CR=64% RQD=NIL 27.75
			T=42Min NL=Highly R30	CR=64% RQD=NIL 28.50
			T=40Min NL=Highly B1	CR=68% RQD=NIL 29.25
			T=45Min NL=Highly B2	CR=62% RQD=NIL 30.60
30.00M				

The Borehole terminated at the Depth of 30.00M below E.G.L. (As per Drawing)

For C.E. Testing Co Pvt Ltd

S. DN

23/2/2020 (BUBL)

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Title : **BORE LOG DATA SHEET**

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Project Geotechnical Investigation Work at NSPCL, Bhilai's TPP (2x250MW) CH

Job No. 4375 Bore Hole No. 05 Date 15/02/2020

Made by Sudip Das Checked by .....

No. of SP Tests	04	Samples	Nos.	Commencement Date	: 15/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	01	Completion Date	: 15/02/2020
Length of Casing	SY = 1.20M, NX = 5.80M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm / 76.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.10M below E.G.

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5 cm/cm)	SAMPLES Ref. No.	SAMPLES Depth (m)
Shift, Brownish grey, Silty clay with morrum and Kankar.			DS-01	0.50
2.00M Very shift, Deep grey, Silty clay Obs - Kankar.		2 2 3 3 4 4 - - N = 14	SPT-01	1.00 - 1.45
			UDS-01	2.00 - 2.45
		3 3 4 4 5 5 N = 18	SPT-02	3.50 - 3.45
			UDS-02	4.00 - 4.15 (R)
4.00M Hard, Brownish grey, Clayey Silt with decomposed rock.		10 16 24 30 20 for 3cm N = 100	SPT-03	5.00 - 5.33
6.00M		100 for 3cm Refusal N = 100	SPT-04	6.00 - 6.03 (R)
Moderately to Slightly weathered, deep brown medium to fine grained, Slightly fractured rock.	NX Rotary Started at the Depth of 6.00M below E.G.L.		T = 35min NL = Partial R1	6.00 CR = 40% RQD = NIL
			T = 40min NL = Partial R2	6.75 CR = 41% RQD = NIL
			T = 44min NL = Partial R3	7.50 CR = 44% RQD = NIL
			T = 42min NL = Partial R4	8.25 CR = 52% RQD = 20%
				9.00

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R = for Refusal Sample Could not Recover.
T = Time taken, NL = Natural.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 02/06

Project : Geotechnical Investigation Work at NSPCL, Bhilai TPP (2X250MW)/CG

Job No. 4376 Bore Hole No. 05 Date 15/02/2020.

Made by Sudip Das Checked by .....

No. of SP Tests	04	Samples	Nos.	Commencement Date	: 11/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	01	Completion Date	: 15/02/2020
Length of Casing	4.20M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	5.80M	Disturbed (DS)	01	Level of Ground	: —
Method of Boring	M	Water Sample (WS)		Water Struck At	: —
	SR ID			Standing Water Level	: 3.00M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				9.00
			T=45min NL=Partial R5	CR=68% RQD=28%
				9.75
			T=50min NL=Partial R6	CR=70% RQD=14%
				10.50
			T=35min NL=Partial R7	CR=68% RQD=20%
				11.25
			T=40min NL=Partial R8	CR=72% RQD=25%
				12.00
			T=44min NL=Partial R9	CR=52% RQD=NIL
				12.75
			T=47min NL=Partial R10	CR=56% RQD=NIL
				13.50

Moderately to Slightly weathered, deep brown, medium to fine grained, Slightly fractured rocky.

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Title : BORE LOG DATA SHEET	DOC No. : CET/STF/01/00 Page : 03/06

Project Geotechnical Investigation Work at NSPCL, Bhilai TPP (2x250 MW), CG

Job No. 4376 Bore Hole No. 05 Date 15/02/2020

Made by Sandip DNS Checked by .....

No. of SP Tests	04	Samples	Nos.	Commencement Date	: 11/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	01	Completion Date	: 15/02/2020
Length of Casing SX :	4.20M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150 mm/76.2mm
DNX :	5.80M	Disturbed (DS)	01	Level of Ground	:
SPT done by (M/H)	(H)	Water Sample (WS)		Water Struck At	: —
Method of Boring	Shell & RD			Standing Water Level	: 3.60M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				13.50
Moderately to Slightly weathered, Deep brown, medium to fine grained Slightly fractured rock.			T=46min NL=Practical R11	CR= 49%. RQD=14%.
				14.25
			T=60min NL=NIL R12	CR= 60%. RQD=NIL
				15.00
			T=52min NL=Partial R13	CR= 64%. RQD=36%.
				15.75
			T=55min NL=Practical R14	CR= 62%. RQD=20%.
				16.50
			T=51min NL=Partial R15	CR= 61%. RQD=14%.
				17.25
			T=54min NL=Partial R16	CR=78%. RQD=22%.
				18.00
			T=56min NL=Partial R17	CR=76%. RQD=36%.
				18.75

15/2/2020 (Shell)

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project Geotechnical Investigation Work at NSPCL, Bhilai TPP (2x250 MW) (G.

Job No. 4375 Bore Hole No. 05 Date 15/02/2020

Made by Sudip D.N. Checked by

No. of SP Tests	04	Samples	Nos.	Commencement Date	: 11/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	01	Completion Date	: 15/02/2020
Length of Casing	SX = 4.20M, NX = 5.80M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & R/D	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.10M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Moderately to Slightly weathered, deep brown, medium to fine grained Slightly fractured rock.			T=56min NL=Partial	18.75 R18 CR=68% RQD=32% 19.50
			T=55min NL=Partial	R19 CR=72% RQD=24% 20.25
			T=62min NL=Partial	R20 CR=78% RQD=NIL 21.00
←21.00M→ Slightly weathered, grey, fine grained, completely fractured rock.			T=61min NL=Partial	R21 CR=76% RQD=NIL 21.75
			T=65min NL=Partial	R22 CR=68% RQD=NIL 22.50
			T=50min NL=Partial	R23 CR=80% RQD=NIL 23.25
←23.25M→ Slightly weathered to fresh, Steel grey, fine grained moderately fractured rock.			T=45min NL=Partial	R24 CR=76% RQD=32% 24.00

S.DN 15/2/2020 (BHBL)

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Title : **BORE LOG DATA SHEET**

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Project : Geotechnical Investigation Work at NSPCL, Bhilai 7 P.P. (2x250 MW) CG.

Job No. 4376 Bore Hole No. 05 Date 15/02/2020

Made by Sudip D.N. Checked by .....

No. of SP Tests	04	Samples	Nos.	Commencement Date	: 11/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	01	Completion Date	: 15/02/2020
Length of Casing	5x3 4.20 M 5x1 5.80 M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150 mm / 76.2 mm
SPT done by (M/H)	M/H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.10 M below G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				24.00
			T=50 min NL=Partial	R25 CR=72% RQD=24%
				24.75
			T=52 min NL=Partial	R26 CR=76% RQD=16%
				25.50
			T=50 min NL=Partial	R27 CR=78% RQD=14%
				26.25
			T=48 min NL=Partial	R28 CR=64% RQD=NIL
				27.00
			T=45 min NL=Partial	R29 CR=80% RQD=21%
				27.75
			T=45 min NL=Partial	R30 CR=84% RQD=61%
				28.50
			T=100 min NL=Partial	R31 CR=86% RQD=16%
				30.00
Slightly weathered to fresh, Steel grey, fine grained, moderately fractured rock.				

15/2/2020 (SHEL)

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Title : **BORE LOG DATA SHEET**

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Project : Geotechnical Investigation Work at NSPCL, Bhilai TPP (2X250 MW) CG.

Job No. 4375 Bore Hole No. 05 Date 15/02/2020

Made by Sudip Das Checked by .....

No. of SP Tests	04	Samples	Nos.	Commencement Date	: 11/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	01	Completion Date	: 15/02/2020
Length of Casing	5 x = 4.20 M, V x = 5.80 M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	M	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & D	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.10 M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
			T=90min NL=Parted	30.00
Slightly weathered to fresh, Steel grey, fine grained, moderately fractured rock.			R32 CR=92% RQD=NIL	31.50
			T=95min NL=Parted	
			R33 CR=80% RQD=34%	33.00
			T=115min NL=Parted	
			R34 CR=81% RQD=28%	34.50
			T=45min NL=Parted	
			R35 CR=81% RQD=NIL	35.00
35.50M				
The Bore hole terminated at the Depth of 35.50 M below E.G.L.				
For C.E.Testing Co Pvt Ltd S. Das				
15/2/2020 (Asstt. Engr.)				

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Co-ordinate N: 1800 E: 9156

Title : **BORE LOG DATA SHEET**

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Project Geotechnical Investigation Work at NSPCL Bhilai, TPP (2X250 MW)

Job No. 4376 Bore Hole No. 06 Date 29.02.2020

Made by R. Roy Checked by S. Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 24.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 29.02.2020
Length of Casing	SX-3.50m NX-7.50m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm 176.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell, R/d	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.30m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE Each 7.5cm Penm	SAMPLES Ref. No.	SAMPLES Depth (m)		
			DS-01	0.50		
		2 2 3 3 4 3	SPT-01	1.00 — 1.45		
Stiff to Hard, Brownish-grey, silty clay obs'. Kankars		N=13	UDS-01	2.00 — 2.45		
		2 2 2 2 3 3	SPT-02	3.00 — 3.45		
		N=10	UDS-02	4.00 — 4.45		
5.50M		2 2 5 11 12 15	SPT-03	5.00 — 5.45		
Hard, Brownish-grey, Silty clay with decomposed rock		N=93 (mPenh	SPT-04	5.70 — 5.80		
6.00M		50 for 2.5cm Penh N=100	SPT-05	6.00 — 6.04 (R)		
		100 for 4cm Penh N=100				
Highly weathered, Brownish-grey, Fine to Medium grained, highly fractured rock	NX-Rotary drilling started from 6.00m below E.G.L		T-32min NE-Partial	R1	6.00	CR-44% RAD-NIL
			T-34min WL-Partial	R2	6.75	CR-59% RAD-NIL
			T-20min WL-Partial	R3	7.50	CR-24% RAD-18%
8.25M			T-23min WL-Partial	R4	8.25	CR-28% RAD-NIL
completely to highly weathered, Brownish-grey, medium grained, decomposed rock			T-20min WL-Partial	R5	9.00	CR-32% RAD-NIL
			T-20min WL-Partial	R6	9.75	CR-20% RAD-NIL
					10.50	

S. Das

29-2-20 (SME)

R-Refusal, T-Time, WL-Water Loss

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Title : **BORE LOG DATA SHEET**	DOC No. : CET/STF/01/00 Page : 02/03

Project : Geotechnical Investigation work at NSPCL Bhilai, TPP (2x250 mw)

Job No. 4276 Bore Hole No. 06 Date 29.02.2020

Made by R. Ray Checked by S. Das

		Samples	Nos.		
No. of SP Tests	05	Undisturbed (UDS)	02	Commencement Date	: 24.02.2020
No. of Vane (V) Test	—	Penetrometer (SPT)	09	Completion Date	: 29.02.2020
Length of Casing	SX 3.51 NX- 7.50	Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	H	Water Sample (WS)		Level of Ground	:
Method of Boring	Shell / RH			Water Struck At	: —
				Standing Water Level	: 2.30m below E.G.

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)	
completely to highly weathered, Brownish-grey, medium grained, R.rom			T-20min WL-Partial	R7	10.50 CR-21% RAD-NIL
			T-22min WL-Partial	R8	11.25 CR-20% RAD-NIL
			T-22min WL-Partial	R9	12.00 CR-32% RAD-NIL
			T-35min WL-Partial	R10	12.75 CR-52% RAD-29%
			T-35min WL-Partial	R11	13.50 CR-45% RAD-16%
Highly to slightly weathered, Brownish-grey, fine to medium grained, highly fractured rock			T-25min WL-Partial	R12	14.25 CR-37% RAD-NIL
			T-28min WL-Partial	R13	15.00 CR-40% RAD-28%
			T-45min WL-Partial	R14	15.75 CR-52% RAD-36%
			T-36min WL-Highly	R15	16.50 CR-44% RAD-40%
			T-45min WL-Highly	R16	17.25 CR-58% RAD-NIL
			T-45min WL-Highly	R17	18.00 CR-56% RAD-NIL
			T-38min WL-Partial	R18	18.75 CR-42% RAD-NIL
					19.50

S. Das

29-2-20 (SHEL)

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Title : BORE LOG DATA SHEET	DOC No. : CET/STF/01/00 Page : 03/03

Project : Geotechnical Investigation work at NSPCL Bhilai, TPP (2X250MW)

Job No. 4376 Bore Hole No. 05 Date 29.02.2020

Made by R. Roy Checked by S. Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 24.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 29.02.2020
Length of Casing SX-	3.50m	Penetrometer (SPT)	09	Bore Hole Diameter	: 151mm / 76.2mm
SPT done by (M/H) NX-	7.50m / H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell / Rtd	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.30m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)	
				19.50	
			T-25min WL-Partial	R19	CR-25% RQD-NIL
				20.25	
			T-35min WL-Partial	R20	CR-97% RQD-NIL
				21.00	
			T-32min WL-Partial	R21	CR-90% RQD-NIL
				21.75	
			T-45min WL-Partial	R22	CR-52% RQD-NIL
				22.50	
			T-38min WL-Partial	R23	CR-43% RQD-24%
				23.25	
			T-56min WL-Partial	R24	CR-80% RQD-92%
				24.00	
			T-65min WL-Partial	R25	CR-60% RQD-55%
				25.00	
Highly to Slightly weathered, Brownish grey, fine to medium grained, highly Fractured rock					
24.0m					
Slightly weathered, steel grey, fine to medium grained, Fractured rock					
25.0m					
The bore hole terminated at the depth of 25.0m below E.G.L					

As per Drawing

S. Das
29-2-20
(BHEL)

For C.E. Testing Co. Pvt. Ltd.
R. Roy

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Title : **BORE LOG DATA SHEET**

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Project : Geotechnical Investigation work at NSPCL Bhilai, TPP (2X250 MW) Bhilai, CG

Job No. 4376 Bore Hole No. BH-07 Date 07/03/2020

Made by Sudip Das Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 01/03/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 07/03/2020
Length of Casing 5"x2	5.70M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/78.2mm
4"x1	6.30M	Disturbed (DS)	01	Level of Ground	:
SPT done by (M/H)	(M)	Water Sample (WS)		Water Struck At	:
Method of Boring	Shell & RTD			Standing Water Level	: 2.95M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm Penetration)	SAMPLES Ref. No.	Depth (m)
Stiff, Brownish grey, Silty clay with morrum.			DS-01	0.50
1.80M		2 2 3 2 2 4 — — N=13	SPT-01	1.00 - 1.45
Very stiff to Hard, Deep grey Silty clay/ clayey silt.			UDS-01	2.00 - 2.45
		3 4 4 5 6 7 — — N=22	SPT-02	3.00 - 3.45
			UDS-02	4.00 - 4.45
5.50M		7 9 9 12 12 17 — — N=50	SPT-03	5.00 - 5.45
Hard, Brownish grey, Silty clay with decomposed rock.		49 50/3cm 2.5cm Pen	SPT-04	5.80 - 5.90
6.00M		100 for 3cm Pen 0Y/100	SPT-05	6.00 - 6.03(R)
Highly to Slightly weathered, Brownish grey, Fine to medium grained, highly fractured rock.	NX rotary Drilling started at the Depth of 6.00M below E.G.L		T=28min NL=Partial R1 CR=25% RQD=NIL	6.00 - 6.75
			T=25min NL=Partial R2 CR=23% RQD=NIL	6.75 - 7.50
			T=25min NL=Partial R3 CR=32% RQD=NIL	7.50 - 8.25
			T=30min NL=Partial R4 CR=35% RQD=NIL	8.25 - 9.00

R for Refusal Sample could not Recover, T= Time taken, NL= Water loss.

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Title : **BORE LOG DATA SHEET**

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Project : Geotechnical Investigation Work at NSPCL (2x237 MW), Bilaspur, C.G.

Job No. 4376 Bore Hole No. BH-07 Date 7/03/2020

Made by Sudip Das Checked by .....

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 01/03/2020
No. of Vane (V) Test		Undisturbed (UDS)	02	Completion Date	: 07/03/2020
Length of Casing	SX = 5.70m, NX = 6.30m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & RD	Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.95M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Slightly weathered, Brownish grey, Fine to medium grained, highly fractured rock.			T=33min NL=Partial R5 CR=40% RQD=NIL	9.00 – 9.75
			T=35min NL=Partial R6 CR=50% RQD=NIL	9.75 – 10.50
			T=35min NL=Partial R7 CR=45% RQD=NIL	10.50 – 11.25
			T=40min NL=Partial R8 CR=52% RQD=16%	11.25 – 12.00
			T=46min NL=Partial R9 CR=64% RQD=NIL	12.00 – 12.75
			T=52min NL=Partial R10 CR=72% RQD=52%	12.75 – 13.50
			T=55min NL=Partial R11 CR=80% RQD=20%	13.50 – 14.25

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 03/05

Project : Geotechnical Investigation Work at NSPCL (2X250MW) Bhilai, CG

Job No. 4376 Bore Hole No. BH207 Date 7/02/2020

Made by Sudip Das Checked by .....

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 01/02/2020
No. of Vane (V) Test		Undisturbed (UDS)	02	Completion Date	: 07/02/2020
Length of Casing SX = 5.70M NX = 6.30M		Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell & RIB		Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.95M below F.S.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Slightly weathered, Brownish grey, Fine to medium grained, highly fractured rock.			T=45min NL=Highly R12 CR=65% RQD=20%	14.25
			T=45min NL=highly R13 CR=60% RQD=NIL	15.00
			T=40min NL=Highly R14 CR=52% RQD=NIL	15.75
			T=30min NL=highly R15 CR=94% RQD=NIL	16.50
			T=30min NL=highly R16 CR=49% RQD=NIL	17.25
			T=37min NL=Highly R17 CR=40% RQD=NIL	18.00
			T=42min NL=highly R18 CR=47% RQD=16%	18.75
				19.50

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 04/05

Project : Geotechnical Investigation Work at NSPCL TPP (2x250 MW) Bhilai, CG

Job No. 4376 Bore Hole No. BH207 Date 7/03/2020

Made by Sudip Das Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 01/03/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 07/03/2020
Length of Casing 5"x3 NX2	5.70M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	8.30M CH	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell & RD		Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.95m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
			T=30 min NL=Highly	19.50
			R18	CR=34%, RQD=17%
				20.25
Highly to Slightly weathered, Brownish grey, Fine to medium grained, highly fractured rock.			T=32 min NL=Partial R19	CR=40%, RQD=20%
				21.00
			T=30 min NL=Partial R20	CR=40%, RQD=16%
				21.75
			T=45 min NL=Highly R21	CR=65%, RQD=20%
				22.50
			T=45 min NL=Highly R22	CR=40% RQD=NIL
				23.25
24.00M			T=40 min NL=Highly R23	CR=50%, RQD=NIL
				24.00
Moderately Weathered, Brownish grey to deep grey, Fine grained Completely fractured rock.			T=40 min NL=Highly R23	CR=52%, RQD=NIL
				24.75

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 05/05

Project : Geotechnical Investigation Work at NSPCL TPP (2x250 MW), Bhilai, CG

Job No. 4376 Bore Hole No. 07 Date 7/03/2020

Made by Sudip Das Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 01/03/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 07/03/2020
Length of Casing	SX = 5.70M, CX = 5.30M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150 mm / 76.2 mm
SPT done by (M/H)	CH	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & RD	Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.95M below E.GL

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Moderately weathered, Brownish grey to deep grey, fine grained, completely fractured rock.			T=52min NL=Highly R26 CR=60% RQD=NIL	24.75 → 25.50
			T=55min NL=Highly R27 CR=48% RQD=NIL	25.50 → 26.25
			T=56min NL=Highly R28 CR=52% RQD=NIL	26.25 → 27.00
			T=60min NL=Highly R29 CR=48% RQD=NIL	27.00 → 27.75
			T=65min NL=Highly R30 CR=52% RQD=NIL	27.75 → 28.50
← 28.50M → Slightly weathered, Brownish grey, fine grained, fractured rock.			T=58min NL=Highly R31 CR=70% RQD=40%	28.50 → 29.25
			T=55min NL=Highly R32 CR=80% RQD=60%	29.25 → 30.00

30.00M

The Borehole terminated as per Drawing at the Depth of 30.00M below E.G.L

For C.E. Testing Co Pvt Ltd S. Das

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 01 /02

Project : Geotechnical Investigation work at NSPCL Bhilai (2x250MW)

Job No. 4376 Bore Hole No. 10 Date 11/3/2020

Made by R. Ray Checked by .....

No. of SP Tests	06	Samples	Nos.	Commencement Date	: 09.3.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 11.3.2020
Length of Casing	Sx-7.00m	Penetrometer (SPT)	05	Bore Hole Diameter	: 150mm / 76.2mm
SPT done by (M/H)	NX-9.00m H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Rod	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.60m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)	
Stiff, Brownish-grey, clayey silt obs: Kankars and murrum			DS-01	0.50	
		1 1 2 2 3 3	SPT-01	1.00 – 1.45	
← 2.50M →		N=10	UDS-01	2.00 – 2.45	
		2 2 3 5 6 6	SPT-02	3.00 – 3.45	
very stiff to hard, Brownish-grey, silty clay / clayey silt obs: Kankars		N=20	UDS-02	4.00 – 4.45	(S)
		2 3 3 4 6 8	SPT-03	5.00 – 5.45	
		N=21	UDS-03	6.00 – 6.45	
		3 5 5 7 9 10	SPT-04	7.00 – 7.45	
← 8.00M →		N=31	UDS-04	8.00 – 8.05	(R)
Hard Brownish-grey, clayey silt / silty clay with decomposed rock	← NX-Rotary drilling started from 9.00m below E.G.L	17 21 35 27 For 2.5cm Penn.	SPT-05	8.50 – 8.75	
← 9.00M →		100 For 4cm Penn. N/100	SPT-06	9.00 – 9.04	(R)
		N/100	T-20min WL-Partial	9.00 R1	CR-20% RAD-NIL
Highly to Moderately weathered Brownish-grey, fine to medium grained, highly fractured rock			T-22min WL-Partial	9.75 R2	CR-25% RAD-NIL
			T-25min WL-Partial	10.50 R3	CR-30% RAD-NIL
			T-23min WL-Partial	11.25 R4	CR-25% RAD-NIL
				12.00	

T – Time, WL – Water Loss, R – Refusal

M = Water loss

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Title : **BORE LOG DATA SHEET**	DOC No. : CET/STF/01/00 Page : 02/02

Project : Geotechnical Investigation work at NSPCL Bhilai (2x250MW)

Job No. 4376 Bore Hole No. 10 Date 11.03.2020

Made by R.Ray Checked by

		Samples	Nos.		
No. of SP Tests	06	Undisturbed (UDS)	02	Commencement Date	: 09.03.2020
No. of Vane (V) Test	—	Penetrometer (SPT)	05	Completion Date	: 11.03.2020
Length of Casing	SX-7.00m NX-9.00m	Disturbed (DS)	01	Bore Hole Diameter	: 150 mm / 76.2mm
SPT done by (M/H)	H	Water Sample (WS)		Level of Ground	:
Method of Boring	Shell, R/d			Water Struck At	: —
				Standing Water Level	: 3.60m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to moderately weathered, Brownish grey, fine to medium grained highly fractured rock			T-28 min WL-Partial	R5 12.00 – 12.75 CR-32% RQD-NIL
			T-25 min WL-Partial	R6 12.75 – 13.50 CR-35% RQD-NIL
			T-30 min WL-Partial	R7 13.50 – 14.25 CR-40% RQD-NIL
			T-25 min WL-Partial	R8 14.25 – 15.00 CR-35% RQD-NIL
			T-25 min WL-Partial	R9 15.00 – 15.75 CR-40% RQD-NIL
			T-23 min WL-Partial	R10 15.75 – 16.50 CR-38% RQD-NIL
			T-25 min WL-Partial	R11 16.50 – 17.25 CR-35% RQD-NIL
18.00M			T-31 min WL-Partial	R12 17.25 – 18.00 CR-42% RQD-NIL
Highly to moderately weathered, Deep grey, Medium grained, highly fractured rock			T-29 min WL-Partial	R13 18.00 – 18.75 CR-30% RQD-NIL
20.00M			T-25 min WL-Partial	R14 18.75 – 19.50 CR-38% RQD-NIL
The bore hole terminated as per drawing at the depth of 20.00m below E.G.L			T-20 min WL-Partial	R15 19.50 – 20.00 CR-48% RQD-NIL

For C.E. Testing Co. Pvt. Ltd
R.Ray

Recovery, WL = Water loss.

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Title : **BORE LOG DATA SHEET**		DOC No. : CET/STF/01/00 Page : 01/03

Project : G.T.I. work at NSPCL, Bhilai TPP (2×250 MW), Bhilai, C.G.

Job No. 4376 Bore Hole No. 16 Date 18.03.20

Made by R. Roy Checked by S. Das

		Samples	Nos.		
No. of SP Tests	05	Undisturbed (UDS)	01	Commencement Date	: 16.03.20
No. of Vane (V) Test	–	Penetrometer (SPT)	04	Completion Date	: 18.03.20
Length of Casing	SX: 6.00m NX: 8.00m	Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	H	Water Sample (WS)		Level of Ground	:
Method of Boring	Shell/R.D			Water Struck At	: ——
				Standing Water Level	: 5.80m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5 cm penetration)							SAMPLES Ref. No.	Depth (m)
Top soil consist of brownish grey to yellowish brown clayey silt with moorum. (0.40m)	NB: Rotary drilling started at the depth of 7.25m below E.G.L								DS-01	0.50
Medium to very stiff, brownish grey, clayey silt. Observed kankars. (4.60m)		1	2	2	2	1	2	N=7	SPT-01	1.00 - 1.45
									UDS-01	2.00 - 2.45
		2	1	2	3	5	6	N=16	SPT-02	3.00 - 3.45
Hard, deep grey, clayey silt/silty clay. Observed - kankars. (6.50m)									UDS-02	4.00 - 4.45(S)
		2	3	5	7	12	12	N=36	SPT-03	5.00 - 5.45
									UDS-03	6.00 - 6.06 (R)
Hard, brownish grey, clayey silt with decomposed rock. (7.25m)		6	12	10	25	40 for 6cm		N>100	SPT-04	6.50 - 6.85
		100 for 3cm							SPT-05	7.25 - 7.28(R)
Highly to moderately weathered brownish grey, fine to medium grained, highly fractured rock.									R1	7.25 – 8.00; T=21min, H.L=Partial; CR=28%, RQD=Nil
									R2	8.00 – 8.75; T=23min, H.L=Partial; CR=40%, RQD=Nil
									R3	8.75 – 9.50; T=28min, H.L=Partial; CR=43%, RQD=Nil
									R4	9.50 – 10.25; T=33min, H.L=Partial; CR=52%, RQD=Nil
									R5	10.25 – 11.00; T=35min, H.L=Partial; CR=50%, RQD=Nil

S. Das

R = Refusal (Sample could not be collected due to hard strata) T: Times Taken (minutes)
S = Slip H.L = Water Loss.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 02/03

Project : G.T.I. Work at NSPCL, Bhilai, TPP (2×250MW), Bhilai, C.G.

Job No. 4376 Bore Hole No. 16 Date 18.03.20

Made by R. Roy Checked by S. Das

		Samples	Nos.		
No. of SP Tests	05	Undisturbed (UDS)	01	Commencement Date	: 16.03.20
No. of Vane (V) Test	-	Penetrometer (SPT)	04	Completion Date	: 18.03.20
Length of Casing SX:	6.00m	Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
Length of Casing NX:	8.00m	Water Sample (WS)		Level of Ground	:
SPT done by (M/H)	H			Water Struck At	: —
Method of Boring Shell & R.D.				Standing Water Level	: 5.80m below E.G.

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				11.00
			R6	T=28min, CR=42%, H.L=Partial, RQD=Nil
				11.75
Highly to moderately weathered, brownish grey, fine to medium grained, highly fractured rock.			R7	T=25min, CR=38%, H.L=Partial, RQD=Nil
				12.50
			R8	T=35min, CR=53%, H.L=Partial, RQD=Nil
				13.25
			R9	T=30min, CR=47%, H.L=Partial, RQD=Nil
				14.00
			R10	T=25min, CR=40%, H.L=Partial, RQD=Nil
				14.75
			R11	T=38min, CR=44%, H.L=Partial, RQD=Nil
15.50m				15.50
Highly to moderately weathered, deep grey, medium grained, highly fractured rock.			R12	T=25min, CR=32%, H.L=Partial, RQD=Nil
				16.25
			R13	T=42min, CR=48%, H.L=Partial, RQD=Nil
				17.00
			R14	T=30min, CR=36%, H.L=Partial, RQD=Nil
				17.75

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T= Times Taken (minutes) H.L=Water Loss.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 03/03

Project : G.T.I. Work at NSPCL, Bhilai TPP (2×250MW), Bhilai, C.G.

Job No. 4376 Bore Hole No. 16 Date 18.03.20

Made by R. Roy Checked by S. Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 16.03.20
No. of Vane (V) Test	- -	Undisturbed (UDS)	01	Completion Date	: 18.03.20
Length of Casing SX:	6.00m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H) NX:	8.00m H	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell	& R.D.	Water Sample (WS)		Water Struck At	: ——
				Standing Water Level	: 5.80m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm Penetration)	SAMPLES Ref. No.	SAMPLES Depth (m)
				17.75
Highly to moderately weathered, deep grey, medium grained, highly fractured rock.			R15 T=38min CR=44% H.L=Partial RQD=Nil	
				18.50
			R16 T=30min CR=36% H.L=Partial RQD=Nil	
				19.25
			R17 T=34min CR=57% H.L=Partial RQD=Nil	
{20.00m} as per drawing				20.00
The bore-hole terminated at the depth of 20.00 m below E.G.L.				

For, C.E. Testing Company Pvt. Ltd.
R. Roy.

S. Das

T = Times Taken (minutes) W.L = Water Loss.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 01/02

Project : Geotechnical Investigation Work at NSPCL Bhilai, (2X250MW)

Job No. 4376 Bore Hole No. 19 Date 08/03/2020

Made by R. Roy Checked by

No. of SP Tests	07	Samples	Nos.	Commencement Date	: 07.03.2020
No. of Vane (V) Test	–	Undisturbed (UDS)	02	Completion Date	: 08.03.2020
Length of Casing SX-	6.00m	Penetrometer (SPT)	05	Bore Hole Diameter	: 150 mm / 76.2 mm
SPT done by (M/H) NX-	9.50m	Disturbed (DS)	02	Level of Ground	:
Method of Boring	Shell, R/d	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.10m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm Penetration)	SAMPLES Ref. No.	Depth (m)	
			DS-01	0.50	
Stiff, Brownish-grey to yellowish-grey, clayey silt obs: Kankars and murrum		2 2 3 2 5 3	SPT-01	1.00 – 1.45	
		N=13	UDS-01	2.00 – 2.45	
2.80M		3 3 3 4 6 6	SPT-02	3.00 – 3.45	
		N=19	UDS-02	4.00 – 4.45	(S)
Very stiff, Deep grey, clayey silt obs: Kankars		2 3 3 7 5 5	SPT-03	5.00 – 5.45	
		N=20	UDS-03	6.00 – 6.45	
7.80m		3 2 3 5 8 12	SPT-04	7.00 – 7.45	
Hard, Brownish-grey, clayey silt / silty clay with decomposed rock		N=24	SPT-05	8.00 – 8.33	
		11 17 19 21 32 For 30cm	SPT-06	9.00 – 9.03	(R)
9.00m	← NX Rotary drilling started from 9.0m below E.G.L	100 For 3cm Penetration N=100			
			T-20min DS-02 WL-Partial	R1	9.00 CR-NIL RQD-NIL 9.75
		10 For 2cm Penetration N=10	SPF07	9.75 – 9.77	(R)
Completely to Highly Weathered, Brownish-grey, Fine to medium grained, highly Fractured rock			T-20min WL-Partial	R2	9.75 CR-20% RQD-NIL 10.50
			T-22min WL-Partial	R3	CR-20% RQD-NIL 11.25
			T-22min WL-Partial	R4	CR-25% RQD-NIL 12.00

T- Time, WL- water loss, R- Refusal

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : Geotechnical Investigation work at NSPCL Bhilai, (2X250 MW)

Job No. 4376 Bore Hole No. 19 Date 08.03.2020

Made by R. Roy Checked by

No. of SP Tests	07	Samples	Nos.	Commencement Date	: 07.03.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 08.03.2020
Length of Casing SX-NX	6.0m 9.50m	Penetrometer (SPT)	05	Bore Hole Diameter	: 150mm / 76.2mm
SPT done by (M/H)	H	Disturbed (DS)	02	Level of Ground	:
Method of Boring	Shell & R/d	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.10m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Completely to highly weathered, Brownish grey, fine to medium grained, highly Fractured rock			T-25min WL-Partial	R5 12.00 CR-30% RAD-NIL 12.75
14.25M			T-22min WL-Partial	R6 CR-25% RAD-NIL 13.50
Moderately to slightly weathered, Deep grey, medium grained, highly Fractured rock			T-32min WL-Partial	R7 CR-37% RAD-NIL 14.25
			T-35min WL-Partial	R8 CR-44% RAD-NIL 15.00
			T-35min WL-Partial	R9 CR-42% RAD-NIL 15.75
			T-36min WL-Partial	R10 CR-48% RAD-16% 16.50
			T-45min WL-Partial	R11 CR-68% RAD-26% 17.25
17.25M			T-40min WL-Partial	R12 CR-52% RAD-NIL 18.00
Moderately to slightly weathered, Brownish grey, fine to medium grained, highly Fractured rock			T-35min WL-Partial	R13 CR-48% RAD-NIL 18.75
			T-43min WL-Partial	R14 CR-68% RAD-NIL 19.50
20.00M			T-30min WL-Partial	R15 CR-80% RAD-NIL 20.00
The bore hole terminated as per drawing at the depth of 20.00m below E.G.L				

For C.E. Testing Co Pvt Ltd
R. Roy

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : Geotechnical Investigation work at NSPCL, Bhilai, (2x50 MW)

Job No. 4376 Bore Hole No. 21 Date 07/03/2020

Made by R. Ray Checked by S. Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 06/03/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 07/03/2020
Length of Casing	SX-5.4m NX-6.0m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.90m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 15cm Penm)	SAMPLES Ref. No.	SAMPLES Depth (m)
Stiff, Reddish-brown, clayey Silt obs: Kankars	NX - Rotary drilling started from 6.75m below E.G.L	1 1 1 2 3 2	DS-01	0.50
2.50M			SPT-01	1.00 – 1.45
		N=08	UDS-01	2.00 – 2.45
Stiff to very Stiff, Brownish-grey, clayey silt, obs: Kankars and murrum		2 2 2 3 5 7	SPT-02	3.00 – 3.95
		N=17	UDS-02	4.00 – 4.45
		2 2 1 2 3 3	SPT-03	5.00 – 5.45
6.00M		N=09	UDS-03	6.00 – 6.05 (R)
Hard, Brownish-grey, clayey Silt with decomposed rock		12 22 32 34 for 2.5cm Penm N/100	SPT-04	6.25 – 6.50
6.75M		100 for 4cm Penm N/100	SPT-05	6.75 – 6.79 (R)
Highly to Moderately Weathered, Brownish-grey, Fine to Medium grained, highly Fractured rock			T-20min WL-Partial	6.75 R1 CR-20% RQD-NIL 7.50
			T-25min WL-Partial	R2 CR-23% RQD-NIL 8.25
			T-28min WL-Partial	R3 CR-20% RQD-NIL 9.00
			T-25min WL-Partial	R4 CR-25% RQD-NIL 9.75
			T-25min WL-Partial	R5 CR-28% RQD-NIL 10.50

S. Das

T- Time, WL- Water loss, R- Refusal

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Title : **BORE LOG DATA SHEET**

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Project : Geotechnical Investigation work at NSPCL, Bhilai (2X250MW)

Job No. 4376 Bore Hole No. 21 Date 07.03.2020

Made by R. Roy Checked by S. Das

		Samples	Nos.		
No. of SP Tests	05	Undisturbed (UDS)	02	Commencement Date	06.03.2020
No. of Vane (V) Test	—	Penetrometer (SPT)	04	Completion Date	07.03.2020
Length of Casing	SX-5.0m NX-6.0m	Disturbed (DS)	01	Bore Hole Diameter	150mm/76.2mm
SPT done by (M/H)	H	Water Sample (WS)		Level of Ground	
Method of Boring	Shell & Bit			Water Struck At	—
				Standing Water Level	2.90m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)	
Highly to Moderately weathered, Brownish-grey, Fine to medium grained, highly Fractured rock 12.75M				10.50	
			T-23min WL-Partial	R6	CR- 25% RAD- NIL
				11.25	
			T-30min WL-Partial	R7	CR- 40% RAD- 20%
				12.00	
			T-40min WL-Partial	R8	CR- 60% RAD- 40
				12.75	
			T-43min WL-Partial	R9	CR- 72% RAD- NIL
				13.50	
Moderately to Slightly Weathered, Deep grey, Medium grained, highly Fractured rock			T-42min WL-Partial	R10	CR- 60% RAD- 40%
				14.25	
			T-37min WL-Partial	R11	CR- 52% RAD- 20%
				15.00	
			T-45min WL-Partial	R12	CR- 68% RAD- NIL
				15.75	
			T-43min WL-Partial	R13	CR- 60% RAD NIL
				16.50	
16.50M			T-45min WL-Partial	R14	CR- 75% RAD 28%
				17.25	
Highly to Slightly Weathered, Brownish-grey Fine to medium grained, highly Fractured rock			T-35min WL-Partial	R15	CR- 52% RAD NIL
				18.00	
			T-55min WL-Partial	R16	CR- 80% RAD- NIL
				18.75	
			T-35min WL-Partial	R17	CR- 44% RAD- NIL
				19.50	

S. Das

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Title : **BORE LOG DATA SHEET**

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Project : Geotechnical Investigation Work at NSPCL, Bhilai (2×250 mw)

Job No. 9376 Bore Hole No. 21 Date 07.03.2020

Made by R. Ray Checked by S. Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 06.03.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 07.03.2020
Length of Casing	SX 5.00m NX 6.00m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm / 76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.90m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				19.50
			T-35min WL-Partial	R18 CR-52% RAD-NIL
				20.25
			T-33min WL-Partial	R19 CR-45% RAD-NIL
				21.00
			T-31min WL-Partial	R20 CR-50% RAD-NIL
				21.75
			T-35min WL-Partial	R21 CR-48% RAD-NIL
				22.50
			T-32min WL-Partial	R22 CR-40% RAD-NIL
				23.25
			T-46min WL-Partial	R23 CR-60% RAD-NIL
				24.00
			T-56min WL-Partial	R24 CR-80% RAD-NIL
				25.00
Highly to slightly weathered, Brownish-grey, fine to medium grained, highly Fractured rock				
25.00M				
The bore hole terminated As per drawing at the depth of 25.0m below E.G.L				

for C.E. Testing Co Pvt Ltd
R. Ray

S. Das

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C. E. Testing Company Pvt. Ltd.

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Title : **BORE LOG DATA SHEET**

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Project : GiTL work at NSPCL, Bhilai T.P.P (2×250 MW), Bhilai, C.G.

Job No. 4376 Bore Hole No. 22 Date 20.03.20

Made by Rupchand Ray Checked by S. Das

		Samples	Nos.		
No. of SP Tests	06			Commencement Date	: 18.03.20
No. of Vane (V) Test	- -	Undisturbed (UDS)	02	Completion Date	: 20.03.20
Length of Casing SX: / NX:	8.50 m / 15.00 m	Penetrometer (SPT)	05	Bore Hole Diameter	: 150 mm / 76.2 mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell / R.D.	Water Sample (WS)		Water Struck At	: - - -
				Standing Water Level	: 4.30 m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (each 7.5 cm penetration)							SAMPLES Ref. No.	SAMPLES Depth (m)
Medium brownish grey, clayey silt. Observed Kankars & moorum	NX: Rotary drilling started at the depth of 8.50 m below E.G.L.								DS-01	0.50
		1	1	2	1	2	3	N=8	SPT-01	1.00 - 1.45
2.50 m									UDS-01	2.00 - 2.45
Stiff to hard, brownish grey clayey silt. Observed Kankars.		2	3	3	2	3	5	N=13	SPT-02	3.00 - 3.45
									UDS-02	4.00 - 4.45
		2	3	2	5	6	6	N=19	SPT-03	5.00 - 5.45
									UDS-03	6.00 - 6.45 (S)
7.50 m		3	3	5	7	9	[illegible]	N=31	SPT-04	7.00 - 7.45
Hard, brownish grey, clayey silt with decomposed rock.		12	27	33	26	[illegible]	[illegible]	[illegible]	SPT-05	8.00 - 8.25
8.50 m		[illegible]							SPT-06	8.50 - 8.53 (R)
Highly to moderately weathered, brownish grey, fine to medium grained, highly fractured rock.										8.50
									R1	T=20 min, W.L=Partial; CR=22%, RQD=Nil
										9.25
									R2	T=22 min, W.L=Partial; CR=25%, RQD=Nil
										10.00
									R3	T=28 min, W.L=Partial; CR=40%, RQD=Nil
										10.75
									R4	T=25 min, W.L=Partial; CR=32%, RQD=Nil
										11.50
									R5	T=20 min, W.L=Partial; CR=25%, RQD=Nil
										12.25
									R6	T=23 min, W.L=Partial; CR=40%, RQD=Nil
										13.00

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R = Refusal (sample could not be collected due to hard strata) T = Times Taken (minutes)
S = Slip W.L = Water Loss

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Title : **BORE LOG DATA SHEET**

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Project : G.T.I. work at NSPCL, Bhilai TPP (2x250MW), Bhilai, C.G.

Job No. 4376 Bore Hole No. 22 Date 20.05.20

Made by R. Roy Checked by S. Das

No. of SP Tests	06	Samples	Nos.	Commencement Date	: 18.03.20
No. of Vane (V) Test-	- -	Undisturbed (UDS)	02	Completion Date	: 20.03.20
Length of Casing SX:	6.00m	Penetrometer (SPT)	05	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H) RR:	10.00m	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell	"	Water Sample (WS)		Water Struck At	: —
	R.D.			Standing Water Level	: 4.30m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to moderately weathered brownish grey, fine to medium grained, highly fractured rock.				13.60
			R7 T=25min W.L=Partial CR=37% RQD=22%	13.75
			R8 T=20min W.L=Partial CR=23% RQD=Nil	14.50
			R9 T=28min W.L=Partial CR=40% RQD=Nil	15.25
			R10 T=25min W.L=Partial CR=27% RQD=Nil	16.60
			R11 T=20min W.L=Partial CR=30% RQD=18%	16.75
			R12 T=30min W.L=Partial CR=40% RQD=Nil	17.50
			R13 T=35min W.L=Partial CR=50% RQD=Nil	18.25
18.25m Moderately weathered, deep grey, medium grained, highly fractured rock.			R14 T=36min W.L=Partial CR=56% RQD=Nil	19.00
			R15 T=30min W.L=Partial CR=43% RQD=Nil	19.75
			R16 T=35min W.L=Partial CR=52% RQD=Nil	20.50

T = Times Taken (minutes) W.L = Water Loss.

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Title : **BORE LOG DATA SHEET**

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Project : G.T.I. Work at NSPCL, Bhilai T.P.P (2×250 MW), Bhilai, C.G.

Job No. 43776 Bore Hole No. 32 Date 20.03.20

Made by R. Roy. Checked by S. Das

		Samples	Nos.		
No. of SP Tests	06	Undisturbed (UDS)	02	Commencement Date	: 18.03.20
No. of Vane (V) Test	--	Penetrometer (SPT)	05	Completion Date	: 20.03.20
Length of Casing SX:	6.00m	Disturbed (DS)	01	Bore Hole Diameter	: 150mm / 76.9mm
NX:	10.00m	Water Sample (WS)		Level of Ground	:
SPT done by (M/H)	H			Water Struck At	: ——
Method of Boring	Shell & D.			Standing Water Level	: 4.30 m below EGL

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Moderately weathered, deep grey, medium grained, highly fractured rock.				20.50
			R17	T=42 min | CR=67% | W.L=Partial | RQD=Nil
				21.25
			R18	T=35 min | CR=50% | W.L=Partial | RQD=Nil
22.00m				22.00
			R19	T=45 min | CR=40% | W.L=Partial | RQD=Nil
Slightly weathered, steel grey, medium grained, highly fractured rock.				22.75
			R20	T=44 min | CR=62% | W.L=Partial | RQD=Nil
				23.50
			R21	T=40 min | CR=60% | W.L=Partial | RQD=Nil
				24.25
			R22	T=45 min | CR=72% | W.L=Partial | RQD=Nil
25.00m				25.00

As per drawing

The bore-hole terminated at the depth of 25.00 m below E.G.L

for, C.E. Testing Company Pvt. Ltd.
R. Roy.

S. Das

for C.E. Testing Co Pvt Ltd
R. Roy

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Title : **BORE LOG DATA SHEET**

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Project : Geo-technical Investigation work at NSPCL, Bhilai (2X250MW)

Job No. 4376 Bore Hole No. 24 Date 13.03.2020

Made by R. Ray Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 11.03.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 13.03.2020
Length of Casing	SX-5.5m, NX-7.0m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell / R/d	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 6.10m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 75cm Penetration)	SAMPLES Ref. No.	SAMPLES Depth (m)	
Top Soil consist of Reddish-brown, clayey silt with murrum, Kankars			DS-01	0.50	
0.30M		2 3 2 3 3 3	SPT-01	1.00 – 1.45	
Stiff to very Stiff, Brownish-grey, clayey silt obs: Kankars and Murrum		N=11	UDS-01	2.00 – 2.45	
3.50M		2 2 2 4 5 5	SPT-02	3.00 – 3.45	
very stiff, Deep grey, clayey silt obs: Kankars		N=16	UDS-02	4.00 – 4.45	
		2 3 3 5 6 9	SPT-03	5.00 – 5.45	
6.50M		N=23	UDS-03	6.00 – 6.07 (R)	
Hard, Brownish-grey, clayey silt with decomposed rock		12 18 29 41 For 2.5cm Penetration	SPT-04	6.50 – 6.75	
7.10M		N/100 100 For 3cm Penetration	SPT-05	7.00 – 7.03 (R)	
Highly to Moderately weathered, Brownish-grey, fine to medium grained, highly Fractured rock	NX- Rotary drilling started from 7.1m below E.G.L		T-23min WL-Partial	R1	7.00 – 7.75 CR-30% RAD-NIL
			T-25min WL-Partial	R2	7.75 – 8.50 CR-35% RAD-NIL
			T-22min WL-Partial	R3	8.50 – 9.25 CR-28% RAD-NIL
			T-25min WL-Partial	R4	9.25 – 10.00 CR-35% RAD-NIL
			T-28min WL-Partial	R5	10.00 – 10.75 CR-40% RAD-NIL

T = Time, R-Refusal, WL = Water Loss

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Title : **BORE LOG DATA SHEET**

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Project : Geotechnical Investigation work at NSPCL Bilai (2X750 MW)

Job No. 4376 Bore Hole No. 24 Date 13.03.2020

Made by R. Ray Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 11.03.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 13.03.2020
Length of Casing SX-	5.50m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H) NX-	7.00m H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell/R/d	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 6.10m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
			T-25 min WL-Partial	10.75 R6 CR-38% RAD-NIL 11.50
			T-30 min WL-Partial	R7 CR-40% RAD-18% 12.25
			T-32 min WL-Partial	R8 CR-48% RAD-NIL 13.00
Highly to Moderately weathered, Brownish-grey, fine to medium grained highly Fractured rock			T-25 min WL-Partial	R9 CR-35% RAD-NIL 13.75
			T-32 min WL-Partial	R10 CR-45% RAD-NIL 14.50
			T-30 min WL-Partial	R11 CR-42% RAD-NIL 15.25
			T-30 min WL-Partial	R12 CR-38% RAD-16% 16.00
			T-35 min WL-Partial	R13 CR-40% RAD-NIL 16.75
← 16.75 M →			T-32 min WL-Partial	R14 CR-35% RAD-NIL 17.50
			T-32 min WL-Partial	R15 CR-47% RAD-NIL 18.25
Moderately to Slightly weathered, Deep grey, medium grained, highly Fractured rock			T-28 min WL-Partial	R16 CR-38% RAD-NIL 19.00
			T-38 min WL-Partial	R17 CR-52% RAD-NIL 19.75
			T-90 min WL-Partial	R18 CR-65% RAD-NIL 20.50

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Title : **BORE LOG DATA SHEET**

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Project Geotechnical Investigation work at NSPCL Bhilai. (2X250 MW)

Job No. 4376 Bore Hole No. 24 Date 13.03.2020

Made by R. Ray Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 11.03.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 13.03.2020
Length of Casing	SX-5.50m NX-7.00m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & R/d	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 6.10m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Moderately to slightly weathered, Deep grey, Medium grained, highly Fractured rock			T-42min WL-Partial	20.50
			R19 CR-70% RQD-NIL	
			T-38min WL-Partial	21.25
			R20 CR-56% RQD-NIL	
			T-42min WL-Partial	22.00
			R21 CR-68% RQD-NIL	
			T-38min WL-Partial	22.75
			R22 CR-59% RQD-NIL	
			T-30min WL-Partial	23.50
			R23 CR-47% RQD-NIL	
			T-35min WL-Partial	24.25
			R24 CR-56% RQD-NIL	
			T-39min WL-Partial	25.00
			R25 CR-60% RQD-NIL	
			T-30min WL-Partial	25.75
			R26 CR-52% RQD-NIL	
			T-38min WL-Partial	26.50
			R27 CR-66% RQD-NIL	
			T-42min WL-Partial	27.25
			R28 CR-78% RQD-NIL	
			T-33min WL-Partial	28.00
			R29 CR-60% RQD-NIL	
			T-45min WL-Partial	28.75
			R30 CR-85% RQD-NIL	
			T-25min WL-Partial	29.50
			R31 CR-90% RQD-NIL	30.00

28.75 M
Fresh, steel grey, Medium grained, highly Fractured rock

30.00M
The bore hole terminated as per drawing at the depth of 30.0m below E.G.L

For C. E. Testing Co. Pvt. Ltd.
R. Ray

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C. E. Testing Company Pvt. Ltd.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : G.T.I work for NSPCL Bhilai, TPP(2×250 MW) Bhilai, C.G.

Job No. 4376 Bore Hole No. 22 Date 12.03.20

Made by Rupchand Roy Checked by S. Das

No. of SP Tests	06	Samples	Nos.	Commencement Date	: 13.03.20
No. of Vane (V) Test	-	Undisturbed (UDS)	02	Completion Date	: 15.03.20
Length of Casing SX: / NX:	6.00m / 11.00m	Penetrometer (SPT)	05	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell/R.D.	Water Sample (WS)	01	Water Struck At	: —
				Standing Water Level	: 5.90 m b/o E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm Penetration)	SAMPLES Ref. No.	SAMPLES Depth (m)
Top soil consist of reddish brown clayey silt with moorum. 0.30m			25.01	0.50
Stiff, brownish grey, clayey silt. Observed - Kankars. 2.50m		1 2 2 3 5 4 N 14	SPT-01	1.00 - 1.45
			UDS-01	2.00 - 2.45
		1 2 2 2 4 4 N 12	SPT-02	3.00 - 3.45
			UDS-02	4.00 - 4.45(S)
Stiff to hard, brownish grey, clayey silt. Observed - Kankars. 7.50m		2 3 5 6 7 7 N 25	SPT-03	5.00 - 5.45
			UDS-03	6.00 - 6.45
		5 5 6 9 12 16 N 43	SPT-04	7.00 - 7.45
		17 33 for 2.5cm Ref. N 100	SPT-05	8.00 - 8.10
Hard, brownish grey, clayey silt with decomposed rock. 8.25m		100 for 2cm ref. N 100	SPT-06	8.25 - 8.28(R)
Highly to slightly weathered, brownish grey, fine to medium grained, highly fractured rock.	NX: Rotary drilling started at the depth of 8.25m below E.G.L.			

8.25
R1 T=20min | CR=22% | H.L=Partial | RQD=Nil
9.00
R2 T=22min | CR=20% | H.L=Partial | RQD=Nil
9.75
R3 T=22min | CR=28% | H.L=Partial | RQD=Nil
10.50
R4 T=25min | CR=25% | H.L=Partial | RQD=Nil
11.25
R5 T=27min | CR=50% | H.L=Partial | RQD=28%
12.00

S. Das

R = Refusal (Sample could not be collected due to hard strata) T = Times Taken (minutes)
S = Slip H.L = Water Loss

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C. E. Testing Company Pvt. Ltd.

Laboratory & Godown
Sardarpara, Brahmapur
Kolkata - 700 096

Co-ordinate- E: 9470
N: 1719

Registered Office
124-A, N. S. C. Bose Road
Kolkata - 700 092

Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 02/05

Project : G.T.I work at NSPCL, Bhilai TPP (2×250 MW), Bhilai, C.G.

Job No. 4376 Bore Hole No. 25 Date 15.03.20

Made by R. Roy Checked by S. Das

		Samples	Nos.		
No. of SP Tests	06	Undisturbed (UDS)	02	Commencement Date	: 13.03.20
No. of Vane (V) Test	---	Penetrometer (SPT)	05	Completion Date	: 15.03.20
Length of Casing SX:	6.00m	Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	11.00m H	Water Sample (WS)	01	Level of Ground	:
Method of Boring	Shell & D			Water Struck At	: —
				Standing Water Level	: 5.98 m below E.G.

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm penetration)	SAMPLES Ref. No.	Depth (m)
				12.00
			R6	T=27min | CR=45% | W.L=Partial | RQD=20%
				12.75
			R7	T=32min | CR=47% | W.L=Partial | RQD=16%
				13.50
			R8	T=32min | CR=50% | W.L=Partial | RQD=Nil
				14.25
Highly to slightly weathered brownish grey, fine to medium grained, highly fractured rock.			R9	T=33min | CR=56% | W.L=Partial | RQD=Nil
				15.00
			R10	T=45min | CR=70% | W.L=Partial | RQD=Nil
				15.75
			R11	T=32min | CR=52% | W.L=Partial | RQD=Nil
				16.50
			R12	T=33min | CR=58% | W.L=Partial | RQD=Nil
				17.25
			R13	T=30min | CR=50% | W.L=Partial | RQD=Nil
				18.00
			R14	T=32min | CR=56% | W.L=Partial | RQD=Nil
				18.75

T= Time Taken (minutes) W.L= Water Loss

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : G.I. work for NSPCL, Bhilai, TPP (2×250 MW) Bhilai, C.G.

Job No. 4337G Bore Hole No. 25 Date 15.03.20

Made by R. Roy Checked by S. Das

		Samples	Nos.		
No. of SP Tests	06	Undisturbed (UDS)	02	Commencement Date	: 13.03.20
No. of Vane (V) Test	-	Penetrometer (SPT)	05	Completion Date	: 15.03.20
Length of Casing	SX: 6.00m NX: 11.00m	Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	M/H	Water Sample (WS)	01	Level of Ground	:
Method of Boring	Rotary			Water Struck At	: —
				Standing Water Level	: 5.90m below E.G.

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to slightly weathered, brownish grey, fine to medium grained, highly fractured rock.				18.95
			R15	T=28min, CR=62%, H.L=Partial, RQD=Nil
				19.50
			R16	T=34min, CR=58%, H.L=Partial, RQD=Nil
				20.25
			R17	T=38min, CR=65%, H.L=Partial, RQD=Nil
				21.00
			R18	T=30min, CR=50%, H.L=Partial, RQD=Nil
				21.75
			R19	T=32min, CR=57%, H.L=Partial, RQD=Nil
				22.50
			R20	T=35min, CR=60%, H.L=Partial, RQD=Nil
				23.25
			R21	T=30min, CR=50%, H.L=Partial, RQD=Nil
				24.00
			R22	T=45min, CR=70%, H.L=Partial, RQD=Nil
				24.75
			R23	T=42min, CR=68%, H.L=Partial, RQD=Nil
				25.50

S. Das

T = Times Taken (minutes) W.L = Water Loss

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 01/05

Project : G.I. Work at NSPCL, Bhilai TPP (2x250MW), Bhilai, C.G.

Job No. 4376 Bore Hole No. 25 Date 15.03.20

Made by R. Roy Checked by S. Das

		Samples	Nos.		
No. of SP Tests	06			Commencement Date	: 13.03.20
No. of Vane (V) Test	-	Undisturbed (UDS)	02	Completion Date	: 15.03.20
Length of Casing SH:	6.00m	Penetrometer (SPT)	05	Bore Hole Diameter	: 150mm/76.2mm
NX:	11.00m			Level of Ground	:
SPT done by (M/H)	H	Disturbed (DS)	01	Water Struck At	: —
Method of Boring	Shell/R.D.	Water Sample (WS)	01	Standing Water Level	: 5.90m below E.G.

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)	
				25.50	
			R24	T=35min / W.L=Partial	CR=55% / RQD=Nil
				26.25	
			R25	T=35min / W.L=Partial	CR=58% / RQD=Nil
				27.00	
			R26	T=36min / W.L=Partial	CR=62% / RQD=Nil
				27.75	
			R27	T=30min / W.L=Partial	CR=60% / RQD=Nil
				28.50	
Highly to slightly weathered, brownish grey, fine to medium grained, highly fractured rock.			R28	T=35min / W.L=Partial	CR=60% / RQD=Nil
				29.25	
			R29	T=32min / W.L=Partial	CR=52% / RQD=Nil
				30.00	
			R30	T=35min / W.L=Partial	CR=57% / RQD=Nil
				30.75	
			R31	T=40min / W.L=Partial	CR=68% / RQD=Nil
				31.50	
			R32	T=43min / W.L=Partial	CR=73% / RQD=Nil
				32.25	
← 28.50m →					
Moderately weathered to fresh, steel grey, fine to medium grained, highly fractured rock.					

S. Das

T=Time Taken (minutes) W.L=Water Loss.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : G.T.I. work at NSPCL, Bhilai TPP(2×250 MW) Bhilai, C.G.

Job No. 4376 Bore Hole No. 25 Date 15.03.20

Made by R. Ray Checked by S. Das

		Samples	Nos.		
No. of SP Tests	06			Commencement Date	: 13.03.20
No. of Vane (V) Test	--	Undisturbed (UDS)	02	Completion Date	: 15.03.20
Length of Casing	SX: 6.00m NX: 11.00m	Penetrometer (SPT)	05	Bore Hole Diameter	: 150 mm / 76.2 mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & B.	Water Sample (WS)	01	Water Struck At	: —
				Standing Water Level	: 5.90 m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				32.25
Moderately weathered to fresh steel grey, fine grained, highly fractured rock.			R33 T=35 min CR=60% WL=Partial RQD=NIL	33.00
			R34 T=35 min CR=56% WL=Partial RQD=NIL	33.45
			R35 T=41 min CR=67% WL=Partial RQD=NIL	34.50
			R36 T=20 min CR=90% WL=Partial RQD=NIL	35.00
(35.00m) As per drawing				
The bore hole terminated at the depth of 35.00m below E.G.L.				

For, C.E. Testing Company Pvt. Ltd.
R. Ray

For C.E. Testing Co. Pvt. Ltd.
R. Ray

S. Das

T = Time Taken (minutes) WL = Water Loss

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : Geotechnical Investigation Work at NSPCL, Bhilai TPP (2X250 MW) CG.

Job No. 4376 Bore Hole No. 27 Date 18/02/2020

Made by Sudip Das Checked by

		Samples	Nos.		
No. of SP Tests	07	Undisturbed (UDS)	01	Commencement Date	: 16/02/2020
No. of Vane (V) Test	—	Penetrometer (SPT)	03	Completion Date	: 18/02/2020
Length of Casing	SX= 4.30 M NX= 7.30	Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(H)	Water Sample (WS)		Level of Ground	:
Method of Boring	Shell & B.D			Water Struck At	: —
				Standing Water Level	: 2.70M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm Penetration)	Ref. No.	Depth (m)
Very Stiff, Brownish grey silty clay with morrum, Kankar.			DS-01	0.50
		2 2 3 3 4 6 - -	SPT-01	1.00-1.45
2.00M		N=16	UDS-01	2.00-2.45
Very Stiff, Deep grey, Silty clay. ols-Kankar.		3 3 4 4 5 7 - -	SPT-02	3.00-3.45
		N=20	UDS-02	4.00-4.15(R)
5.00M		5 8 19 39 37 (for 5)	SPT-03	5.00-5.36
Hard, Brownish grey, Silty clay with decomposed rock.		Cm Pent N>140		
		100 for 3cm Pent	SPT-04	6.00-6.03(R)
6.00M		N>100		6.00
Completely to Slightly weathered, Brownish grey, medium to fine grained, completely to slightly fractured rock	NX Rotary Drilling Started at the Depth of 6.00M below E.G.L		T=25min WL=Partial	R1 CR=15% RQD=NIL
				6.75
		100 for 2cm Pent	SPT-05	6.75-6.77(R)
		N>100	T=35min WL=Partial	R2 CR=16% RQD=NIL
				7.50
		100 for 3cm Pent	SPT-06	7.50-7.53(R)
		N>100	T=30min WL=Partial	R3 CR=13% RQD=NIL
				8.25
		100 for 2cm Pent	SPT-07	8.25-8.27(R)
		N>100		

S. Das [signature] 18/2/2020 (BHEL)

R for Refusal Sample could not Recover
T= Time taken, WL = Water loss.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : Geotechnical Investigation Work at NSPCL, Bhilai TPP (2X210 MW) C.G.

Job No. 1376 Bore Hole No. 27 Date 18/02/2020

Made by Sudip Das Checked by .....

No. of SP Tests	07	Samples	Nos.	Commencement Date	: 16/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	01	Completion Date	: 18/02/2020
Length of Casing	Sx: 1.20 m Nx: 7.20 m	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.30M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Completely to Slightly weathered, Brownish grey, medium to fine grained, completely to Slightly fractured rock.			T=35min NL=Partial R1	8.25 CR=36% RQD=NIL 9.00
			T=40min NL=Partial R5	CR=53% RQD=17% 9.75
			T=51min NL=Partial R6	CR=54% RQD=14% 10.50
			T=42min NL=Partial R7	CR=51% RQD=NIL 11.25
			T=42min NL=Partial R8	CR=45% RQD=24% 12.00
			T=43min NL=Partial R9	CR=37% RQD=NIL 12.75

SDB 18/2/2020 (RHEL)

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C. E. Testing Company Pvt. Ltd.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 03/04

Project : Geotechnical Investigation Work at NSPCL, Bhilai TPP (2x250 MW) C.G

Job No. 4376 Bore Hole No. 27 Date 18/02/2020

Made by Sudip Das Checked by .....

No. of SP Tests	07	Samples	Nos.	Commencement Date	: 16/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	01	Completion Date	: 18/02/2020
Length of Casing SX = 1.30M, NX = 7.30M		Penetrometer (SPT)	03	Bore Hole Diameter	: 150 mm/76.2 mm
SPT done by (M/H)	CH	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell & RD		Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.70M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Completely to Slightly weathered, Brownish grey medium to fine grained. Completely to Slightly fractured rock.			T=45min NL=Partial	12.75
			R10 CR=55% RQD=28%	13.50
			T=58min NL=Partial	R11 CR=68% RQD=33%
← 14.25M →				14.25
			T=52min NL=Partial	R12 CR=70% RQD=26%
Slightly weathered, Deep grey to light grey, fine grained, Completely fractured rock.				15.00
			T=50min NL=Partial	R13 CR=68% RQD=32%
				15.75
			T=55min NL=Partial	R14 CR=75% RQD=NIL
				16.50
			T=52min NL=Partial	R15 CR=74% RQD=24%
				17.25

18/2/2020 (BHEL)

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C. E. Testing Company Pvt. Ltd.

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Title : **BORE LOG DATA SHEET**	DOC No. : CET/STF/01/00 Page : 04/04

Project : Geotechnical Investigation Work at NSPCL Bhilai TPP (2x250MW) CG.

Job No. 4376 Bore Hole No. 27 Date 18/02/2020

Made by Sudip Das Checked by .....

No. of SP Tests	07	Samples	Nos.	Commencement Date	: 16/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	01	Completion Date	: 18/02/2020
Length of Casing	3"x = 4.30M NX = 7.30M	Penetrometer (SPT)	03	Bore Hole Diameter	: 150 mm / 76.2 mm
SPT done by (M/H)	CH	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & RIT	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.70M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Slightly weathered, Deep grey to light grey, fine grained, completely fractured rock.			T=50 min NL=Partial R16 CR=72% RQD=20%	17.25
				18.00
			T=52 min NL=Partial R17 CR=80% RQD=20%	
				18.75
			T=54 min NL=Partial R18 CR=78% RQD=NIL	
				19.50
			T=32 min NL=Partial R19 CR=70% RQD=NIL	
				20.00
20.00M				
The bore hole terminated at the Depth of 20.00M below E.G.L	as per dtg.			
For C.E. Testing Co Pvt Ltd Sudip Das			18/2/2020 (B.H.EL)	

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Title : **BORE LOG DATA SHEET**

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Project : G.I. Work at N.S.P.C.L. Bhilai TPP (2×250MW), Bhilai, C.G.

Job No. 6376 Bore Hole No. 28 Date 15.03.2020

Made by R. Roy Checked by [signature]

		Samples	Nos.		
No. of SP Tests	05	Undisturbed (UDS)	02	Commencement Date	: 09.03.20
No. of Vane (V) Test	–	Penetrometer (SPT)	04	Completion Date	: 15.03.2020
Length of Casing	SX: 4.50m, NX: 8.00m	Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	M	Water Sample (WS)		Level of Ground	:
Method of Boring	Shell/R.D.			Water Struck At	: —
				Standing Water Level	: 3.70m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm Penetration)								SAMPLES Ref. No.	Depth (m)
Filled up with clayey silt, ash dust & moorum c.t.c.	NX: Rotary drilling started at the depth of 6.00 m below E.G.L									DS-01	0.50
← 0.80m →		2	2	2	2	3	2	N=	9	SPT-01	1.00 - 1.45
Stiff, brownish grey, silty clay/clayey silt. Observed kankars.										UDS-01	2.00 - 2.45
		2	2	1	3	3	5	N=	12	SPT-02	3.00 - 3.45
										UDS-02	4.00 - 4.45
← 4.00m →		7	8	7	7	15	12	N=	41	SPT-03	5.00 - 5.45
Hard, brownish grey, clayey silt/silty clay with decomposed rock.		45/51 for 2.5cm Penet.								SPT-04	5.75 - 5.85
← 6.00 m →		50 for 3cm Penet.						N=R/Refusal		SPT-05	6.00 - 6.03 (R)
Highly to slightly weathered, brownish grey, fine to medium grained, highly fractured rock.										R1	6.00 – 6.75; T=25min, CR=30%, W.L=Partial, RQD=Nil
										R2	6.75 – 7.50; T=28min, CR=35%, W.L=Partial, RQD=Nil
										R3	7.50 – 8.25; T=25min, CR=28%, W.L=Partial, RQD=Nil
										R4	8.25 – 9.00; T=35min, CR=45%, W.L=Partial, RQD=22%
										R5	9.00 – 9.75; T=28min, CR=30%, W.L=Partial, RQD=16%
										R6	9.75 – 10.50; T=35min, CR=48%, W.L=Partial, RQD=Nil

[signature]

R: Refusal (sample could not be collected due to hard strata) T = Times Taken (minutes) W.L = Water Loss

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 02/03

Project G.I. work of NSPCL, Bhilai TPP (2×250 MW), Bhilai, C.G.

Job No. 4376 Bore Hole No. 28 Date 15.03.2020

Made by R. Roy Checked by S. Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 9.03.20
No. of Vane (V) Test	- -	Undisturbed (UDS)	02	Completion Date	: 15.03.2020
Length of Casing SX:	4.50 m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150 mm / 76.2 mm
SPT done by (M/H) NX:	2.00 m	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell & D.	"	Water Sample (WS)		Water Struck At	: ——
				Standing Water Level	: 3.70 m below EGL

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to slightly weathered, brownish grey, fine to medium grained, highly fractured rock.				10.50
			R7	T=38 min, CR=52%, W.L=Partial, RQD=Nil
				11.25
			R8	T=32 min, CR=40%, W.L=Partial, RQD=Nil
				12.00
			R9	T=42 min, CR=18%, W.L=Partial, RQD=Nil
				12.75
			R10	T=45 min, CR=56%, W.L=Partial, RQD=Nil
				13.50
			R11	T=48 min, CR=70%, W.L=Partial, RQD=40%
				14.25
			R12	T=41 min, CR=60%, W.L=Partial, RQD=Nil
				15.00
			R13	T=39 min, CR=53%, W.L=Partial, RQD=42%
				15.75
			R14	T=35 min, CR=50%, W.L=Partial, RQD=28%
				16.50

S. Das

T = Times Taken (minutes) W.L = Water Loss.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 02/03

Project : G.F.I. work at NSPCL, Bhilai TPP (2×250 MW) Bhilai, C.G.

Job No. 4376 Bore Hole No. 28 Date 15.03.2020

Made by R.Roy Checked by S. Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 9.03.20
No. of Vane (V) Test	- -	Undisturbed (UDS)	02	Completion Date	: 15.03.2020
Length of Casing SX:	4.50m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150 mm / 76.2mm
SPT done by (M/H) NX:	8.00m	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell & D.	"	Water Sample (WS)		Water Struck At	: ——
				Standing Water Level	: 3.70 m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to slightly weathered, brownish grey, fine to medium grained, highly fractured rock.				10.50
			R7	T=38min, W.L=Partial, CR=52%, RQD=Nil
				11.25
			R8	T=32min, W.L=Partial, CR=40%, RQD=Nil
				12.00
			R9	T=42min, W.L=Partial, CR=48%, RQD=Nil
				12.75
			R10	T=45min, W.L=Partial, CR=56%, RQD=Nil
				13.50
			R11	T=48min, W.L=Partial, CR=70%, RQD=40%
				14.25
			R12	T=41min, W.L=Partial, CR=65%, RQD=Nil
				15.00
			R13	T=39min, W.L=Partial, CR=53%, RQD=42%
				15.75
			R14	T=36min, W.L=Partial, CR=50%, RQD=28%
				16.50

S. Das

T = Times Taken (minutes) W.L = Water Loss.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 03/03

Project : G.T.L. work at NSPCL, Bhilai TPP(2x250 MW), Bhilai, C.G.

Job No. 4376 Bore Hole No. 28 Date 15.03.2020

Made by R.Ray Checked by S.Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 09.03.20
No. of Vane (V) Test	- -	Undisturbed (UDS)	02	Completion Date	: 15.03.2020
Length of Casing SX: 4.50m NX: 8.50m		Penetrometer (SPT)	04	Bore Hole Diameter	: 150 mm/76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell & D.		Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.40m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				16.50
Highly to slightly weathered, brownish grey, fine to medium grained, highly fractured rock.			R15 T=30min CR=28% H.L=Partial RQD=18%	17.25
			R16 T=40min CR=37% H.L=Partial RQD=Nil	18.00
			R17 T=37min CR=48% H.L=Partial RQD=Nil	18.75
18.75m			R18 T=39min CR=47% H.L=Partial RQD=Nil	19.50
Moderately weathered to fresh, steel grey, fine to medium grained, highly fractured rock.			R19 T=26min CR=90% H.L=Partial RQD=Nil	20.00
20.00m				
The bore-hole terminated at the depth of 20.00 m below E.G.L.				
For C.E. Testing Company Pvt. Ltd. R.Ray				
S.Das				

For C.E. Testing Co Pvt Ltd
R.Ray.

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Title : BORE LOG DATA SHEET

DOC No. : CET/STF/01/00
Page 02/02

Project : Geotechnical Investigation work at NSPCL Bhilai.(2x250MW)

Job No. 9376 Bore Hole No. 29 Date 03.03.2020

Made by R.Ray Checked by S. Das

No. of SP Tests	07		
No. of Vane (V) Test	—		
Length of Casing	SX-7.4m NX-9.5m		
SPT done by (M/H)	H		
Method of Boring	Shell, R/d		

Samples	Nos.
Undisturbed (UDS)	02
Penetrometer (SPT)	06
Disturbed (DS)	01
Water Sample (WS)	

Commencement Date	: 02.03.2020
Completion Date	: 03.03.2020
Bore Hole Diameter	: 150mm / 76.2mm
Level of Ground	: —
Water Struck At	:
Standing Water Level	: 1.90m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Moderately weathered, Brownish-grey, Fine to medium grained, highly fractured rock			T-33min WL-Partial	R5 12.50–13.25 CR-32% RQD-18%
			T-28min WL-Partial	R6 13.25–14.00 CR-28% RQD-NIL
			T-30min WL-Partial	R7 14.00–14.75 CR-30% RQD-NIL
			T-35min WL-Partial	R8 14.75–15.50 CR-45% RQD-NIL
			T-40min WL-Partial	R9 15.50–16.25 CR-56% RQD-NIL
			T-35min WL-Partial	R10 16.25–17.00 CR-43% RQD-NIL
			T-30min WL-Partial	R11 17.00–17.75 CR-35% RQD-NIL
			T-32min WL-Partial	R12 17.75–18.50 CR-33% RQD-NIL
			T-30min WL-Partial	R13 18.50–19.25 CR-30% RQD-NIL
20.00M — As Per Drawing. The bore hole terminated at the depth of 20.00m below E.G.L			T-32min WL-Partial	R14 19.25–20.00 CR-35% RQD-NIL

S. Das (BHEL) 03/03/2020

For C.E Testing Co. Pvt. Ltd. R.Ray

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Title : **BORE LOG DATA SHEET**		DOC No. : CET/STF/01/00 Page : 01/02

Project : Geotechnical Investigation work at NSPCL, Bhilai (2X250MW)

Job No. 4376 Bore Hole No. 29 Date 03.03.2020

Made by R.Roy Checked by S. [signature]

		Samples	Nos.		
No. of SP Tests	07	Undisturbed (UDS)	02	Commencement Date :	02·03·2020
No. of Vane (V) Test	—	Penetrometer (SPT)	06	Completion Date :	03·03·2020
Length of Casing	SX-7.0m NX-9.51m	Disturbed (DS)	01	Bore Hole Diameter :	151mm/76.2mm
SPT done by (M/H)	H	Water Sample (WS)		Level of Ground :	—
Method of Boring	Shell, R/d			Water Struck At :	
				Standing Water Level :	1.91m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 15cm Penetration)	SAMPLES Ref. No.	SAMPLES Depth (m)
Stiff, Brownish-grey; clayey silt obs: Kankars	NX Rotary drilling started from 9.50m below E.G.L		DS-01	0.50
		2, 2, 2, 1, 2, 2 (N=07)	SPT-01	1.00 – 1.45
			UDS-01	2.00 – 2.45
← 3.50M →		1, 2, 3, 3, 2, 3 (N=11)	SPT-02	3.00 – 3.45
Very stiff to hard, Reddish-brown to Brownish-grey, Silty clay obs: KANKAR			UDS-02	4.00 – 4.45
		1, 2, 2, 3, 3, 6, 6 (N=18)	SPT-03	5.00 – 5.45
			UDS-03	6.00 – 6.45 (S)
		2, 3, 2, 2, 5, 5 (N=14)	SPT-04	7.00 – 7.45
← 8.50 m →		12, 15, 23, 23, 28 for 3cm Penetration (N) 100	SPT-05	8.00 – 8.33
Hard, Brownish-grey, clayey silt / silty clay with decomposed rock		17, 19, 35, 29 for 7.5cm Penetration (N) 100	SPT-06	9.00 – 9.26
← 9.50 M →		100 for 4cm Penetration (N) 100	SPT-07	9.50 – 9.54 (R)
Highly to moderately weathered, Brownish-grey, Fine to medium grained, highly Fractured rock			T-20min, WL-Partial	9.50 – 10.25: R1, CR-20%, RQD-NIL
			T-22min, WL-Partial	10.25 – 11.00: R2, CR-25%, RQD-NIL
			T-25min, WL-Partial	11.00 – 11.75: R3, CR-30%, RQD-NIL
			T-30min, WL-Partial	11.75 – 12.50: R4, CR-32%, RQD-NIL

S. [signature] [signature] 03/3/2020 (BHEL)

T- Time, WL- water Loss, R- Refusal

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Title : **BORE LOG DATA SHEET** | DOC No. : CET/STF/01/00 | Page : 01/02

Project : Geotechnical Investigation work at NSPCL Bhilai (2X350MW)

Job No. 9375 Bore Hole No. 30 Date 05.03.2020

Made by R. Ray Checked by S. Das

No. of SP Tests	06	Samples	Nos.	Commencement Date	04.03.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	03	Completion Date	05.03.2020
Length of Casing SX-	7.00m	Penetrometer (SPT)	05	Bore Hole Diameter	150mm / 76.2mm
Length of Casing NX-	9.00m	Disturbed (DS)	01	Level of Ground	
SPT done by (M/H)	H	Water Sample (WS)		Water Struck At	—
Method of Boring	Shell, R/d			Standing Water Level	2.65M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm Penetration)	SAMPLES Ref. No.	SAMPLES Depth (m)
			DS-01	0.50
Medium, Reddish-brown to Brownish-grey, clayey silt / silty clay obs: Kankars		1 1 1 2 2 2 N=07	SPT-01	1.00 – 1.45
2.50M			UDS-01	2.00 – 2.45
		1 1 1 2 3 5 N=11	SPT-02	3.00 – 3.45
			UDS-02	4.00 – 4.45
Stiff to very stiff, Brownish-grey, silty clay obs: Kankars		2 2 3 3 5 4 N=14	SPT-03	5.00 – 5.45
7.80M			UDS-03	6.00 – 6.45
		2 2 3 3 5 7 N=18	SPT-04	7.00 – 7.45
Hard, Brownish-grey, silty clay / clayey silt with decomposed rock		40 50 For 4.5cm Penetration N>100	SPT-05	8.00 – 8.12
8.25M		100 For 3cm Penetration N>100	SPT-06	8.25 – 8.28 (R)
	NX- Rotary drilling started from 8.25m below E.G.L			
			T-20min WL-Partial R1	8.25 CR-22% RQD-NIL 9.00
Highly weathered, Deep grey, Medium grained, highly Fractured rock			T-25min WL-Partial R2	9.00 CR-20% RQD-NIL 9.75
			T-27min WL-Partial R3	9.75 CR-25% RQD-NIL 10.50
			T-27min WL-Partial R4	10.50 CR-25% RQD-NIL 11.25

S. Das 05/3/20

(BHEL) T- Time, R- Refusal, WL- Water Loss

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Title : **BORE LOG DATA SHEET**

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Project : Geotechnical Investigation work at NSPCL Bhilai (2x250MW)

Job No. 4376 Bore Hole No. 30 Date 05.03.2020

Made by R.Roy Checked by S. Das

		Samples	Nos.			
No. of SP Tests	01			Commencement Date	:	04.03.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	03	Completion Date	:	05.03.2020
Length of Casing	SX- 7.00m NX- 9.00m	Penetrometer (SPT)	05	Bore Hole Diameter	:	150mm 176.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:	
Method of Boring	Shell, R/d	Water Sample (WS)		Water Struck At	:	—
				Standing Water Level	:	2.65 M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.		Depth (m)
Highly weathered Deep grey, Medium grained, highly Fractured rock ← 14.25 M →			T-25min WL-Partial	R5	11.25 – 12.00 CR- 20% RQD- NIL
			T-30min WL-Partial	R6	12.00 – 12.75 CR- 40% RQD- NIL
			T-37min WL-Partial	R7	12.75 – 13.50 CR- 38% RQD- NIL
			T-35min WL-Partial	R8	13.50 – 14.25 CR- 36% RQD-NIL
Highly weathered, Brownish-grey, Fine to medium grained, highly Fractured rock ← 20.00 M →			T-31min WL-Partial	R9	14.25 – 15.00 CR- 28% RQD- NIL
			T-35min WL-Partial	R10	15.00 – 15.75 CR-40% RQD-NIL
			T- 30min WL-highly	R11	15.75 – 16.50 CR-28% RQD- NIL
			T- 30min WL-highly	R12	16.50 – 17.25 CR- 30% RQD- NIL
			T- 28min WL-Partial	R13	17.25 – 18.00 CR- 30% RQD- NIL
			T-30min WL- Partial	R14	18.00 – 18.75 CR- 28% RQD- NIL
			T- 30min WL- highly	R15	18.75 – 19.50 CR- 32% RQD-NIL
			T- 20min WL- highly	R16	19.50 – 20.00 CR-25% RQD- NIL

The bore hole terminated as per drawing at the depth of 20.00m below E.G.L

S. Das

For C.E. Testing Co. Pvt Ltd
R.Roy

05/3/2020 (BHEL)

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Title : **BORE LOG DATA SHEET**		DOC No. : CET/STF/01/00 Page : 01 /05

Project Geotechnical Investigation Work for NSPCL TPP (2x250MW), Bhilai CG

Job No. 4376 Bore Hole No. TBH-01 Date 15/03/2020

Made by Sudip Das Checked by

		Samples	Nos.		
No. of SP Tests	05			Commencement Date	: 9/03/2020
No. of Vane (V) Test	-	Undisturbed (UDS)	02	Completion Date	15/03/2020
Length of Casing SX = 5.63M, NX = 7.30M		Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm / 76.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell	SRB	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.90M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5 cm Penetn.)	SAMPLES Ref. No.	SAMPLES Depth (m)
Filled up with brick bats, Coal dust			DS-01	0.50
← 0.50M →				
Stiff, Brownish grey to yellowish grey, obs-kankar.	6.50M	2 2 3 3 2 5 - -	SPT-01	1.00 - 1.45
		N = 13	UDS-01	2.00 - 2.45
← 2.80M →				
Very stiff to Hard, Brownish grey, clayey silt. Obs-kankar.		2 2 3 3 6 10 - -	SPT-02	3.00 - 3.45
		N = 22	UDS-02	4.00 - 4.45
		3 5 8 17 11 12 - -	SPT-03	5.00 - 5.45
← 5.80M →		N = 38		
Hard, Brownish grey, Silty clay/clayey silt with decomposed rock.			UDS-03	6.00 - 6.05 (R)
		47 53 for 2.5cm Penetn	SPT-04	6.20 - 6.30
		N > 100		
← 6.50M →		100 for 4cm Penetn	SPT-05	6.50 - 6.54 (R)
		N > 100		
Highly to Moderately weathered, Brownish grey, Fine to medium grained, highly fractured rock.	NX Rotary Drilling at the Depth of 6.50M below E.G.L		T = 25min WL = Partial	6.50 R1 CR = 25%, RQD = NIL
			T = 28min WL = Partial	7.25 R2 CR = 30%, RQD = NIL
			T = 30min WL = Partial	8.00 R3 CR = 37%, RQD = 26%
				8.75

S. Das (signature)

R = Refusal Sample could not Recover

T = Time taken, WL = Water loss

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Title : **BORE LOG DATA SHEET**

DOC No. CET/STF/01/00
Page : 02 / 05

Project : Geotechnical Investigation Work at NSPCL (2x110MW), Bhilai, CG

Job No. 4376 Bore Hole No. IBH-01 Date 15/03/2020

Made by Sudip DAS Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 9/03/2020
No. of Vane (V) Test	-	Undisturbed (UDS)	02	Completion Date	: 15/03/2020
Length of Casing	SPT 5.60M, NX 7.30M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150 mm / 76.2 mm
SPT done by (M/H)	(M)	Disturbed (DS)	01	Level of Ground	
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	: -
				Standing Water Level	: 2.90 M below G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Moderately Weathered, Brownish gray, Fine to Medium grained, Highly Fractured Rock.			T=30min NL=Partial R4	8.75 CR=42% RQD=NIL 9.50
			T=28min NL=Partial R5	CR=30% RQD=NIL 10.25
			T=32min NL=Partial R6	CR=40% RQD=28% 11.00
			T=56min NL=Partial R7	CR=56% RQD=NIL 11.75
			T=30min NL=Partial R8	CR=35% RQD=NIL 12.50
			T=38min NL=Partial R9	CR=40% RQD=NIL 13.25

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : Geotechnical Investigation Work for NSPCL TPP (2X25 MW), Bhilwara
Job No. 4376 Bore Hole No. IBH-01 Date 15/03/2020
Made by Sudip Das Checked by

		Samples	Nos.		
No. of SP Tests	05	Undisturbed (UDS)	02	Commencement Date	: 9/03/2020
No. of Vane (V) Test		Penetrometer (SPT)	04	Completion Date	: 15/03/2020
Length of Casing	SX = 5.60 M, NX = 7.30 M	Disturbed (DS)	01	Bore Hole Diameter	: 150 mm/76.2 mm
SPT done by (M/H)	(H)	Water Sample (WS)		Level of Ground	:
Method of Boring	Shell & R/D			Water Struck At	: —
				Standing Water Level	: 2.90 M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Moderately Weathered, Brownish grey, Fine to medium grained highly fractured rock.			T=45min WL-Partial	13.25 – R10 – CR=52%, RQD=24%
			T=45min WL-Partial	14.00 – R11 – CR=56%, RQD=30%
			T=33min WL-Partial	14.75 – R12 – CR=44%, RQD=20%
			T=42min WL-Partial	15.50 – R13 – CR=56%, RQD=16%
			T=48% WL=20%	16.25 – R14 – CR=48%, RQD=20%
			T=30min WL-Partial	17.00 – R15 – CR=40%, RQD=NIL
			T=40min WL-Partial	17.75 – R16 – CR=52%, RQD=NIL
				18.50

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 04/05

Project : Geotechnical Investigation Work for NSPCL TPP (2×250MW), Bhilai-3/4

Job No. 437B Bore Hole No. BH-01 Date 15/03/2020

Made by Sudip Das Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 9/03/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 15/03/2020
Length of Casing	5" = 58.0M, NX = 7.30M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/96.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Rotary	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.90M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				18.50
Moderately weathered to Slightly weathered, yellowish grey to fine grained grey & highly fractured rock.			T=43min NL=Partial R17	CR=56% RQD=NIL
				19.25
			T=40Min NL=Partial R18	CR=50% RQD=NIL
				20.00
			T=35min NL=Partial R19	CR=38% RQD=NIL
				20.75
			T=40Min NL=Partial R20	CR=48% RQD=NIL
				21.50
			T=45Min NL=Partial R21	CR=65% RQD=NIL
				22.25
			T=40Min NL=Partial R22	CR=52% RQD=NIL
				23.00
			T=45Min NL=Partial R23	CR=68% RQD=NIL
				23.75

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 05/05

Project : Geotechnical Investigation Works at NSPCL PP (2 x 750 MW), Bhilai

Job No. 4376 Bore Hole No. TBH : 01 Date 15/03/2020

Made by Sudip Das Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 9/03/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 15/03/2020
Length of Casing	5"x1 5.60M, NX2 7.30M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & RIO	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 2.90M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Moderately weathered to Slightly weathered, yellowish grey to grey, fine grained, highly fractured rock.	fine grained		T=33min HL=Packed R24	23.75 CR=40% RQD=NIL
				24.50
			T=42min HL=Packed R25	CR=52% RQD=20%
				25.25
25.25M			T=50min HL=Packed R26	CR=58% RQD=NIL
				26.00
Moderately to Slightly weathered, Steel grey, fine grained, fractured rock.			T=51min HL=Packed R27	CR=65% RQD=40%
				26.75
			T=45min HL=Packed R28	CR=70% RQD=45%
				27.50
			T=46min HL=Packed R29	CR=65% RQD=NIL
				28.25
			T=48min HL=Packed R30	CR=60% RQD=30%
				29.00
			T=42min HL=Packed R31	CR=69% RQD=NIL
30.00M				30.00

For C.E Testing Co Pvt Ltd
Sudip Das

The bore hole terminated after reaching at the Depth of 30.00 M below E.G.L

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C. E. Testing Company Pvt. Ltd.

Laboratory & Godown
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Kolkata - 700 096

Co-ordinate E: 9164
N: 1683

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 01/03

Project : Geotechnical Investigation work at NSPCL, Bhilai, (2X250 MW)

Job No. 4376 Bore Hole No. BH-03 Date 08.03.2020

Made by R. Roy Checked by

		Samples	Nos.		
No. of SP Tests	05			Commencement Date	: 05.03.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 08.03.2020
Length of Casing SX-	5.4m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150 mm / 76.2 mm
SPT done by (M/H) NX-	6.9m	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell & Auger		Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.20m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm Penetration)	SAMPLES Ref. No.	SAMPLES Depth (m)
Top Soil Consist of Brownish-grey, clayey silt obs: coal dust, brick dust etc			DS-01	0.50
0.30M		1 1 1 1 1 2	SPT-01	1.00 — 1.45
Medium to very stiff, Brownish-grey, clayey silt obs: Kankars and murrum		N=05	UDS-01	2.00 — 2.45
3.80M		2 3 2 3 5 7	SPT-02	3.00 — 3.45
Hard, Brownish-grey, clayey silt obs: Kankars		N=17	UDS-03	4.00 — 4.45
6.00M		2 3 5 7 12 19	SPT-03	5.00 — 5.45
Hard, Brownish-grey, clayey silt with decomposed rock		N=43	UDS-03	6.00 — 6.07 (R)
6.75M		12 20 25 21 22 for 30cm Penetration	SPT-04	6.25 — 6.58
		100 for 2cm Penetration N/100	SPT-05	6.75 — 6.77 (R)
Highly to slightly weathered, Brownish-grey, Fine to Medium grained, highly Fractured rock	← NX Rotary drilling started from 6.75m below E.G.L	N/100		

6.75
T-30min WL-Partial — R1 — CR-40% RQD-20%
7.50
T-58min WL-Partial — R2 — CR-50% RQD-NIL
8.25
T-45min WL-Partial — R3 — CR-62% RQD-30%
9.00
T-33min WL-Partial — R4 — CR-45% RQD-NIL
9.75
T-47min WL-Partial — R5 — CR-50% RQD-NIL
10.50
T-43min WL-Partial — R6 — CR-56% RQD-16%
11.25

T- Time, WL- Water Loss, R- Refusal

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Kolkata - 700 092

Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : Geotechnical Investigation work at NSPCL, Bhilai (2×250 mW)

Job No. 9376 Bore Hole No. BH-03 Date 08.03.2020

Made by R. Roy Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 05.03.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 08.03.2020
Length of Casing	SX-5.0m, NX-6.5m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm & 76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & R/d	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.20m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)	
			T-48min WL-Partial	R7	11.25 CR-60% RQD-30% 12.00
			T-42min WL-Partial	R8	CR-52% RQD-NIL 12.75
			T-35min WL-Partial	R9	CR-45% RQD-20% 13.50
			T-42min WL-Partial	R10	CR-52% RQD-NIL 14.25
			T-42min WL-Partial	R11	CR-50% RQD-20% 15.00
			T-45min WL-Partial	R12	CR-56% RQD-NIL 15.75
			T-45min WL-Partial	R13	CR-52% RQD-16% 16.50
			T-48min WL-Partial	R14	CR-55% RQD-36% 17.25
			T-55min WL-Partial	R15	CR-68% RQD-26% 18.00
			T-45min WL-Partial	R16	CR-56% RQD-NIL 18.75
			T-55min WL-Partial	R17	CR-70% RQD-NIL 19.50

(1) Highly to slightly weathered, Brownish-grey, Fine to Medium grained, highly fractured rock

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 03/03

Project : Geotechnical Investigation work at NSPCL Bhilai (2x250MW)

Job No. 4376 Bore Hole No. IBH-03 Date 08.03.2020

Made by R.Ray Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 05.03.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 08.03.2020
Length of Casing	SX-5.0m NX-6.50m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm / 76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	: —
				Standing Water Level	: 3.20m below E.G.

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				19.50
			T-35min WL-Partial	R18 CR-45% RQD-NIL
				20.25
			T-43min WL-Partial	R19 CR-60% RQD-28%
				21.00
			T-45min WL-Partial	R20 CR-60% RQD-14%
				21.75
			T-43min WL-Partial	R21 CR-54% RQD-NIL
				22.50
			T-45min WL-Partial	R22 CR-52% RQD-NIL
				23.25
			T-42min WL-Partial	R23 CR-51% RQD-NIL
				24.00
			T-65min WL-Partial	R24 CR-75% RQD-40%
				25.00
Highly to slightly weathered, Brownish-grey, fine to medium grained, highly fractured rock				
← 25.00M →				
The bore hole terminated as per drawing at the depth of 25.00m below E.G.				

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Title : **BORE LOG DATA SHEET**		DOC No. : CET/STF/01/00 Page : 01/02

Project : Geotechnical Investigation Work at NSPCL Bhilai, T.PP (2X250MW)

Job No. 1376 Bore Hole No. BH-04 Date 28.02.2020

Made by R. Ray Checked by S. Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 24.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 28.02.2020
Length of Casing	6m-EX- 3.0m-NX-	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm | 76.2mm
SPT done by (M/H)	9.0m H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & R/D	Water Sample (WS)		Water Struck At	: ———
				Standing Water Level	: 2.20m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE Each 75 cm penetration	SAMPLES Ref. No.	SAMPLES Depth (m)	
Stiff, Brownish-grey, Silty clay obs: Murrum		1 2 1 2 3 3	DS-01	0.50	
2.50 M			SPT-01	1.00 – 1.45	
Very stiff to Hard, Brownish grey, silty clay obs: Kankars		N=09	UDS-01	2.00 – 2.45	
5.50m		2 2 3 3 5 7	SPT-02	3.00 – 3.45	
Hard, Brownish-grey, Silty clay with decomposed rock		N=18	UDS-02	4.00 – 4.45	
6.00 M		8 12 12 15 15 21	SPT-03	5.00 – 5.45	
		N=63	SPT-04	5.60 – 5.85	
		17 19 39 25 for 2.5cm	SPT-05	6.00 – 6.03	(R)
		100 for 3 cm Penetration			
		N) 100			
Highly to slightly weathered, Brownish-grey, fine to medium grained, highly Fractured rock	NX-Rotary drilling started from 6.00m below E.G.L		T-30min WL-Partial	R1	6.00 CR-44% RQD-NIL 6.75
			T-45min WL-Partial	R2	CR-57% RQD-36% 7.50
			T-45min WL-Partial	R3	CR-60% RQD-13% 8.25
			T-55min WL-Partial	R4	CR-68% RQD-NIL 9.00
			T-35min WL-Partial	R5	CR-40% RQD-16% 9.75
			T-46min WL-Partial	R6	CR-52% RQD-26% 10.50

S. Das 28-2-2020 (BHEL)

T- Time, WL- Water Loss, R- Refusal

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Title **BORE LOG DATA SHEET**	DOC No CE/STI/01/00 Page 02/02

Project Geotechnical Investigation work at NSPCL Bhilai, TPP (2X250 MW)

Job No 9378 Bore Hole No 1BH-09 Date 28.02.2020

Made by R. Roy Checked by S. Das

		Samples	Nos		
No. of SP Tests	05	Undisturbed (UDS)	02	Commencement Date	24.02.2020
No. of Vane (V) Test	—	Penetrometer (SPT)	04	Completion Date	28.02.2020
Length of Casing SX- / NX-	3.0m / 9.0m	Disturbed (DS)	01	Bore Hole Diameter	150mm / 76.2mm
SPT done by (M/H)	H	Water Sample (WS)		Level of Ground	
Method of Boring Shell	R/d			Water Struck At	——
				Standing Water Level	2.20m below E.G.L.

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.		Depth (m)
Highly to slightly weathered, Brownish-grey, Fine to medium grained, highly Fractured rock			T-35min WL Partial	R7	10.50 – 11.25; CR-32%, RQD-20%
			T-43min WL Partial	R8	11.25 – 12.00; CR-40%, RQD-30%
			T-43min WL Partial	R9	12.00 – 12.75; CR-42%, RQD-NIL
			T-35min WL Partial	R10	12.75 – 13.50; CR-35%, RQD-20%
			T-40min WL Partial	R11	13.50 – 14.25; CR-45%, RQD-NIL
			T-32min WL Partial	R12	14.25 – 15.00; CR-36%, RQD-NIL
			T-35min WL Partial	R13	15.00 – 15.75; CR-40%, RQD-NIL
			T-41min WL Partial	R14	15.75 – 16.50; CR-56%, RQD-24%
			T-30min WL Partial	R15	16.50 – 17.25; CR-25%, RQD-NIL
			T-32min WL Partial	R16	17.25 – 18.00; CR-30%, RQD-NIL
18.75M			T-35min WL Partial	R17	18.00 – 18.75; CR-38%, RQD-NIL
Fresh, steel grey, Fine to medium grained Fractured rock			T-56min WL Partial	R18	18.75 – 19.50; CR-84%, RQD-40%
20.00M			T-32min WL Partial	R19	19.50 – 20.00; CR-88%, RQD-63%
The bore hole terminated As per Drawing at The depth of 20.00m below E.G.L. ~~As per Drawing~~					

S. Das (RNBL) 28/2/20 R. Roy G.T. Engg.

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Title : **BORE LOG DATA SHEET**		DOC No. : CET/STF/01/00 Page : 01 /04

Project: Geotechnical Investigation Work at NSPCL TPP (2X250MW) Bhilai CG.

Job No. 4376 Bore Hole No. TBH-05 Date 23/02/2020

Made by Sudip Das Checked by

		Samples	Nos.		
No. of SP Tests	05	Undisturbed (UDS)	02	Commencement Date	: 20/02/2020
No. of Vane (V) Test	—	Penetrometer (SPT)	04	Completion Date	: 23/02/2020
Length of Casing	6"X = 4.30 M 4"X = 5.70 M	Disturbed (DS)	01	Bore Hole Diameter	: 150 mm/76.2 mm
SPT done by (M/H)	M	Water Sample (WS)		Level of Ground	:
Method of Boring	Shell & RP			Water Struck At	:
				Standing Water Level	:

DESCRIPTION	SYMBOL	N-VALUE (Each 15cm penetration)	SAMPLES Ref. No.	SAMPLES Depth (m)
Very Stiff, Brownish grey, Silty clay with morrum, Kankar	NX Rotary Drilling Started at the Depth of 6.00M below G.L.		DS-01	0.50
		4 5 5 6 6 7 - -	SPT-01	1.00-1.45
← 2.00M →		N=24	UDS-01	2.00-2.45
Very Stiff, Deep grey, Silty clay.		3 3 4 4 5 5 - -	SPT-02	3.00-3.45
		N=18	UDS-02	4.00-4.45
← 5.00M →		12 17 31 55 for 1.5 cm R N>100	SPT-03	5.00-5.25
Hard, Brownish grey, silty clay with decomposed rock.		11 6 6 16 61 for 5cm R N>100	SPT-04	5.50-5.85
← 6.00M →		100 for 3cm R N>100	SPT-05	6.00-6.03 (R)
Highly to Slightly weathered, Brownish grey, medium to fine grained, fractured rock.			T=40 min NL=Partial	R1: 6.00 → 6.75, CR=20%, RQD=NIL
			T=40 min NL=Partial	R2: 6.75 → 7.50, CR=40%, RQD=24%
			T=45 min NL=Partial	R3: 7.50 → 8.25, CR=28%, RQD=NIL

S.Das

[signature] 23/2/20 LBHED

R for Refusal sample could not recover.
T= Time taken NL= Water loss

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Title : **BORE LOG DATA SHEET**

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Project : Geotechnical Investigation Work at NSPCL TPP (2x250 MW) Bhilai,

Job No. 4276 Bore Hole No. BH-05 Date 23/02/2020

Made by Sudip Das Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 20/02/2020
No. of Vane (V) Test		Undisturbed (UDS)	02	Completion Date	: 23/02/2020
Length of Casing	SX = 4.30 M, NX = 5.70 M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150 mm/76.2 mm
SPT done by (M/H)	M	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	:
				Standing Water Level	:

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Slightly weathered, Brownish grey, medium to fine grained, fractured rock.			T-50 min WL-Partial R4 CR-36% RQD-NIL	8.25
			T-45 min WL-Partial R5 CR-44% RQD-NIL	9.00
			T-42 min WL-Partial R6 CR-72% RQD-24%	9.75
			T-45 min WL-Partial R7 CR-64% RQD-NIL	10.50
			T-42 min WL-Partial R8 CR-68% RQD-40%	11.25
			T-45 min WL-Partial R9 CR-68% RQD-48%	12.00
				12.75

S. Das 23/2/20 (Client)

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Project : Geotechnical Investigation Work at NSPCL-TPP (2x250MW) Bhilai, CG

Job No. 4376 Bore Hole No. IBH-05 Date 23/02/2020

Made by Sudip Das Checked by .....

		Samples	Nos.		
No. of SP Tests	05			Commencement Date	: 20/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 23/02/2020
Length of Casing	1.30 m	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	:
				Standing Water Level	:

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Slightly weathered, Brownish grey, medium to fine grained, fractured rock.			T-50min NL-Partial R10 CR-56% RQD-14%	12.75 – 13.50
			T-55min NL-Partial R11 CR-58% RQD-20%	13.50 – 14.25
			T-60min NL-Partial R12 CR-52% RQD-18%	14.25 – 15.00
			T-65min NL-Partial R13 CR-60% RQD-14%	15.00 – 15.75
← 16.50M → Moderately to Slightly weathered, Yellowish grey, fine grained, completely fractured rock.			T-50min NL-Partial R14 CR-64% RQD-60%	15.75 – 16.50
			T-50min NL-Partial R15 CR-52% RQD-NIL	16.50 – 17.25

S. Das 23/2/20

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project Geotechnical Investigation Work at NSPCL TPP (2X250MW) Bhilai, Ch

Job No. 4376 Bore Hole No. TBH-05 Date 23/02/2020

Made by Sudip Das Checked by .....

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 20/02/2020
No. of Vane (V) Test	–	Undisturbed (UDS)	02	Completion Date	: 23/02/2020
Length of Casing	5 x 1.30M 1 x 5.70M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	CH	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	:
				Standing Water Level	:

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
			T= 55min NL=Partial R16	17.25 CR=64% RQD=NIL 18.00
Moderately to Slightly weathered, yellowish grey, fine grained completely fractured rock.			T=50min NL=Partial R17	CR=56% RQD=16% 18.75
			T=65min NL=Partial R18	CR=64% RQD=14% 19.50
			T=35min NL=Partial R19	CR=65% RQD=NIL 20.00
20.00M				
The Bore Hole terminated at the Depth of 20.00M (As per drawing) below E.G.L				

For CE Testing Co Pvt Ltd
Sudip Das

S. Das
23/2/20
(BHEL)

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Title : **BORE LOG DATA SHEET**

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Project: Geotechnical Investigation work at NSPCL Bhilai, TPP (2X250 MW)

Job No. 4316 Bore Hole No. BH-06 Date 26/02/2020

Made by Rupchand Ray Checked by [signature]

		Samples	Nos.		
No. of SP Tests	04			Commencement Date	24.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	26.02.2020
Length of Casing	SX- 5.00 M, NX- 9.00 M	Penetrometer (SPT)	03	Bore Hole Diameter	150 mm / 76.2 mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	
Method of Boring	Shell, R/D	Water Sample (WS)		Water Struck At	—
				Standing Water Level	1.90 m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5 cm Penetration)	SAMPLES Ref. No.	SAMPLES Depth (m)
Filled up with stone, kankar and etc — 0.30 M	NX- Rotary drilling started from 5.75 m below E.G.L		DS-01	0.50
Stiff, brownish-grey, silty clay obs: kankars — 5.00 M		2, 2, 2, 3, 4, 4; N=13	SPT-01	1.00 – 1.45
			UDS-01	2.00 – 2.45
		3, 3, 1, 2, 3, 3; N=09	SPT-02	3.00 – 3.45
			UDS-02	4.00 – 4.45
Hard, brownish-grey, silty clay with decomposed rock — 5.75 M		5, 17, 20, 23, 29 for 5 cm penetration (50 for 20 cm penetration); N>100	SPT-03	5.00 – 5.35
		100 for 3 cm penetration	SPT-04	5.75 – 5.78 (R)
Highly to slightly weathered, brownish-grey, fine to medium grained, fractured rock			T-20min, WL-Partial	R1: 5.75 – 6.50, CR-20%, RQD-NIL
			T-24min, WL-Partial	R2: 6.50 – 7.25, CR-22%, RQD-NIL
			T-31min, WL-Partial	R3: 7.25 – 8.00, CR-20%, RQD-NIL
			T-35min, WL-Partial	R4: 8.00 – 8.75, CR-25%, RQD-NIL
			T-40min, WL-Partial	R5: 8.75 – 9.50, CR-32%, RQD-NIL
			T-39min, WL-Partial	R6: 9.50 – 10.25, CR-44%, RQD-NIL
			T-40min, WL-Partial	R7: 10.25 – 11.00, CR-42%, RQD-36%

[signature] [signature] 26-02-20 (BHEL)

T- Time, WL- Water loss, R- Refusal

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Project : Geotechnical Investigation work at NSPCL Bhilai, TPP (2X250MW)

Job No. 4376 Bore Hole No. IBH-06 Date 26/02/2020

Made by Rupchand Roy Checked by S. Das

No. of SP Tests	04	Samples	Nos.	Commencement Date	: 24.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 26.02.2020
Length of Casing	SX- 5.00m NX- 9.00m	Penetrometer (SPT)	03	Bore Hole Diameter	: 150mm / 76.2mm
SPT done by (M/H)	H	Disturbed (DS)		Level of Ground	:
Method of Boring	Shell, R/D	Water Sample (WS)	01	Water Struck At	: —
				Standing Water Level	: 1.90m below G.C.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)	
			T-46min WL-Partial	R8	11.00 CR-60% RAD-10% 11.75
			T-40min WL-Partial	R9	CR-44% RAD-NIL 12.50
			T-45min WL-Partial	R10	CR-60% RAD-NIL 13.25
			T-50min WL-Partial	R11	CR-68% RAD-16% 14.00
			T-50min WL-Partial	R12	CR-70% RAD-NIL 14.75
			T-51min WL-Partial	R13	CR-60% RAD-NIL 15.50
			T-56min WL-Partial	R14	CR-74% RAD-NIL 16.25
			T-55min WL-Partial	R15	CR-68% RAD-NIL 17.00
			T-60min WL-Partial	R16	CR-77% RAD-NIL 17.75
			T-52min WL-Partial	R17	CR-57% RAD-NIL 18.50
			T-55min WL-Partial	R18	CR-69% RAD-NIL 19.25
			T-62min WL-Partial	R19	CR-82% RAD-NIL 20.00

Highly to slightly weathered, Brownish-grey, fine to medium grained, fractured rock

← 14.00m →

Highly to slightly weathered, steel grey, Fine to medium grained, Fractured rock

S. Das 26-2-20 (GHEL)

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Title : **BORE LOG DATA SHEET**	DOC No. : CET/STF/01/00 Page : 03/03

Project : Geotechnical Investigation Work at NSPCL Bhilai, TPP (2x250 MW)

Job No. 4376 Bore Hole No. BH-06 Date 26/2/2020

Made by Rupchand Ray Checked by S. Das

		Samples	Nos.		
No. of SP Tests	04	Undisturbed (UDS)	02	Commencement Date :	24.02.2020
No. of Vane (V) Test	—	Penetrometer (SPT)	03	Completion Date :	26.02.2020
Length of Casing	SX- 5.4m NX- 9.4m	Disturbed (DS)		Bore Hole Diameter :	150mm/76.2mm
SPT done by (M/H)	H	Water Sample (WS)	01	Level of Ground :	
Method of Boring	Shell, R/D			Water Struck At :	—
				Standing Water Level :	1.91m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.		Depth (m)
Highly to slightly weathered, steel grey, fine to medium grained fractured rock			T-52min WL-Partial	R20	20.00 – 20.75 CR-60% RQD-NIL
			T-53min WL-Partial	R21	20.75 – 21.50 CR-62% RQD-20%
			T-55min WL-Partial	R22	21.50 – 22.25 CR-68% RQD-16%
			T-43min WL-Partial	R23	22.25 – 23.00 CR-40% RQD-NIL
			T-42min WL-Partial	R24	23.00 – 23.75 CR-62% RQD-NIL
			T-45min WL-Partial	R25	23.75 – 24.50 CR-68% RQD-NIL
			T-47min WL-Partial	R26	24.50 – 25.25 CR-75% RQD-NIL
			T-50min WL-Partial	R27	25.25 – 26.00 CR-60% RQD-NIL
			T-52min WL-Partial	R28	26.00 – 26.75 CR-65% RQD-NIL
			T-47min WL-Partial	R29	26.75 – 27.50 CR-60% RQD-NIL
			T-50min WL-Partial	R30	27.50 – 28.25 CR-67% RQD-NIL
			T-45min WL-Partial	R31	28.25 – 29.00 CR-60% RQD-NIL
			T-68min WL-Partial	R32	29.00 – 30.00 CR-75% RQD-NIL
30.00 M The bore hole terminated at the depth of 30.0m below E.G.L As per Drawning.					

Testing conducted R Ray

S. Das

26.2.20 C&C (BHEL)

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Kolkata - 700 096

Co-ordinate: N = 1779
E- 9055

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 01/05

Project : Geotechnical Investigation works at NSPCL, Bhilai TPP (2x 250 MW), C.G.

Job No. 4376 Bore Hole No. BH-07 Date 12/02/2020

Made by A. Ship Checked by S.DN

No. of SP Tests	07	Samples	Nos.	Commencement Date	: 05/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 12/02/2020
Length of Casing SX=	9M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm / 76.2mm.
SPT done by (M/H) NX=	7M H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell R/D	Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.80 M below EGL

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5 Cm Penetn.)	SAMPLES Ref. No.	Depth (m)	
Very stiff, Brownish grey, Silty clay.		4 4 5 5 5 5 — — N= 20	DS-01	0.50	
Obs- traces of Kankar and calcarious.			SPT-01	1.00 — 1.45	
			UDS-01	2.00 — 2.45	
		2 2 3 4 6 7 — — N= 20	SPT-02	3.00 — 3.45	
			UDS-02	4.00 — 4.45	
		3 4 4 5 7 7 — — N= 23	SPT-03	5.00 — 5.45	
5.70M					
Hard, brownish grey, silty clay, with decomposed rock frag-ments.		23 27 50 for 3 Cm Penetn. N/100	SPT-04	5.75 — 5.93	
6.00M		100 for 4 Cm Penetn. N/100	SPT-05	6.00 — 6.04	(R)
			T=35MIN DL-P	6.00 R1 CR=14% RQD=NIL 6.75	
Completely to moderately Weathered, brownish grey in coloured, fine grained, fractured, rock.		100 for 3 Cm Penetn. N/100	SPT-06	6.75 — 6.78	(R)
			T=33MIN DL-P	6.75 R2 CR=20% RQD=NIL 7.50	
		100 for 4 Cm Penetn. N/100	SPT-07	7.50 — 7.54	(R)
			T=35MIN NL-P	7.50 R3 CR=36% RQD=24% 8.25	

NOTE:- NX rotary drilling started from 6.00m below E.G.L

S.DN

11-2-2020 (BHEL)

R=Refusal, T=Time, WL=Water loss, P=Partial

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 02/05

Project : Geotechnical Investigation work at NSPCL, Bhilai TPP (2x250MW), CG.

Job No. 4376 Bore Hole No. BH-07 Date 12/02/2020

Made by A. Shil Checked by S. Das

		Samples	Nos.
No. of SP Tests	07	Undisturbed (UDS)	02
No. of Vane (V) Test	—	Penetrometer (SPT)	04
Length of Casing	Sx= 3M, NX= 7M	Disturbed (DS)	01
SPT done by (M/H)	H	Water Sample (WS)	
Method of Boring	Shell & D		

Commencement Date : 05/02/2020
Completion Date : 12/02/2020
Bore Hole Diameter : 150mm/76.2mm
Level of Ground :
Water Struck At : —
Standing Water Level : 2.80 M below EGL

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				8.25
			T=37 MIN WL-P	R4 CR=34%. RQD=16%
				9.00
			T=36 MIN WL=P	R5 CR=36%. RQD=21%
completely to moderately				9.75
weathered, brownish grey in			T=39 MIN WL-P	R6 CR=33%. RQD=16%
coloured, fine grained, fractured,				10.50
rock.			T=38 MIN WL-P	R7 CR=37%. RQD=27%
				11.25
			T=37 MIN WL-P	R8 CR=36%. RQD=27%
				12.00
			T=34 MIN WL-P	R9 CR=42%. RQD=14%
				12.75
			T=37 MIN WL-P	R10 CR=35%. RQD=20%
				13.50
			T=39 MIN WL-P	R11 CR=48%. RQD=24%
				14.25

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T= Time. WL= Water Loss. P= Partial.

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : Geotechnical Investigation work at NSPCL, Bhilai TPP (2x250MW), CG.

Job No. 4376 Bore Hole No. 1811-07 Date 12/02/2020

Made by A. Ghil Checked by S. Das

No. of SP Tests	07	Samples	Nos.	Commencement Date	:	05/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	:	12/02/2020
Length of Casing	3M	Penetrometer (SPT)	04	Bore Hole Diameter	:	150mm/76.2mm
SPT done by (M/H)	7M H	Disturbed (DS)	01	Level of Ground	:	
Method of Boring	Shell	Water Sample (WS)	-	Water Struck At	:	—
	RID			Standing Water Level	:	

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				14.25
			T=36MIN WL-P	R12 CR=49% RQD=23%
				15.10
			T=37MIN WL-P	R13 CR=40% RQD=NIL
				15.75
			T=39MIN WL-P	R14 CR=48% RQD=13%
				16.50
			T=42MIN WL-P	R15 CR=44% RQD=NIL
				17.25
			T=36MIN WL-P	R16 CR=45% RQD=NIL
				18.00
			T=39MIN WL-P	R17 CR=41% RQD=NIL
				18.75
			T=41MIN WL-P	R18 CR=49% RQD=NIL
				19.50
			T=36MIN WL=P	R19 CR=44% RQD=NIL
				20.25

Completely to moderately Weathered, brownish grey in coloured, fine grained, fractured, rock.

S. Das 11-2-2020 (BHEL)

T=Time, WL=Water Loss, P=Partial.

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Title : **BORE LOG DATA SHEET**

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Project : Geotechnical Investigation work for NSCCL, Bhilai, TPP, (2x250MW) CG

Job No. 4376 Bore Hole No. TBH-07 Date 12/02/2020

Made by A. Shil Checked by S. Das

		Samples	Nos.		
No. of SP Tests	07	Undisturbed (UDS)	02	Commencement Date	: 05/02/2020
No. of Vane (V) Test	–	Penetrometer (SPT)	04	Completion Date	: 12/02/2020
Length of Casing Sec / NX	3M / 7M	Disturbed (DS)	01	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	H	Water Sample (WS)		Level of Ground	:
Method of Boring	Shell, R/D			Water Struck At	: –
				Standing Water Level	:

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.		Depth (m)
Completely to moderately weathered, brownish grey in coloured, fine grained, fractured, rock.			T=39MIN, NL=P	R20	20.25 – 21.00, CR=49%, RQD=NIL
			T=37MIN, NL=P	R21	21.00 – 21.75, CR=45%, RQD=NIL
			T=40MIN, NL=P	R22	21.75 – 22.50, CR=48%, RQD=16%
22.50M					
Slightly weathered, grey in coloured, fine grained, fractured, rock.			T=42MIN, NL=P	R23	22.50 – 23.25, CR=63%, RQD=13%
			T=38MIN, NL=P	R24	23.25 – 24.00, CR=64%, RQD=44%
			T=44MIN, NL=P	R25	24.00 – 24.75, CR=61%, RQD=37%
			T=49MIN, NL=P	R26	24.75 – 25.50, CR=60%, RQD=41%
			T=53MIN, NL=P	R27	25.50 – 26.25, CR=63%, RQD=37%

S. Das [signature] 11-2-2020 (BHEL)

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Title : BORE LOG DATA SHEET	DOC No. : CET/STF/01/00 Page : 05/05

Project : Geotechnical Investigation work at NSPCL Bhilai TPP (2x250MW), CG

Job No. 4376 Bore Hole No. BH-07 Date 12/02/2020

Made by A. Shi Checked by S. Das

No. of SP Tests	07	Samples	Nos.	Commencement Date	: 05/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 12/02/2020
Length of Casing	Sc- 3M Nc- 7M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell	R/D	Water Sample (WS)	—	Water Struck At	: —
				Standing Water Level	:

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Slightly weathered, grey in coloured, fine grained, fractured, rock.			T= 56M DL=P	R28: 26.25 – 27.00, CR=68%, RQD=36%
			T=54MIN DL=P	R29: 27.00 – 27.75, CR=72%, RQD=38%
			T=40MIN DL=P	R30: 27.75 – 28.30, CR=74%, RQD=26%
28.30M				

The Bore hole terminated at the depth of 28.30M below E.G.L As RQD > 25% at 5.0m cont. Dor.

for. C.E. Testing Co.(P). Ltd.
S. Das
11-2-2020 (BHEL)

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Title BORE LOG DATA SHEET		DOC No. CETSPL/01/00 Page 01/01

Project: Geotechnical Investigation work at NSPCL Bhilai (Expansion)

Job No: 4376 Bore Hole No: 1BH-08 Date: 01.03.2020

Made by: R. Roy Checked by: S. D[illegible]

		Samples	Nos.		
No. of SP Tests	05			Commencement Date	27.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	01.03.2020
Length of Casing SP / NX	6.0 m / 3.0 m	Penetrometer (SPT)	04	Bore Hole Diameter	150 mm / 76.2 mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	
Method of Boring	Shell / R/d	Water Sample (WS)	—	Water Struck At	——
				Standing Water Level	3.20 m below E.G.L.

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5 cm blows)	SAMPLES Ref. No.	Depth (m)
Stiff, Brownish-grey, Silty clay/clayey silt obs: Kankars and murrum			DS-01	0.50
		2 2 3 3 4 4	SPT-01	1.00 – 1.45
		N: 14	UDS-01	2.00 – 2.45
2.50M				
Stiff to hard, Brownish-grey, Silty clay/clayey silt obs: Kankars		3 3 4 3 5 3	SPT-02	3.00 – 3.45
		N: 13	UDS-02	4.00 – 4.45
		7 12 17 17 20 19	SPT-03	5.00 – 5.45
5.80M		N: 73		
Hard, Brownish grey, Silty with decomposed rock		9 18 27 23 26 Fr. 5cm	SPT-04	6.00 – 6.35
		100 Pen Fr. 4 cm Pen; N>100	SPT-05	6.50 – 6.54 (R)
6.50M	Started from 6.50m below E.G.L.			
Highly to Moderately weathered, Brownish-grey, Fine to medium grained, highly Fractured rock	NX-Rotary drilling		T-20min, WL-Partial, R1	6.50 – 7.25; CR-20%, RQD-NIL
			T-23min, WL-Partial, R2	7.25 – 8.00; CR-22%, RQD-NIL
			T-25min, WL-Partial, R3	8.00 – 8.75; CR-25%, RQD-NIL
			T-25min, WL-Partial, R4	8.75 – 9.50; CR-32%, RQD-NIL
			T-20min, WL-Partial, R5	9.50 – 10.25; CR-20%, RQD-NIL

[signatures] 01-3-20 (ONGL)

T = Time. WL = Water Loss. R = Refusal

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Title **BORE LOG DATA SHEET**

DOC No CET/STF/01/00
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Project Geotechnical Investigation work at NSPCL Bhilai. (2×250MW)

Job No 1376 Bore Hole No IBH-08 Date 01.03.2020

Made by R. Roy Checked by S. Das

		Samples	Nos.		
No. of SP Tests	05	Undisturbed (UDS)	02	Commencement Date	27.02.2020
No. of Vane (V) Test	—	Penetrometer (SPT)	09	Completion Date	01.03.2020
Length of Casing	SX-6m NX-9.4m	Disturbed (DS)	01	Bore Hole Diameter	151mm/76.2mm
SPT done by (M/H)	H	Water Sample (WS)	—	Level of Ground	
Method of Boring	Shell & Bit			Water Struck At	—
				Standing Water Level	3.20m below EGL

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)	
				10.25	
			T-25min WL-Partial	R6	CR-28% RQD-NIL
				11.00	
			T-28min WL-Partial	R7	CR-35% RQD-NIL
				11.75	
			T-25min WL-Partial	R8	CR-32% RQD-NIL
				12.50	
			T-30min WL-Partial	R9	CR-35% RQD-NIL
				13.25	
			T-32min WL-Partial	R10	CR-40% RQD-NIL
				14.00	
			T-35min WL-Partial	R11	CR-52% RQD-NIL
				14.75	
			T-30min WL-Partial	R12	CR-93% RQD-NIL
				15.50	
			T-33min WL-Partial	R13	CR-97% RQD-NIL
				16.25	
			T-30min WL-Partial	R14	CR-90% RQD-NIL
				17.00	
			T-35min WL-Partial	R15	CR-95% RQD-NIL
				17.75	
Highly to Moderately Brownish-grey, weathered, fine to medium grained, highly fractured rock					

S. Das 01-3-20 (SHE)

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Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
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Project : Geotechnical Investigation work at NSPCL Bhilai (2X250 MW)

Job No. 4376 Bore Hole No. BH-08 Date 01.03.2020

Made by R. Roy Checked by S. Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 27.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 01.03.2020
Length of Casing	SX- 6.0m NX- 9.00m	Penetrometer (SPT)	09	Bore Hole Diameter	: 150 mm / 76.2 mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell, RH	Water Sample (WS)	—	Water Struck At	: —
				Standing Water Level	: 3.2m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
				17.75
Highly to Moderately Weathered, Brownish-grey, Fine to medium grained, highly Fractured rock			T-35min WL-Partial R16 CR-46% RAD-NIL	18.50
← 19.25 M →			T-45min WL-Nigny R17 CR-52% RAD-NIL	19.25
			T-38min WL-Partial R18 CR-40% RAD-NIL	20.00
			T-40min WL-Nigny R19 CR-57% RAD-NIL	20.75
			T-38min WL-Nigny R20 CR-50% RAD-NIL	21.50
Moderately weathered to Fresh, Deep grey, Medium-grained, highly Fractured rock			T-35min WL-Partial R21 CR-48% RAD-NIL	22.25
			T-42min WL-Partial R22 CR-56% RAD-NIL	23.00
			T-45min WL-Partial R23 CR-68% RAD-NIL	23.75
			T-52min WL-Partial R24 CR-82% RAD-NIL	24.50

S Das 01-3-20

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Title BORE LOG DATA SHEET	DOC No. : CET/STF/01/00 Page : 04/09

Project : Geotechnical Investigation work at NSPCL Bhilai (2X250MW)

Job No. 4276 Bore Hole No. IBH-08 Date 01/03/2020

Made by R.Roy Checked by S.Das

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 27.02.2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 01.03.2020
Length of Casing SY- NX-	6.4m 9.4m	Penetrometer (SPT)	09	Bore Hole Diameter	: 150mm / 76.2mm
SPT done by (M/H)	H	Disturbed (DS)	01	Level of Ground	:
Method of Boring Shell,	R/d	Water Sample (WS)	—	Water Struck At	: —
				Standing Water Level	: 3.20m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)	
				24.50	
Moderately weathered to Fresh, Deep grey, Medium grained, highly Fractured rock			T-35min WL-Partial	R25	CR-45% RAD-NIL
				25.25	
			T-40min WL-Partial	R26	CR-60% RAD-NIL
				26.00	
← 26.00M →			T-45min WL-Partial	R27	CR-70% RAD-NIL
				26.75	
Slightly weathered to Fresh, steel grey, Medium grained, Fractured rock			T-48min WL-Partial	R28	CR-84% RAD-NIL
				27.50	
			T-40min WL-Partial	R29	CR-78% RAD-NIL
				28.25	
			T-45min WL-Partial	R30	CR-88% RAD-NIL
				29.00	
← 30.00M →			T-52min WL-Partial	R31	CR-92% RAD-NIL
				30.00	
The bore hole terminated at the depth of 30.0m below E.G.L (As per Drawing)					

For C.E. Testing Pvt. Ltd.
R.Roy

S.Das
01-3-20
(BHEL)

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Title : **BORE LOG DATA SHEET**

DOC No CE/STT/01/00
Page 02/04

Project Geotechnical Investigation Work at NSPCL TPP (2X250MW), Bhilai, CG

Job No. 4376 Bore Hole No. IBH - 11 Date 5/03/2020

Made by Sudip Das Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 23/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 05/03/2020
Length of Casing	5x3 NX=7.20M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	M/S	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & RID	Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.50m below G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Slightly weathered, Brownish grey, Fine to medium grained, highly fractured rock.			T=25min NL=Partial R5	8.75 CR=37% RQD=NIL 9.50
			T=28min NL=Partial R6	CR=30% RQD=NIL 10.25
			T=28min NL=Partial R7	CR=32% RQD=NIL 11.00
			T=20min NL=Partial R8	CR=35% RQD=NIL 11.75
			T=25min NL=Partial R9	CR=35% RQD=NIL 12.50
			T=32min NL=Partial R10	CR=40% RQD=NIL 13.25
			T=30min NL=Partial R11	CR=35% RQD=NIL 14.60

03/3/2020

S. Das

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Sardarpara, Brahmapur
Kolkata - 700 096

Registered Office
124-A, N. S. C. Bose Road
Kolkata - 700 092

Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 03/04

Project : Geotechnical Investigation Work at NSPCL TPP (2X250MW), Bhilai (Ch)

Job No. 4376 Bore Hole No. EBH – 11 Date 5/03/20

Made by Sudip Das Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 23/02/2020
No. of Vane (V) Test	5x = 5.80	Undisturbed (UDS)	02	Completion Date	: 05/03/2020
Length of Casing	NX = 7.20	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm/76.2mm
SPT done by (M/H)	(M)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & RID	Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.80 M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE		SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Slightly weathered, Brownish grey, Fine to medium grained, highly fractured rock.			T=38min NL=Partial	R12	14.00 – 14.75 (CR=40% RQD=NIL)
			T=45min NL=Partial	R13	14.75 – 15.50 (CR=57% RQD=NIL)
			T=38min NL=Partial	R14	15.50 – 16.25 (CR=48% RQD=NIL)
			T=48min NL=Partial	R15	16.25 – 17.00 (CR=62% RQD=28%)
			T=45min NL=Partial	R16	17.00 – 17.75 (CR=55% RQD=30%)
			T=30min NL=Partial	R17	17.75 – 18.50 (CR=38% RQD=NIL)
			T=35min NL=Partial	R18	18.50 – 19.25 (CR=45% RQD=NIL)

[signature] 5/3/2020 (BHEL)

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C. E. Testing Company Pvt. Ltd.

Laboratory & Godown	Registered Office
Sardarpara, Brahmapur Kolkata - 700 096	124-A, N. S. C. Bose Road Kolkata - 700 092

Title : **BORE LOG DATA SHEET**

DOC No. : CET/STF/01/00
Page : 04/09

Project : Geotechnical Investigation Work at NSPCL TPP (2×250 MW) Bhilai, Chh

Job No. 4376 Bore Hole No. EBH-11 Date 5/03/2020

Made by Sudip Das Checked by

No. of SP Tests	05	Samples	Nos.	Commencement Date	: 23/02/2020
No. of Vane (V) Test	—	Undisturbed (UDS)	02	Completion Date	: 05/03/2020
Length of Casing	5X = 5.80 M 6X = 7.20 M	Penetrometer (SPT)	04	Bore Hole Diameter	: 150mm / 76.2mm
SPT done by (M/H)	(H)	Disturbed (DS)	01	Level of Ground	:
Method of Boring	Shell & Bit	Water Sample (WS)		Water Struck At	:
				Standing Water Level	: 2.80M below E.G.L

DESCRIPTION	SYMBOL	N-VALUE	SAMPLES Ref. No.	SAMPLES Depth (m)
Highly to Slightly weathered, Brownish grey, Fine to medium grained, highly fractured rock.			T=42min NL=Partial R19	19.25 CR=56% RQD=28%
			T=45min NL=Partial R20	20.00 CR=56% RQD=20%
20.75M			T=48min NL=Partial R21	20.75 CR=68% RQD=NIL
Slightly weathered, Deep grey, medium grained highly fractured rock.			T=42min NL=Partial R22	21.50 CR=60% RQD=NIL
21.50M			T=56min NL=Partial R23	22.25 CR=86% RQD=16%
Slightly weathered to Fresh, Brownish grey, Fine to medium grained, fractured rock.			T=45min NL=Partial R24	23.00 CR=60% RQD=20%
			T=50min NL=Partial R25	23.75 CR=65% RQD=50%
			T=40min NL=Partial R26	24.50 CR=88% RQD=48%
25.00M				25.00

The Borehole terminated at the Depth of 25.00M as per Drawing below E.G.L

For C.E. Testing Co. Pvt. Ltd.
Sudip Das
05/3/2020 (BHEL)

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C. E. Testing Company Pvt. Ltd.

Laboratory & Godown Sardarpara, Brahmapur Kolkata - 700 096	Co-ordinate N = 1638 E = 9128	**Registered Office** 124-A, N. S. C. Bose Road Kolkata - 700 092
Title : **BORE LOG DATA SHEET**		DOC No. : CET/STF/01/00 Page : 01/04

Project : Geotechnical Investigation Work at NSPCL Bhilai, IPP (2x250 MW) Bhilai, CG

Job No. 4376 Bore Hole No. CBH-11 Date : 05-03-2020

Made by Sudip Das Checked by

		Samples	Nos.		
No. of SP Tests	05	Undisturbed (UDS)	02	Commencement Date	: 23/02/2020
No. of Vane (V) Test	–	Penetrometer (SPT)	04	Completion Date	: 05/03/2020
Length of Casing	SX = 5.80 M NX = 7.20 M	Disturbed (DS)	01	Bore Hole Diameter	: 150mm / 76.2mm
SPT done by (M/H)	(M)	Water Sample (WS)		Level of Ground	:
Method of Boring	Shell & R/D			Water Struck At	:
				Standing Water Level	: 2.80 m below E.G.L

DESCRIPTION	SYMBOL	N-VALUE (Each 7.5cm penetration)								SAMPLES Ref. No.	Depth (m)
Stiff, yellowish grey, silty clay. Obs-kankar										DS-01	0.50
		2	2	1	3	3	3	–	–	SPT-01	1.00 – 1.45
				N = 10						UDS-01	2.00 – 2.45
← 3.00 M →											
Medium to Hard, Brownish grey, silty clay. Obs-kankar.		2	2	1	2	3	2	–	–	SPT-02	3.00 – 3.45
				N = 08						UDS-02	4.00 – 4.45
		8	12	15	18	20	21	–	–	SPT-03	5.00 – 5.45
← 5.60 M →				N = 74							
Hard, Brownish grey, silty clay with decomposed rock.		35	75 for 2.5cm penetration							SPT-04	5.60 – 5.70
				N > 100							
← 5.75 M →		100 for 3cm penetration								SPT-05	5.75 – 5.78 (R)
	NX Core Drilling started at the Depth of 5.75 M below E.G.L			N > 100							5.75
Highly to slightly weathered, Brownish grey, Fine to medium grained, highly fractured rock.										T = 30 min WL = Partial	R1 CR = 40%, RQD = NIL
											6.50
										T = 32 min WL = Partial	R2 CR = 44%, RQD = 28%
											7.25
										T = 35 min WL = Partial	R3 CR = 50%, RQD = NIL
											8.00
										T = 30 min WL = Partial	R4 CR = 40%, RQD = NIL
											8.75

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R for Refusal Sample could not Recover

T = Time taken, WL = water loss

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Annexure-G