DB Power Limited

CIN: U40109MP2006PLC019008
Business Office : Village – Badadarha, Post – Kanwali, Dist – Jangir – Champa, Chhattisgarh, PIN – 495695
Tel. : +91-7389912699

No. DBPL/ENV/42 Date: 31.05.2021

To,

The Director
Ministry of Environment and Forests, Climate Change
Regional Office (WCZ), Ground Floor
East Wing, New Secretariat Building,
Civil Line, Nagpur-440001
eccompliance-cg@gov.in
apccfcentral-ngp-mef@gov.in

Subject: Six Monthly Compliance Report for the period of October 2020 – March 2021

Ref: Environment Clearance granted by MOEF vide letter no. J-13012/79/2008-IA. II (T) Dated 16/09/2010 to our 2X600 MW Thermal Power Plant located at village – Badadarha, Taluka- Dabhra, Dist – Janjgir Champa, Chhattisgarh, DB Power Limited.

Dear Sir,

We are pleased to enclose herewith six monthly Compliance Status Report for the conditions stipulated in subject EC granted to our Thermal power plant located at Village - Badadarha, Taluk - Dabhra, District-Janjgir Champa, Chhattisgarh. The report has following enclosures –

1.	CSR Report, Expenses & Social Audit	Annexure IA, IB & IC
2.	FGD Phase Plan	Annexure IIA & IIB
3.	Fly Ash Utilization	Annexure III
4.	Env. Monitoring Report	Annexure IV
5.	Hydro-geological study	Annexure V

Sincerely Yours,
For M/s. DB Power Limited

M. K. Panda
Head - Environment

Enclosures: as above

Copy to:

The Member Secretary, Chhattisgarh Environment Conservation Board,
Paryavas Bhavan, North Block Sector-19, Atal Nagar, Raipur (C.G.) 492002

Regional Officer, Chhattisgarh Environment Conservation Board
Vyapar Vihar, Near Pt. Dindayal Upadyay Garden, Dist: Bilaspur (C.G.)

Status of compliance of conditions of Environment Clearance granted by MOEF vide letter no. J-13012/79/2008-IA.II (T) dated 16.09.2010 to M/S DB Power limited, 2X600 MW Thermal Power Plant located at Baradarha, Janjgir- Champa, Chhattisgarh

(Period : October 2020 – March 2021)

A. Specific Conditions

S. No.	Stipulation	Compliance Status
i.	Vision document specifying prospective plan for the site shall be formulated and submitted to the Ministry within six months.	Complied.
ii.	Sulphur and ash contents in the coal to be used in the project shall not exceed 0.5% and 34% respectively at any given time. In case of variation of coal quality at any point of time, fresh reference shall be made to MoEF for suitable amendments to environmental clearance condition wherever necessary.	Company is procuring coal from Coal India subsidiaries namely SECL & MCL. We are committed to comply MOEF&CC notification vide S.O. 1561(E) dated 21.05.2020.
iii.	A bi-flue stack of 275 m height shall be provided with continuous online monitoring equipments for SOx, NOx and Particulate Matter. Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions from stack may also monitored on periodic basis.	A 275 meter tall twin flue stack has been constructed for effective dispersion of fumes aimed at proper dilution. We have installed continuous online monitoring system each attached to stack for SOx, NOx and Particulate Matter. The exit velocity of flue gas > 22 m/s.
iv.	Source sustainability study of water requirement shall be carried out by an institute of repute. The study shall also specify the source of water for meeting the requirement during lean season. The Report shall be submitted to the Regional Office of the Ministry within six months.	Complied. Source sustainability study, once again carried out by ISM Dhanbad and same is submitted along with compliance report vide our Letter No. DBPL/ENV/41 Dated 28.05.2018.
v.	Hydro-geological study of the area shall be reviewed annually and report submitted to the Ministry.	No ground water extraction for any industrial & domestic purpose. Hydro-geological study is attached as **Annexure V.**
vi.	No ground water shall be extracted for use in operation of the power plant even in Lean season. COC of 5.0 shall be adopted.	Ground water is not extracted for use. COC of > 5.0 is maintained in water circulated through the cooling tower during operation. This is aimed at water conservation.
vii.	No water bodies including natural drainage system in the area shall be disturbed due to activities associated with the setting up /operation of the power plant. Minimum required environmental flow suggested by the competent Authority of the state govt. shall be maintained in the channel / Rivers (as applicable) even in lean season.	Being complied.
viii.	Local employable youth shall be trained in skills relevant to the project for eventual employment in the project itself. The action taken report and details thereof to this effect shall be submitted to the Regional Office of the Ministry and the State Govt. Dept concerned from time to time.	The local youths are being trained in skills such as Plumbing, Masonry, Hand pump repair etc by DB Power CSR team. CSR Report indicating such initiatives is attached as **Annexure I A.**

ix.	Additional soil for leveling of the proposed site shall be generated within the sites (to the extent possible) so that natural drainage system of the area is protected and improved.	Complied
x.	Provision for installation of FGD shall be provided for future use. High Efficiency Electrostatic Precipitators (ESPs) shall be installed to ensure that particulate emission does not exceed 50 mg/Nm3. Adequate dust extraction system such as cyclones / bag filters and water spray system in dusty areas such as in coal handling and ash handling points, transfer areas and other vulnerable dusty areas shall be provided.	Adequate space for installation for Flue Gas De-Sulphurisation(FGD) Plant has been provided for future use. DBPL has been awarded EPC work to meet the MOEF emission norms. Contract awarded to Chinese EPC contractor M/s TUNA Corporation in Sep 2019. Status of FGD implementation program and phase plan is attached as **Annexure IIA and IIB** submitted to CPCB & CEA respectively. 2. High Efficiency (99.94%) Electro-static precipitator having 80 fields have been installed. This has kept particulate emission from stack < 50 mg/Nm3. 3. We have provided dust extraction system (DE) complete with filter bags, cage and hopper fitted to Crusher unit, transfer points (5,6,7 and 8) and bunkers. We have also provided dust suppression system (DS) at crusher house, TP-1,2,3 and 4 and also at MUH and ERH. The conveyors have been closed on all sides using color coated galvanized profile sheet (CCGP) to confine fugitive emissions. We have provided water cannons at strategic locations in coal handling. Water sprinkling using tankers is done for dust suppression on road. Ash transportation from generation point to silo and to ash pond is done using closed MS pipes. Above actions have immensely helped us contain fugitive emission and meet ambient air quality norms in the area.
xi.	Utilization of 100% Fly Ash generated shall be made from 4th year of operation of the plant. Status of implementation shall be reported to the Regional Office of the Ministry from time to time. Fly ash shall be collected in dry form and storage facility (silos) shall be provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry form. Mercury and other	Fly ash generation & utilization report of 2020-21 is attached as **Annexure III.** Heavy metal monitoring is done periodically and analysis report is attached as **Annexure IV**.

	heavy metals (As,Hg,Cr, Pb etc.) will be monitored in the bottom ash as also in the effluents emanating from the existing ash pond. No ash shall be disposed off in low lying area.	
xii.	Ash pond shall be lined with HDPE / LDPE lining or any other suitable impermeable media such that no leaching takes place at any point of time. Adequate safety measures shall also be implemented to protect the ash dyke from getting breached. For disposal of Bottom Ash in abandoned mines (if proposed to be undertaken) it shall be ensured that the bottom and sides of the mined out areas are adequately lined with clay before Bottom Ash is tilled up. The project proponent shall inform the State Pollution Control Board well in advance before undertaking the activity.	Complied. LDPE liners used for lining of Ash pond.
xiii.	Green Belt consisting of 3 tiers of plantations of native species around plant and at least 100 m width shall be raised. Wherever 100 m width is not feasible a 50 m width shall be raised and adequate justification shall be submitted to the Ministry. Tree density shall not less than 2500 per ha with survival rate not less than 75 %.	The total plantation done in the area of 210 acre by ending FY 2020 is 2,10,300 (33% of total area of 630 acres).
xiv.	Two nearest village shall be adopted and basic amenities like development of roads, drinking water supply, primary health centre, primary school etc shall be developed in coordination with the District administration. For the tribal families (if any) affected directly or indirectly by the proposed project, specific schemes for upliftment of their sustainable livelihood shall be prepared with time bound implementation and in built monitoring program me. The status of implementation shall be submitted to the Regional Office of the Ministry from time to time.	We have adopted 2 villages Tundri and Badadrha located near the plant as required. Basic amenities like development of roads, drinking water supply, health camps, infrastructure and other support in schools, etc are being done. **Annexure I A.**
xv.	An action plan for R&R (as applicable) with package for the project affected persons be submitted and implemented as per prevalent R&R policy within three months from the date of issue of this letter.	Complied.
xvi.	An amount of Rs 26.0 Crores shall be earmarked as one time capital cost for CSR program. Subsequently a recurring expenditure of Rs 5.2 Crores per annum shall be earmarked as recurring expenditure for CSR activities. Details of the activities to be undertaken shall be submitted within one month along with road map for implementation.	Expenses incurred towards implementation of CSR program for the FY 20120-21 is attached as **Annexure 1B**.
xvii.	While identifying CSR programme the company shall conduct need based assessment for the nearby villages to study economic measures with action plan which can help in upliftment of poor Section of society. Income generating projects consistent with the traditional skills of the people besides development of fodder farm, fruit bearing orchards, vocational training etc. can form a part of such program. Company shall provide separate budget for community development activities and income	CSR activities have been undertaken by DB Power Ltd. CSR activity is attached as **Annexure I A.**

	generating program. This will be in addition to vocational training for individuals imparted to take up self employment and jobs.	
xviii.	It shall be ensured that in-built monitoring mechanism for the schemes identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time.	Annual Social Audit report for the year 2019-20 is attached as **Annexure I C.** Social Audit for the year 2020-21 to be submitted in next compliance period.

B. General Conditions

S. No.	Stipulation	Compliance Status
i.	The treated effluents conforming to the prescribed standards only shall be re-circulated and reused within the plant. There shall be no discharge outside the Plant boundary except during monsoon. Arrangements shall be made that effluents and storm water do not get mixed.	● Treated water of ETP is reused green belt irrigation besides in ash handling plant. ● Ash Dyke overflow is treated and re-circulated to ash water sump for reuse. ● The plant is designed for zero discharge. ● Process and storm water is kept separate.
ii.	A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt / Plantation.	Sewage Treatment Plants (15 in number) have been installed and commissioned. These are working fine. The treated water from STPs is used for green belt nursing.
iii.	Rainwater harvesting should be adopted, Central Groundwater Authority / Board shall be consulted for finalization of appropriate rainwater harvesting technology within a period of three months from the date of issue of clearance and details shall be furnished to the Regional Office of the Ministry.	We have constructed 7 number of Rain water harvesting structures for the purpose. This is complete with receiving pond, gravel/sand bed filter besides bore well. The collected water is subjected to ground water recharging.
iv.	Adequate safety measures shall be provided in the plant area to check / minimize spontaneous fires in coal yard, especially during summer season. Copy of these measures with full details along with plant layout shall be submitted to the Ministry as well as to the Regional Office of the Ministry.	Complied. We have provided a Fire Detection & Protection System (FDPS) including fire hydrants at all strategic points. The detail of same has already been submitted to your office.
v.	Storage facilities for auxiliary liquid fuel such as LDO and HFO /LSHS shall be made in the plant area in consultation with Department of Explosives, Nagpur Sulphur content in the liquid fuel will not exceed 0. 5%, Disaster Management Plan shall be prepared to meet any eventuality in case of an accident taking place due to storage of oil.	A storage facility for LDO is in place after obtaining license from PESO. We are also owning onsite Disaster/emergency plan duly approved by Factory inspectorate for meeting emergencies.
vi.	Regular monitoring of ground water level shall be carried out by establishing a network of existing wells and constructing new piezometers. Monitoring around the ash pond area shall be carried out particularly for heavy metals (Hg, Cr,As, Pb) and records maintained and	The ground water monitoring is done at regular intervals and records are maintained.

	submitted to the Regional Office of this Ministry. The data so obtained should be compared with the baseline data so as to ensure that the ground water quality is not adversely affected due to the project.	
vii.	Monitoring surface water quantity and quality shall also be regularly conducted and records maintained. The monitored data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of flow of ground water and records maintained. Monitoring for heavy metals in ground water shall be undertaken.	The monitoring is done at regular intervals and records maintained. **Annexure IV**
viii.	First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.	Complied
ix.	Noise levels emanating from turbines shall be so controlled such that the noise in the work zone shall be limited to 75 dBA. For people working in the high noise areas, requisite personal protective equipment like earplugs / ear muffs etc. shall be provided, Workers engaged in noisy areas such as turbine area, air compressors etc shall be periodically examined to maintain audiometric record and for treatment for any hearing loss including shifting to non noisy / less noisy areas.	● Turbine is housed in a specially designed acoustic insulated box. ● Compressors are kept in isolated closed chambers. ● Boiler safety valves are fitted with silencers to contain noise. ● In high noise areas PPE like Ear plugs / Ear Muffs are provided to keep impact minimum. ● High noise area kept unmanned as far as practical. Above arrangements have helped keep noise level below 75 dB (A) and impact negligible.. The ambient noise monitoring is conducted regularly and records maintained. See **Annexure IV**
x.	Regular monitoring of ground level concentration of SO2, NOX, PM2.5 & PM10 and Hg shall be carried out in the impact zone and records maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be provided immediately. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to the Regional Office of this Ministry. The data shall also be put on the website of the company.	Regular monitoring for AAQM is carried in the impact zone. Values are well within norms. The monitoring report is enclosed as **Annexure IV.** We have installed on line AAQMS for real time monitoring of ground level concentration. These are working fine.
xi.	Provision shall be made for the housing of construction labor (as applicable) within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the Project.	Complied.
xii.	The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days	Complied

	from the date of this clearance letter, informs that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board/Committee and may also be seen at Website of the Ministry of Environment and Forests.	
xiii.	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parisad / Municipal Corporation, urban local Body and the Local NGO, if any, from whom suggestions/representations, if any, received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.	Complied
xiv.	An Environmental Cell shall be created at the project site itself and shall be headed by an officer of appropriate seniority and qualification. It shall be ensured that the head of the Cell shall directly report to the head of the organization.	Environmental Cell is in place and is suitably staffed. It is headed by a senior officer. He reports directly to the head of the organization.
xv.	The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically, It shall simultaneously be sent to the Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM (PM2.5 & PM10), SO2, NOX (ambient levels as well as stack emissions) shall be displayed at a convenient location near the main gate of the company in the public domain.	Complied.
xvi.	The environment statement for each financial year ending 31st March in From –V as is mandated to be submitted by the project proponent to the concerned State pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of the Ministry by e-mail.	Complied. Environment Statement submitted for FY 2019-20 vide letter dated 24.08.2020.
xvii.	The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Central Pollution Control Board and State Pollution Control Board. The project proponent shall upload the status of compliance of the environment of the environmental clearance conditions on their website and update the same periodically and simultaneously send the same bye-mail to the Regional Office, Ministry of. Environment and Forests.	Complied. The last six monthly compliance report to EC conditions was submitted via e mail to MOEF Regional office at Nagpur vide our Email dated 27.11.2020.
xviii.	Regional Office of the Ministry of Environment & Forests will monitor the implementation of the stipulated conditions.	Being Complied as and when required.

<table>
<tr><td></td><td>A complete set of documents including Environmental Impact Assessment Report and Environment Management Plan along with the additional information submitted from time to time shall be forwarded to the Regional Office for their use during monitoring. Project proponent 'will upload the compliance status in their website and up-date the same from time to time at least six monthly basis. Criteria pollutants levels including NOX (Stack & ambient air) shall be displayed at the main gate of the power plant.</td><td></td></tr>
<tr><td>xix.</td><td>Separate funds shall be allocated for implementation of environmental protection measures along with item-wise break-up, These cost shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for other purposes and year-wise expenditure should be reported to the Ministry.</td><td>The Expenditure incurred in environmental protection measures are – Capital Expenditure upto March 2018 = 1237.48 Crore
Recurring Expenditure :
<table><tr><td>Department</td><td>Expenses in FY 2020-21 (in Crore)</td></tr><tr><td>Environment</td><td>0.88</td></tr><tr><td>Horticulture</td><td>0.48</td></tr><tr><td>Flyash utilization</td><td>44.7</td></tr><tr><td>OHC</td><td>0.10</td></tr><tr><td>Total</td><td>46.16</td></tr></table></td></tr>
<tr><td>xx.</td><td>The project authorities shall inform the Regional Office as well as the Ministry regarding the date of financial closure and final approval of the project by the concerned authorities and the dates of start of land development work and commissioning of plant.</td><td>Complied.
Informed vide letter dated 06.06.2011.</td></tr>
<tr><td>xxi.</td><td>Full cooperation shall be extended to the Scientists / Officers from the Ministry / Regional Office of the Ministry at Bhopal / CPCB / SPCB who would be monitoring the compliance of environmental status.</td><td>Full cooperation will be extended to the Scientists / Officers from the Ministry / Regional Office of the Ministry at Bhopal / CPCB / SPCB as and when required.</td></tr>
</table>

Annexure IA

A Glimpses

on

CSR Activities

(October 2020 to March-2021)

DB Power Ltd., Badadarha

Corporate Social Responsibility

Constructed water tank (10000 lts.) & connected pipe line near dussehra chowk at Tundri.

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Construction of kachha stop dam near patadi nala at Badadarha.

Cleaning of dadu pond at Badadarha

Constructed shed near cremation ground of mahant community at Badadarha.

2 nos. hume pipe provided to gram panchayat Tundri.

Repairing of village road at Badadarha & Tundri.

Constructed of village road at Jamgahan.

Constructed of culvert at Jamgahan.

Ambulance referral services have been provided to 122 cases.

1186 Cases attended in CHC.

Cleaning of canal at Badadarha.

Repairing of 19 Hand pump have been done at Badadarha, Rampur, Tundri & Kunkuni* Repairing of 18 Motor pumps have been done at Badadarha Tundri & Rampur. * Repairing of 21 Bio gas units at Badadarha & Rampur * Repairing of street lights of 99 different poles at Badadarha & Rampur have been done. * Repairing of 19 time Personal light connection of villagers at Badadarha & Rampur *Repairing of 5 stand post at Badadarha. * Repairing of 2 times pipe line near labour colony at Badadarha

On the occasion of the marriage of Lambodhar Yadav, Banshilal Yadav at Badadarha, Santuram Rathai daughter at Rampur & Puniram Rathia & Ramprasad Rathia at Tundri, a 5 nos. sewing machine has been given to him by DBPL Management.

Volleyball & net provided to Yuva Vikas Samiti at Badadarha.

Sprinkling is been done at Main road Tundri to Kanwali , approach road Badadarha, ash dyke, labor colony & L&T gate at Badadarha.

Provided tent materials during visit of Shri Ram Kumar Yadav (MLA, Chandrapur constituency) at village Badadarha & Tundri.

Supported grocery items occasion of daskarm near house of Samaylal Yadav at Rampur.

Organized Sundarkand path at Badadarha, Rampur & Tundri

DB Power Limited

Annexure IB

CSR EXP SORTED MONTH WISE from April 2020 to Mar 2021

	April'20	May '20	June'20	July'20	Aug'20	Sep'20	Oct'20	Nov' 20	Dec' 20	Jan'21	Feb'21	Mar'21	GRAND TOTAL
CSR EXP SORTED MONTH WISE													
Health & Sanitation	611830	157838	3014204	101380	69559	55166	1327719	47259	553975	124747	59318	1377216	7500211
Infrastructure	84840	204578	611422	18580	9060	874810	261573	756304	16660	3969803	694081	4015761	11517471
Cultural & Social Events	0	492350	6525	6525	43985	16525	3637277	287583	21373	43775	28052	84643	4668613
Rehabilitation and Compensation	2600000	2600636	2579192	2601961	2591627	2590570	2374401	3824789	2587784	2575380	1309334	2058858	30294532
Women Empowerment & Skill	0	5500	5500	5317	5500	7100	5500	5500	5500	5500	5551	10771	67239
Education &Skill Development	0	11500	11500	11317	11500	11500	11500	11500	11500	11288	11525	23000	137630
Operating Expenses	54530	2129	29737	15477	24961	18015	16459	305529	-148972	4998	7607	37257	367727
MONTHLY TOTAL	**3351200**	**3474531**	**6258081**	**2760557**	**2756192**	**3573686**	**7634429**	**5238464**	**3047821**	**6735490**	**2115467**	**7607506**	**54553423**

Annexure IC

SOCIAL AUDIT REPORT

APRIL 2019 –MARCH 2020

Of

DB Power Limited

Village: Badadarha & Tundri
Tehsil: Dabhra
Distt: Janjgir-Champa
Chhattisgarh – 495695

Prepared By: Dr. Vikram Singh
Assistant Professor
Department of Social Work
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Vikram Singh
Assistant Professor
Department of Social Work
Guru Ghasidas Vishwavidyalaya
Koni, Bilaspur (C.G.)

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APPENDIX

1. Introduction (DB Power Ltd)

DB Power Limited ("DBPL"), a special purpose vehicle (SPV), incorporated on October 12, 2006, is subsidiary of Diligent Power Private Limited (DPPL), an associate company of the Dainik Bhaskar group, a diversified Indian conglomerate. DBPL has set up coal based Super thermal Power Plant (TPP) of capacity 1200 MW (2 X 600 MW) at village Baradarha District Janjgir -Champa in the state of Chhattisgarh. The major components of project include Boiler, Turbine, and Generator. The other components include coal handling system, switch yard, ash handling system. It also includes wagon tippler, railway siding, transmission lines besides water pipeline drawn between intake well at Mahanadi river, Chandrapur to plant site. The plant is accessible by major district road between Raigarh and Bilaspur. The site is also approachable from Kharsia via Kharsia Dabhra road. The nearest urban area is Raigarh, located at a distance of about 25 km towards East from the plant. The nearest railway station is at Robertson, 15 km away while the nearest commercial airport is at a distance of 250 km away at Raipur.

2. Social Audit

A social audit is a way of measuring, understanding, reporting and ultimately improving an organization's social and ethical performance. A social audit helps to narrow gaps between vision/goal and reality, between efficiency and effectiveness. It is a technique to understand, measure, verify, report on and to improve the social performance of the organization. Social auditing creates an impact upon governance. It values the voice of stakeholders, including marginalized/poor groups whose voices are rarely heard. Social auditing is taken up for the purpose of enhancing local governance, particularly for strengthening accountability and transparency in local bodies.

The underlying assumption that Corporate Social Responsibility (CSR) is one way through which companies can demonstrate their commitments towards being socially responsible. In fact, CSR as an integral aspect of corporate has double edge effect in terms of creating

goodwill to the company and acting as a social and economic intervention to bring about large scale change in the life of people from different walks. Social audit is an independent evaluation of the performance of an organization as it relates to the attainment of its social goals. It is an instrument of social accountability of an organization.

In other words social audit may be defined as an in-depth scrutiny and analysis of working of any public utility vis-à-vis its social relevance. Social auditing is a process that enables an organization to asses and demonstrates its social, economical and environmental benefits. Social Audit gained significance after the 73rd amendment of the constitution relating to the Panchayati raj institutions. It demonstrates its social, economical and environmental benefits. Social Audit gained significance after the 73rd amendment of the constitution relating to the Panchayati raj institutions. Social audit is based on the principle that democratic local governance should be carried out, as far as possible, with the consent and understanding of all concerned demonstrates its social, economical and environmental benefits. Social Audit gained significance after the 73rd amendment of the constitution relating to the Panchayati raj institutions. It is thus a process and not an event. A social audit is a way of measuring, understanding, reporting and ultimately improving an organization's social and ethical performance. A social audit helps to narrow gaps between vision/goal and reality, between efficiency and effectiveness. It is a technique to understand, measure, verify, report on and to improve the social performance of the organization.

A social audit can be defined as a review of a company's production procedure, policies, and code of conduct to find how they impact society. It is conducted out of social responsibility by an organization to establish its positive image in public, and if anything is found negative, then suitable actions are taken to correct them. The objective of conducting a social audit is to analyze the process implemented for the execution of the process, quality of basic services and infrastructure created, and to assess the health and security measure taken.

The Social has been carried out of CSR for FY: 2019-20. There are 08 villages where CSR activities has been carried out details are given below:

Table-1 Coverage Areas of CSR Activities

S.No.	Villages	Population
A.	**Project Villages**	
1.	Badadarha	1634
2.	Tundri	3810
B.	**Railway Corridor Villages**	
3.	Basanpali	582
4.	Fulbandhia	797
5.	Amapali	318
6.	Khairpali	735
7.	Bendojharia	470
8.	Kunkuni	2258

3. Objectives of Social Audit

1. Assessing the actual needs of village development and resources provided by DB power for village development.
2. Provide suggestion for Increasing efficacy and effectiveness of village development programmes carried-out by DB Power Ltd.
3. Analysis of work carried out keeping in view stakeholder interests and priorities, particularly of villagers.
4. To assess infrastructural development and its impact on the quality of lives (well-being) of the residents
5. Assessing the physical and financial gaps between needs and resources available for local development.
6. Creating awareness among beneficiaries and providers of local social and productive services.
7. Increasing efficacy and effectiveness of local development programmes.
8. Scrutiny of various policy decisions, keeping in view stakeholder interests and priorities, particularly of rural poor at community level.

9. *Estimation of the opportunity cast for stakeholders of not getting timely access to public services.*

4. Methods Used for Social Audit

Preliminary surveys of two category villages' i.e. Project Affected and Railway Corridor has been conducted from personal field observations, personal interviews, and obtaining information through schedules from various beneficiary groups. Series of meetings has been conducted with various SHGs Groups and Sewing Centre beneficiaries.

4.1 The Profile of Dabhra Block

Dabhra is a Tehsil / Block (CD) in the Janjgir Champa District of Chhattisgarh. Total area of Dabhra is 437 km^2 including 419.48 km^2 rural area and 17.19 km^2 urban area. Dabhra has a population of 1,64,863 peoples. There are 43,160 houses in the sub district. There are about 121 villages in Dabhra block. In which 8 Villages are selected for CSR Activities and rural development.

5. Sources of Data for Social Audit

The sources of data to prepare social audit was primary data collected by auditor and secondary data provided by DB power Ltd such as Stock, meeting registers, Quarterly and Monthly reports published by CSR of DB Power. The survey approach questionnaire/interview schedule, focus group discussion and observation checklist were used to collect data under the descriptive design since it attempts to collect data from particular members of the population.

6. Major Developmental Areas of CSR at DB Power Ltd

Corporate social responsibility (CSR) refers to strategies corporations or firms conduct their business in a way that is ethical, society friendly and beneficial to community in terms of development. The present-day CSR (also called corporate responsibility, corporate citizenship, responsible business and corporate social opportunity) is a concept

whereby business organizations consider the interest of society by taking responsibility for the impact of their activities on communities and other stakeholders as well as their environment.

This obligation shows that the organizations have to comply with legislation and voluntarily take initiatives to improve the well-being of the effected local community and society at large. CSR simply refers to strategies corporations or firms conduct their business in a way that is ethical and society friendly. The focus of the corporate social responsibility unit of DB Power Plant Janjgir-Champa is the holistic development and improvement in the quality of life of habitations and affected communities, particularly of the disadvantaged groups, in and around the neighborhoods of power station project sites. DB power plant under its CSR policy has implemented various projects in financial year from 2018-19 based on the needs of the neighboring affected villages above mentioned communities with the participation of the villagers, district and local administrations. Based on the CSR guidelines issued by department of public enterprises, Government of India, DB Power Ltd have to carry out CSR activities on affected villages in every financial year. All activities undertaken by DB Power under CSR in the 8 Project Affected Villages will be covered in the Social Audit. The CSR Interventions and activities pertain to various developmental fields which are as follows:

A. Rural Infrastructure Programme

B. Education and Skill Development

C. Health, Hygiene & Sanitation

D. Women Empowerment

E. Social Welfare and Development Programme

7. Expenses of Budget Allocated in Financial Year 2019-20 for CSR Activities

Financial Year	Rural Infrastructure Development	Health & Sanitation	Education & Skill Development	Women Empowerment	Employment	Social & Cultural Programmes	Operating
2019-20	2028057	3046368	268565	102268	32538769	3144309	749271

The above details are given about the expenditure done by CSR Unit of DB Power Ltd in different thrust areas in affected villages in financial year 2019-20. After calculating the sub-heads the total expenditure is Rs **42978207/-**. *The expenses details have been cross-checked through maintained records.*

8. Detail description of Activities Carried-Out in different Developmental Areas

A. Rural Infrastructure Programme:

Rural infrastructure provides essential production conditions such as telecommunication, roads, medical services and educational facilities which enhances development in a rural setting. Rural development means sustained improvement in the well-being of rural people and a strategy designed to improve the economic and social life of a group of people thus the rural poor. It involves the extension of benefits of development to the poorest among those seeking livelihood in the rural areas and this group may include small scale farmers, tenants and the landless.[1]

The importance of infrastructure for economic growth and development in rural area can hardly be overemphasized in a developing economy like India. With poor rural infrastructure, even a marginal improvement in its quantity and quality could significantly improve economic development and human well-being. Improving basic infrastructure, such

as roads, transport, electricity, telecommunications, housing, health, water and sanitation, is essential for development and well-being of the rural population. The development of rural infrastructure could promote economic growth, improve the standard of living of the population and reduce the incidence of poverty by generating both farm and non-farm employment and earning opportunities, increasing productivity, providing access to basic goods and services and improving the health and physical condition of people.

In spite of the crucial importance of infrastructure, significant deficiencies have persisted in rural infrastructure across Indian states. The quantity and quality of infrastructure facilities are substantially lower in rural areas than in urban areas. A relatively low density of population, low household incomes and the absence of scale economies are considered to be challenges to the expansion of basic infrastructure facilities in rural areas.[2]

1. Construction of CC road is in progress at Badadarha

Photograph 1 : CC Road in Badarha Village

Overview of Badadarha: *According to Census 2011 information the location code or village code of Badadarha village is 437104. Badadarha village is located in Dabhra Tehsil of Janjgir Champa district in Chhattisgarh, India. It is situated 30km away from sub-district headquarter Dabhra and 85km away from district headquarter Janjgir. As per 2009 status, Badadaraha is the gram panchayat of Badadarha village.*

The total geographical area of village is 458.82 hectares. Badadarha has a total population of 1,634 peoples. There are about 436 houses in Badadarha village. Kharsia is nearest town to Badadarha which is approximately 15km away. In Badadarha village population of children with age 0-6 is 218 which makes up 13.34 % of total population of village. Average Sex Ratio of Badadarha village is 907 which is lower than Chhattisgarh state average of 991. Child Sex Ratio for the Badadarha as per census is 1057, higher than Chhattisgarh average of 969. Badadarha village has higher literacy rate compared to Chhattisgarh. In 2011, literacy rate of Badadarha village was 75.07 % compared to 70.28 % of Chhattisgarh. In Badadarha Male literacy stands at 86.28 % while female literacy rate was 62.41 %. Schedule Tribe (ST) constitutes 16.89 % while Schedule Caste (SC) were 11.44 % of total population in Badadarha village. In Badadarha village out of total population, 1076 were engaged in work activities. 47.12 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 52.88 % were involved in Marginal activity providing livelihood for less than 6 months. Of 1076 workers engaged in Main Work, 85 were cultivators (owner or co-owner) while 206 were Agricultural labourers.[1]

Badadarha Village Data

Particulars	Total	Male	Female
Total No. of Houses	436	-	-
Population	1,634	857	777
Child (0-6)	218	106	112
Schedule Caste	187	96	91
Schedule Tribe	276	137	139
Literacy	75.07 %	86.28 %	62.41 %

Particulars	Total	Male	Female
Total Workers	1,076	594	482
Main Worker	507		
Marginal Worker	569	169	400

Source: Census 2011

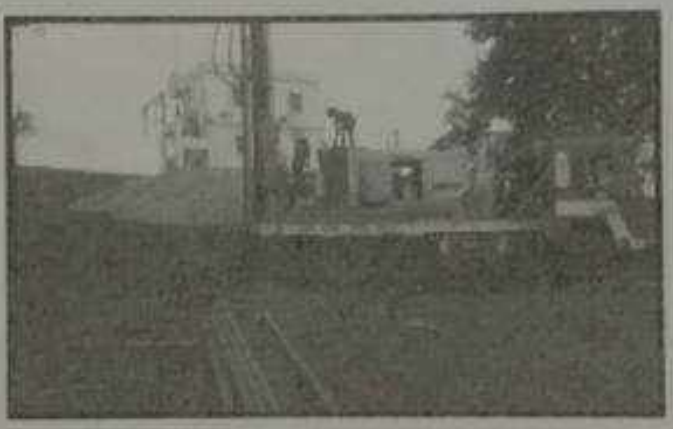
Impact on Village: The CC road has been constructed by DB Power Ltd under CSR which has improved the transportation with in the village **(Please See Photograph 1: CC Road in Badudarha Village)**. "Interest in concrete roads exists for many reasons, especially in developing countries. Concrete roads offer several advantages to other solutions from both technical and economic points of view."[4] A good load distribution, which eliminates the need for thick and expensive bases; A great resistance to deformation and wear at any temperature; and An insensitivity to stagnant oil, clay, or fecal matter. An estimated service life of more than 30 yrs. Now Villagers are connected to urban pockets.

Table-2 Repair Hand-Pump, Motar Pump and Pipe-line

S.No.	Village	Total Number of Handpump	Number of Repaired Hondpump	Total Number of Motarpump	Number of Repaired Motarpump	Number of Repaired Pipelines
1.	Badadarha	14	14	DB Power-3 Panchayat-4 Total-7	12	11
2.	Rampur	7	9 Times	Panchayat-2	6 Times	0
3.	Tundri	37	23 Times	DB Power 3 Panchayt 5 Total 8	21 Times	0

4.	Kunkuni	1	2 Times	-	0	0
5.	Phulbandhiya	1	1 Times	-	0	
	Total Repaired Number of Handpupm, Motor and Pipeline	60	49	17	39	11
Source: DB Power PVT LTD Report 2019-20.						

II. Drilling of Bore well & installation of submersible pump near BC building Badadarha & Fulbandhiya village.



Photograph 2: Drilling of Bore-well in Badadarha

Groundwater is an important source for irrigation in large tracks of India. This source has been considered as infinite and used indiscriminately without any disregard to recharge prospects[5]. In India about 45% rural poor do not have access to safe Drinking water. The drinking water crisis in Indian Cities has reached explosive proportions. In rural areas inadequate drinking water supplies forced to use any water that is available even it is highly contaminated. Consequently, it is this section of the population that is most often hit by water borne epidemics of Jaundice, Cholera or gastroenteritis[6]." In rural area being an agrarian, farmers are depend mainly on groundwater for irrigation. With increasing population, lesser land holdings and urbanisation, deeper borewells are dug for groundwater abstraction.

III. Drilling of Bore well & Installation of Hand pump near LC (Line Crossing) gate 1,2,3 & 4 in respective area and also Amapali & Kunkuni villages

Borewells & tubewells, are very similar. Both are basically vertical drilled wells, bored into an underground aquifer in the earth's surface, to extract water for various purposes."? Drilling of Bore well & Installation of Hand pump near LC (Line Crossing) gate 1,2,3 & 4 in respective area and also Amapali & Kunkuni villages through assist of DB Power Pvt. Ltd which can help out the villagers to safe and drinking water ***(Please see Photograph 3: Installation of Hand pump near LC).***

Photograph 3: Installation of Hand pump near LC

IV. Leveling of premises of Cremation place by murrum near main road Tundri.

In village Tundri by assistance of DB Power Pvt. Ltd. Leveling of premises of Cremation place by murrum near main road. Such initiatives are expected to improve the durability of area of Cremation place within the Tundri village.

Photograph 4: Leveling of premises of Cremation place by murrum near main road Tundri

V. Soil filling and leveling has been done in premises of Anganwadi Badadarha

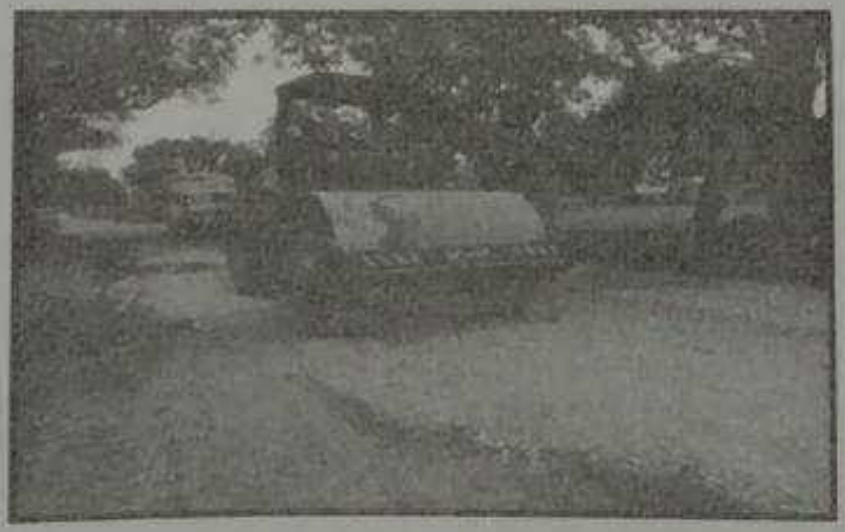
Photograph 5: Soil filling and leveling of Anganwadi Badadarha

In village Badadarha by assistance of DB Power Pvt. Ltd. Soil filling and leveling has been done in premises. This is provides comfortable zone surround of Anganwadi center and many Pits are filled by soil. Due to which rainwater will not fill the pits. It will be easy for people to come Anganwadi center.

VI. Approach road of Dadu Pond & Village road Badadadrah and also Village road Tundri have been repaired by Murrum at Badadarha

Photograph 6: Village Road Repaired by Murrum at Badadarha

VII. Repairing of main road Tundri has been done



Photograph 7: Repairing of main road

Rural transport is double faced: first it is a transport chain with one end in the agricultural fields and the other on the local market. But secondly it is also the transport chain from the main highway network up to the local market. It is important to note that both of these rural transport chains should be considered separately, as ownership and responsibility on the one

hand and road standards as well as the level of division of labour of the transport systems.[8] In Badadadrah with help out of DB Power Pvt. Ltd roads are repaired by murrum and Tundri Village main road repaired by concretes. **(Photograph 6 & 7)**

VIII. Repairing of Kachcha Canal has been done for irrigation purpose at Badadarha

Photograph 8: Repairing of Kachcha Canal at Badadarha

In rural set up Canal is main source of irrigation in crop fields. Repairing of Kachcha Canal has been done for irrigation purpose at Badadarha by the DB Power Pvt. Ltd. Canals can be an effective source of irrigation in areas of low level relief, deep fertile soils, perennial source of water and extensive command area.[9] In India 22 million hector by irrigated canals and about two third of cultivation in India is still depending on monsoon.[10]

IX. Electric wiring has been done in common class room of Govt. Higher Secondary School, Sandka and Govt. Primary School Bansmuda, Kharsia

Electric wiring has been done by DB Power Pvt. Ltd. In Govt. Higher Secondary School, Sandka and Govt. Primary School Bansmuda, Kharsia which facilitate students and teachers of this school and Benefits of school electrification include increased study time, improved educational performance, staff retention, and positive benefits for gender equality and the wider community **(Please see Photograph:9)**. With regard to the challenges of electrifying schools, crucially, a lack of household access can prevent the full benefits of energy for education being realized.[11]

There are numerous potential applications of electricity within schools. At the most basic level, lighting and computers charging form key uses of the energy. At a more advanced level, ICT and television may be factored in amongst other applications depending on the needs of that particular school. The electrification of schools may also have positive impacts on wider issues such as water and sanitation.

Table 3 Repairing of Street Lights

S.No.	Village	Total Street Lights	Total Repaired Street Lights
1.	Badadarha	47	149 Times
2.	Rampur	17	67 Times
Total			216

Photograph 9: Electric wiring in Govt. Higher Secondary School, Sondka and Govt. Primary School Bansmuda, Kharsia.

X. Repairing of Hand pump, Motor pump, Pipe line , Street light & Bio gas (61 HP-49 times, 13 MP- 39 times, 11 times Pipeline , 69 Street light-216 times & 35 Biogas- 58 times .)

Photograph 10: Repairing of Motor Pump

In Rural area, repairing of Hand pump, Motor pump, Pipe line, Street light & Bio gas (61 HP-49 times, 13 MP-39 times, 11 times Pipeline, 69 Street light-216 times & 35 Biogas- 59 times,) are very necessary for villagers.

B. Education & Skill Development Program

This section B covered the details intervention of CSR in Education and Skill Development. Education features very highly in both the UN Millennium Development Goals and the Sustainable Development Goals. Whilst progress is being made, there are still huge gaps in terms of educational outcomes in developed vs. developing countries. India's organized sector has only 34 million people which form very small strata of the total population. This statement itself says a lot about the Indian literacy rate and the education system.[12]

The system of education in rural areas has been undergoing many changes and transformations. In the present existence, there have been developments and progressions taking place in the system of education in rural areas. The role of education in assisting social and economic progress is well accepted. Access to education is critical to access emerging opportunities that supplement economic growth. Taking into consideration this accepted fact, there has been the main thrust on education, since the country achieved its independence. But as far as guaranteeing quality education in rural India is concerned, it has been one of the major challenges for the government.[13]

Every village is not provided with school which means that students have to go to other villages to get education. Owing to this parents usually do not send their daughters to school, leading to a failure in achieving rural education in India. Poverty is another setback. Government schools are not as good and private schools are expensive. Drop-out –rate of the

secondary level is extremely high in Villages.[14]

Different Work carried out under Education and Skill Development section which are:

I. Organized Quiz competition on water and environment conservation in Govt Higher Secondary School, Kunkuri

Organizing this type of activity aims at encouraging rural school children to study hard in school and also to award hardworking teachers in rural communities. Competitions and awards are organized for deprived schools to help create an atmosphere of effective learning and arena for competition and hard work amongst school children.

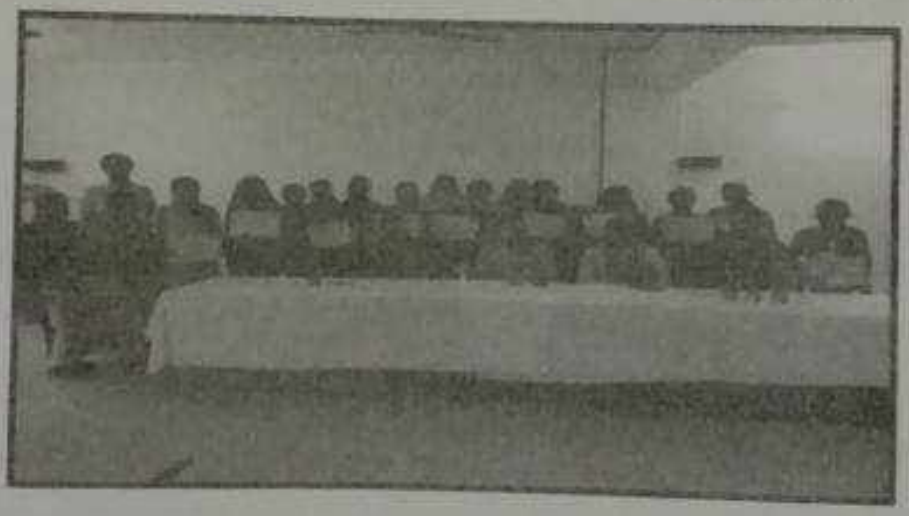
Photograph 11: Quiz competition on water and environment conservation at Govt Higher Secondary School, Kunkuri

II. Tailoring Training Center is being run with 20 candidates.

Photograph 12: Tailoring Training Center

To improve the abilities and skill of girls run tailoring training center with 20 students. That enhances their capabilities and preparation for self dependent through tailoring work in rural set-up.

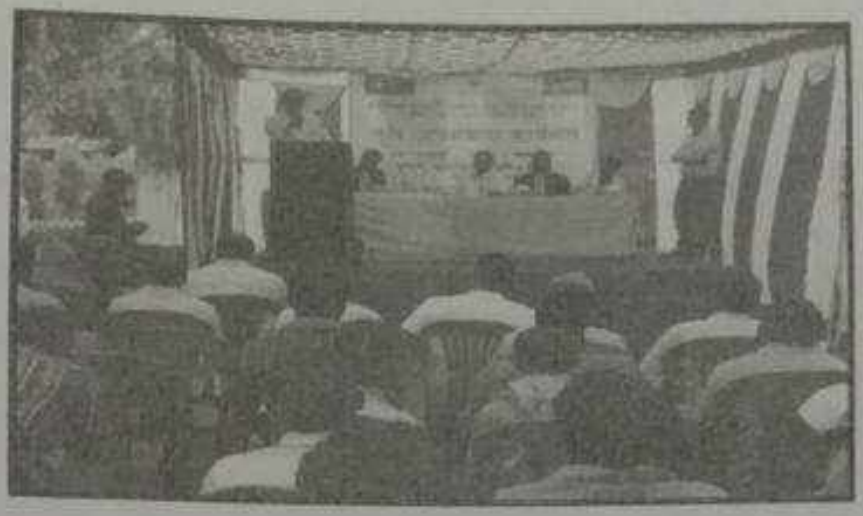
III. Certificate distributed of tailoring training center among 15 candidates at Tundri



Photograph 13: Certificate distributed of tailoring training center

Certificate distribution done in tailoring training center among 15 candidates at Tundri village which is motivate other girls also to join tailoring center and improve their own skills in this field.

IV. Organized awareness program among villagers of Bedadorha & Tundri on Modern Agriculture Technology



Photograph 14: Awareness program at Badadarha & Tundri on Modern Agriculture Technology

Modern agriculture is driven by continuous improvements in digital tools and data as well as collaborations among farmers and researchers across the public and private sectors. During the Green Revolution in the 1960s, India could achieve self-sufficiency in food grain production by using modern methods of agriculture like better quality of seeds, proper irrigation, chemical fertilizers and pesticides. As time passed, more technological advances appeared in agriculture. The tractor was introduced, followed by new tillage and harvesting equipment, irrigation and air seeding technology, all leading to higher yields and improved quality of the food and fiber that was grown.[15] Technologies in agriculture developed to increase production, resolve chemo-physical, biological, and socioeconomic constraints related to crop production. The technology covers everything from powered machinery that does work formerly preformed people and animals to enhanced seed technologies that support crop growth and protect plants from insects.[16]

V. Inauguration of School Building has been done by Honorable Minister Umesh Patel

Photograph 15: Inauguration of School Building

Inauguration of school building done by Honorable Minister Umesh Patel. He is minister of Higher Education of Chhattisgarh and Skill development, Science and Technology, Sports and Youth Development

C. Health & Sanitation Program

Equal access to essential health, clean water and sanitation services continue to be a priority for India, which houses one-sixth of the world's population. India has already made remarkable strides in the eradication of polio and the elimination of neonatal tetanus. Further, the progress on key health indicators such as infant and maternal mortality rates, as well as the reduction in the incidence of HIV, TB and malaria, helped India meet the Millennium Development Goals on health.[17] The issues of health and well-being are closely related to that of an adequate water supply and functional sanitation systems. India is focused on ensuring access to water and sanitation services to all. Since the launch of Government of India's flagship scheme, the Swachh Bharat Abhiyan (Clean India Mission), more than 12 million toilets have been constructed in rural areas. India also faces significant challenges in the provision of quality water, sanitation, solid waste management and drainage. Inequality in access is acute, with more than 90% of urban residents accessing sanitation facilities compared to only 39% in rural India. Additionally, 44% of the population continues to defecate in the open.

The Government of India has demonstrated its commitment to the overall well-being of its citizens. Back in 2005, the central government established the National Health Mission and introduced structural reforms to strengthen health care and sanitation. The National Health Policy 2017 clearly articulates the government's commitment to reforming the health sector and achieving universal health coverage, not least by proposing an increase in the health budget to 2.5% of GDP. The policy also sets bound targets for disease elimination, reduction of premature and preventable mortality, systems strengthening, as well as improving health services. The government launched Mission Indradhanush in 2015 to rapidly increase immunization coverage. It is also investing significant resources towards ending open defecation by 2019 through the Swachh Bharat programme.

Table-4 Detailed information regarding health camps

S.No.	Village	Number of Health Camps	Number of Beneficiaries
1.	Badadarha	11	725
2.	Rampur	9	498
3.	Tundri	10	667
4.	Basanpali	8	487
5.	Phulbandhiya	6	271
6.	Khairapali	6	248
7.	Amapali	5	205
8.	Bendojhariya	6	406
9.	Kunkuni	7	459
Total Health Camps		**68**	**3966**

1. Orgonized health comp (Total 68 comp 3966 cases attended) at Project affected & Railway Corridor villages

Health camps or outreach clinics are the effective strategies adopted by both government and non-government organizations, associations, and societies with various interests and scope. A well-organized health camp with a concentration on the various principles of planning, coordination, collaboration, tools, and techniques will not only make the health camp successful but also aids in improving the health status of the unreached community who are often deprived of basic to advance health care facility due to different circumstances. Health camp or out-reach clinic, is one of the frequently used methods of reaching the unreached from advanced health service in the developing world, where people get health consultation and along with the distribution of drugs at local level. Broadly defined, health camps (swásthya sivir) are stationary or mobile short term medical interventions for target communities, generally lasting anywhere from a day to a week. According to the need of public, camp venues are usually designated in the targeted place like selected rural or urban community, school, University, prison, orphanage, old age care home etc .The pattern of camp is generally non-specific termed

as general health camp but in recent years health camp are being organized in specific manner for screening targeted disease like screening of heart disease, screening of cervix, ophthalmology screening, epilepsy camp, psychiatric camp, dental camp, family planning camp etc. The importance of health camps has also got high significance in areas devastated by hurricanes, floods, disasters as well as difficult geographical location.[8]

Photograph 16: Organized health camp at Project affected & Railway Corridor villages

DB Power Pvt. Ltd. Organized health camp (Total 68 camp-3966 cases attended) at Project affected & Railway Corridor villages. There were 68 health camps in which 3966 people who are benefited by health camps.

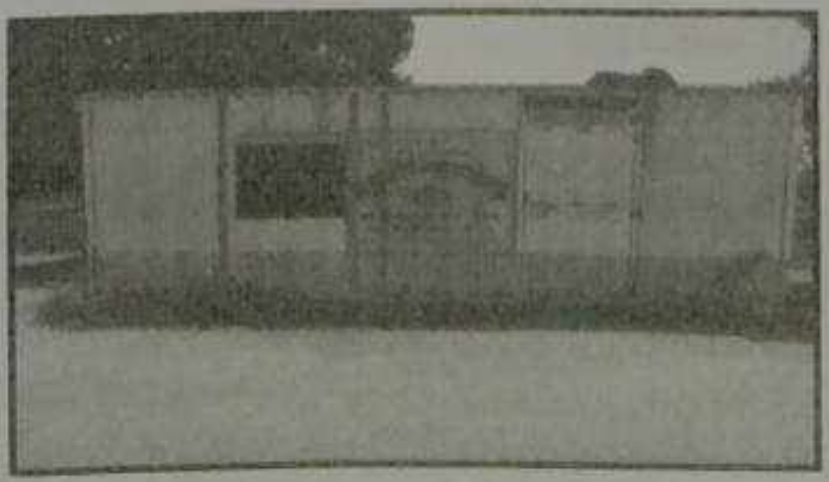
II. Provided referral ambulance service (482 cases attended) of nearby villages of plant.

Transportation of trauma cases is an integral component of health care provision. Ambulance services to transport pregnant women, children and those that require emergency medical attention remains a challenge in India even after 50 years of public health care provision. The transport component is known to contribute to accelerating the achievement of various Millennium Development Goals, including those relating to reducing maternal and infant mortalities. It was in this context that the National Rural Health Mission (NRHM) in India funded a nationwide initiative to support rural ambulance service - the "Dial 108 service". This was largely adopted from a not-for-profit organization.

Photograph 17: Referral ambulance service (482 cases attended) of nearby villages

In India, about 69% of the population lived in rural areas in 2011. According to the national census of 2011, the number of rural villages in India is 540,867. Out of these, only 22% of the rural population lives within 5 kilometers from the nearest town, 28% are in a range of 5 to 10 kilometers from a town, and the majority of 50% are located 10 kilometers from the nearest town (Census, 2011). Although the number of poor people living in urban areas is growing, poverty remains a predominantly rural phenomenon. DB Power Pvt. Ltd. Provided referral ambulance service for local people to rich out timely at hospital whenever they required.

III. Community Health Center (2142 cases attended) at Badadarha



Photograph 18: Community Health Center (2142 cases attended) at Badadarha

Health care delivery in India has been envisaged at three levels namely primary, secondary and tertiary. The Community Health Centre's (CHCs) which constitute the secondary level of health care were designed to provide referral as well as specialist health care to the rural population. Public health being a State subject, the primary responsibility to provide improved access to healthcare services is that of the State Governments. However, under National Health Mission (NHM) financial support is provided to State/UT Governments to strengthen their healthcare systems to provide better and easy access to healthcare services. As per Rural Health Statistics, 2014, there is a shortfall of 36346 Sub Health Centre's (SCs), 6700 Primary Health Centre's (PHCs), and 2350 Community Health Centre's (CHCs) against the specified population norm.[19]

These centre's are however fulfilling the tasks entrusted to them only to a limited extent. The launch of the National Rural Health Mission (NRHM) gives us the opportunity to have a fresh look at their functioning.[20] *The CHCs were designed to provide referral health care for cases from the Primary Health Centre's level and for cases in need of specialist care approaching the centre directly.*[21] *NRHM envisages bringing up the CHC services to the level of Indian Public Health Standards. The support manpower will include a Public Health Nurse, ANM, Dental Assistant and Cold Chain and Vaccine Logistic Assistant in addition to the existing staff. An Ophthalmic Assistant will also need to be provided in centre's where currently there is none. One Ophthalmologist (MS or Diploma in Ophthalmology) for every 5 CHCs is recommended in addition to existing Provisions. One Dental Surgeon, 6 GDMOS, one AYUSH specialist and one AYUSH general doctor are also recommended in this IPHS.*[22] *DB Power Pvt Ltd Community Health Center in Badadarha. The time of survey 2142 persons are benefited by CHCs Center.*

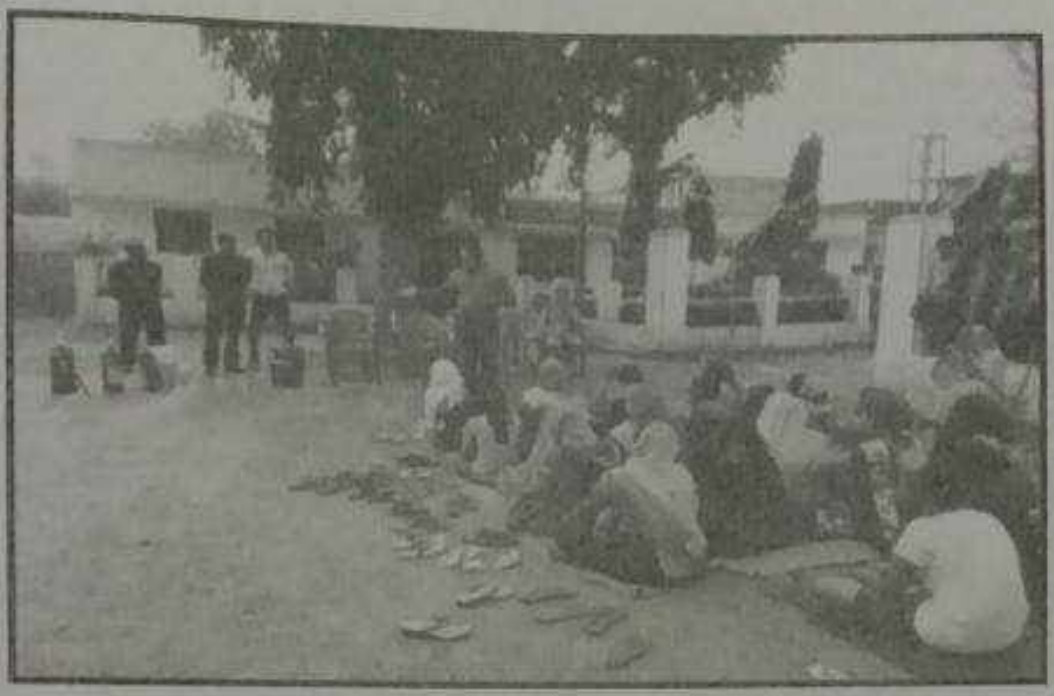
IV. Organized Sanitation awareness programme (46 times) and attended (1017 people) SHG members, School students & among village women's

Photograph 19. Organized Sanitation awareness programme

Organized Sanitation awareness programme among SHG members, School students & village women. Proper sanitation is impor tant not only from the general health point of view but it has a vital role to play in our individual and social life too. Sanitation is one of the basic amenities people must have as it has a direct link to food hygiene. Good sanitation practices pre-vent contamination of water and soil, and thereby, prevent diseases.[23] The concept of sanitation was, therefore, expanded to include personal hygiene, home sanita-tion, safe water, garbage disposal, excreta disposal and waste water disposal. Community sanitation is now an essential issue of environmental sustainability.[24]

V. Organized awareness program on fire mitigation methodology and safe use of LPG cylinder among villagers Badadarha. (Women & Youths) participated (52 People) in this program.

Organizations must manage the risk of fires in order to protect the safety of human and limit physical damage. It is imperative that any organization has a plan in place to minimize the likelihood and impact of fires. Prevention is the most important part of any risk management strategy. By mitigating risks in advance, organizations save time, effort, and money. Fire risk management is no exception: prevention is key. Fortunately, there are many strategies an organization can put in place to help prevent fires.[25]



Photograph 20: Organized awareness program on fire mitigation methodology and safe use of LPG cylinder among villagers Badadarha

While safety is an important issue it should also be emphasized that LP Gas is an excellent, versatile and often preferred fuel for many applications. It is also recognized as an environmentally friendly fuel with many social advantages. As with all forms of energy LP Gas is potentially hazardous if mishandled or misused.[26] To mitigate the accidents, awareness programs are very necessary at community level and for safety purpose DB Power Pvt Ltd organized awareness program in Badadarha Village.

VI. Sprinkling of water on main road Tundri to Kanwali and approach road Badadarha.

***Photograph 21:** Sprinkling of water on main road Tundri to Kanwali*

Sprinkling of water on main road Tundri to Kanwali and approach road Badadarha through the DB Power Ltd.

D. Women Empowerment Program

Women's empowerment in India is heavily dependent on many different variables that include geographical location (urban/rural), educational status, social status (caste and class), and age. Policies on women's empowerment exist at the national, state, and local (Panchayat) levels in many sectors, including health, education, economic opportunities, gender-based violence, and political participation. However, there are significant gaps between policy advancements and actual practice at the community level.[27] By providing equal provision of rural services and infrastructure, it is possible to facilitate women's access to education, productive resources, and build on their knowledge, skills and abilities. Despite seeing an improvement, there is a requirement to focus and make efforts to increase women's representation in local institutions and governance mechanisms and include them in decision-making within their households and communities. Women empowerment has progressed beyond being an urban phenomenon as the government and various welfare organizations are trying to bring a paradigm shift at grassroots level.

There are multiple government schemes to support and guide the rural women through various entitlements, which has also helped them to come together to form Self Help Groups (SHGs). Schemes like Pradhan Mantri Mudra Yojana supports more than 50 million small business owners, a majority of whom (78 per cent) are women. These SHGs with enterprising women help a community at large to explore business ideas, gain access to resources (human, intellectual and financial) to begin their venture and explore means to expand these as well. Mahila Shakti Kendra is another scheme that aims to empower rural women with opportunities for skill development, employment, digital literacy, health and nutrition.

Self-help Groups Concept

- Self-help group is an informal association of women from poor households
- It is an organization in which members with similar socio-economic conditions come together around a common interest.
- The size of the group normally consists of 10 – 15 members
- Self-help and mutual help are the core principles of the group
- The group provides equal opportunity to all its members to participate in the meeting
- Members thrift and credit are the key elements for the group development
- Members in the group take all decisions in their meetings by democratic process and consensus approach

I. Income Generating Activities By SHG (Self Help Group)

Women living in rural India, employed in both skilled and unskilled labour in the hinterlands, have managed to assert their rights and demands through various platforms. They have effectively used environmental concerns, socio-economic advancement, and digital platforms to seek credibility, independence, and competitiveness in their community.[28]

Micro-credit schemes like self-help groups (SHGs) were introduced, which partnered with the local banks in the area. These SHGs are based on the principles of peer-monitoring. In this model, it is acknowledged that the bank may or may not be rooted in the village and therefore each beneficiary is responsible and accountable for the entire group. This scheme was successful since it imparted financial knowledge as well as financial discipline, thereby

enabling a significant decrease in payment defaults. As opposed to the earlier schemes, this model encouraged women to take up different economic activities at their own pace since they had access to a dependable source of credit.

Photograph 22: Income Generating Activities By SHG (Self Help Group)

The SHGs promotes small savings among its members. The savings are kept with a bank. This common fund is in the name of the SHGs. Mainly, members of the SHGs are women. Therefore, participation of women in the Development is increasing. As majority of the women lack of resources that help contribute to their empowerment and well-being, economic independence through self- employment and entrepreneurial development must be paid attention.[28]

II. Organized training on Record keeping and Documentations among members of 5 SHG'S at Badadarha village.

Photograph 23: Organized training on Record keeping and Documentations among members of SHG'S at Badadarha village.

Self Help Groups are community-based institutions that share common economic and social conditions in rural areas. They voluntarily came together to pool resources for the upliftment of their community members. Documentation is the written and legal recording of the interventions that concern the all importants incidents and works which was done or in progress and it includes a sequence of processes. Documentation is established with the personal record and information regarding all important plans and works of the goal, which constitutes a base of information on the situation of his SHGs members works. The purpose of the report or documentation is to be transmitted valuable information to a person or a group of persons. A report, either oral or written, ought to be brief and to include all the relevant information, without further details.

III. Organized SHG meeting in Project affected village & Railway corridor village

***Photograph 24**: Organized SHG meeting in Project affected village & Railway corridor village*

***SHG Meeting Agenda**: All the members of the group starting from the representatives will be introduced by themselves. Bookkeeper will record the attendance in the minute book including the names of the absentees and late comers. Members will review follow up action on the previous meeting resolutions and will take final decisions. All the members' handover savings amounts to the presiding member. The Loan members will hand over the installment and interest amount in the meeting to the presiding member.*

IV. Income Generating Activities by SHG (Self Help Group)

*For earning an income of their own, **(Please See Photograph 25)** SHGs have been imparted training in incense stick making (Agarbatti). Apart from this, A few SHGs have started their business, which has been linked up with the local market. and duties of panchayats, welfare schemes of the government such as mid day programme, Anganhadi pathan anhar schmes,etc. they are involve in food making at school and anganhadi center for children.*

Photograph 25: Income Generating Activities by SHG (Self Help Groups)

E. Social & Welfare programme

Hence the basic objective of the social welfare programme is to support and improve the standard of living of the above-mentioned people and provide them with equal opportunities. Social welfare for the poor and deprived to receive direct benefits for example Women issues, people living with HIV/AIDS, tribal's living in geographical distant areas, people from disadvantaged castes and the economically vulnerable category, who do not have substantial source of income.

I. 15 Chairs, 1 Almirah and 1 Table provided to Yuva Vikas samiti Badadarha and 4 chairs, 1 Almirah and 1 Table provided to Anganwadi Center, Sahnipara, Badadarha.

Photograph 26: Furniture distribution at Yuva Vikas Samiti, Badadarha

In. Sahnipara, Badadarha village through help out of DB Power Pvt Ltd, 15 Chairs, 1 Almirah and 1 Table distributed to Yuva Vikas samiti Badadarha and 4 chairs, 1 Almirah and 1 Table provided to Anganwadi Center.

II. Organized seminar on utilization of Cow Dung among members of SHG and villagers of Badadarha, Rampur and Tundri at Urja Bhawan, DBPL

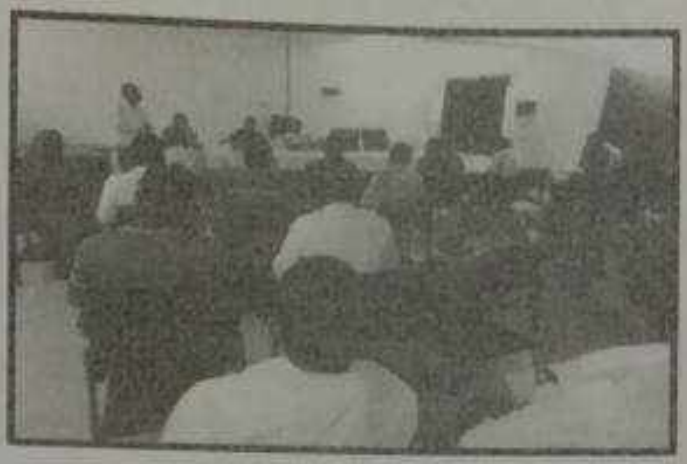
Photograph 27: Organized seminar on utilization of Cow Dung at Badadarha, Rampur and Tundri at Urja Bhawan, DBPL

Organized seminar on utilization of Cow Dung among members of SHG and villagers of Badadarha, Rampur and Tundri at Urja Bhawan, through DB Power. Which were help the people and get awareness regarding resource utilization.

III. Organized meeting in village Badadarha & Rampur. Meeting headed by Namita koyande (Corporate HR) regarding to launch scheme of subh Laxmi & Soubhagyawati among PAP who are working in DBPL. During meeting villagers and members of SHG were also present.

Photograph 28: Organized meeting in village Badadarha & Rampur.

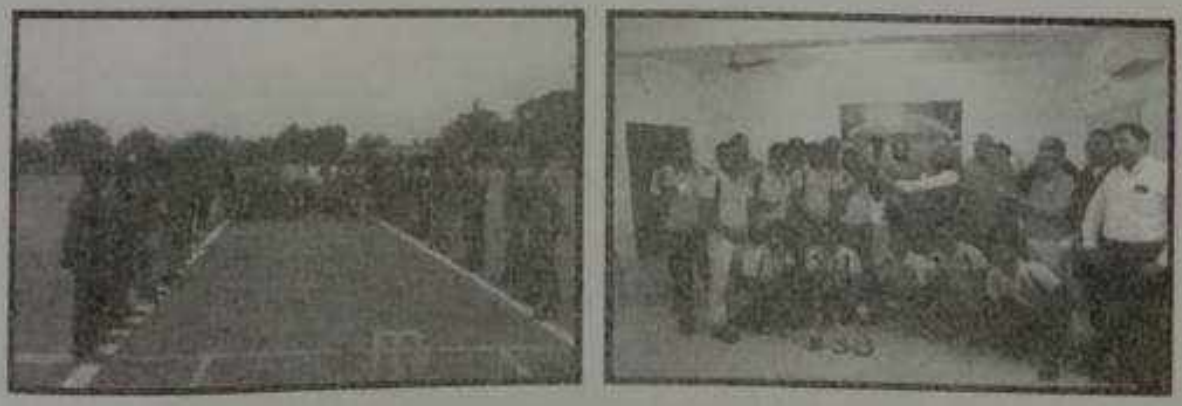
IV. Organized meeting with villagers Badadarha and DBPL management regarding village issues on date 25/07/19 at Training hall Urja bhawan. Meeting headed by COO Sir.



Photograph 29: Organized meeting with villagers Badadarha and DBPL management

Representatives of Villagers and voluntary organizations invited into the meetings have continuously delivered their opinions on village matters. To mitigate problems at community level.

V. Organized cricket tournament in govt. higher secondary school, Sondka.



A. *B.*

Photograph 30: Cricket tournament in govt. higher secondary school, Sondka.

Organized cricket tournament in govt. higher secondary school, Sondka by DB Power Ltd Rural sports are games developed in the traditional times. Practiced since ages it can be seen taking place among people involved in rural areas. The games were involved in their daily lives, some them were based on daily hunting techniques such as running, throwing, jumping

VI. Provided volleyball & net to Youths , Badadarha

Photograph 31: Distribution of volleyball & net to youths , Badadarha

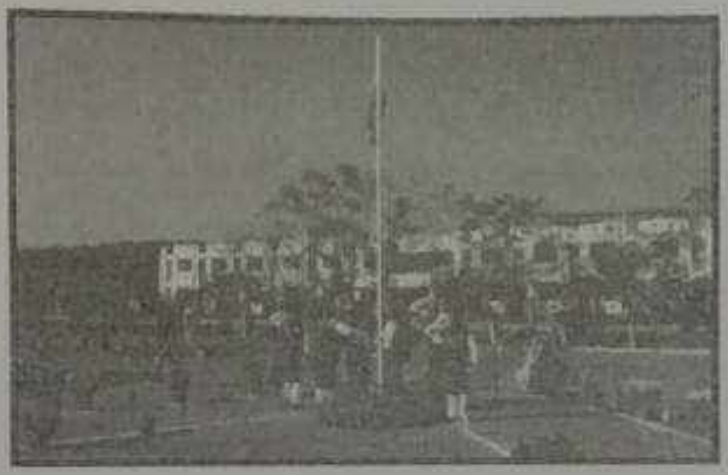
Distribution of volleyball & net among Youths in Badadarha by DB Power Ltd. Main objective of this activity is motivate to youths for sports fields

VII. Supported tent items, Sound system, and Snacks for organizing Guru Ghashidas Jayanti Samaroh at Beladula Tundri.

Photograph 32: Provided tent items, Sound system, and Snacks for organizing Guru Ghashidas Jayanti Samaroh at Beladula Tundri.

In 18th December day of Guru Ghasi Das Jayanti, DB Power Ltd provide the essentials things to organize the Jayanti in proper way and also distributes snacks and some food items to present audience.

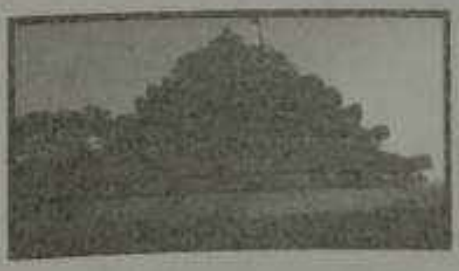
VIII. Distribution of Sweets on the occasion of National festivals (Independence & Republic Day) among Govt schools & Anganwadi (20 (school & anganwadi)at Project affected & Railway Corridor villages. Organized cultural program on National festivals.



Photograph 33: Organized cultural program on National festivals

Organizing cultural programs and activities, it is the desire to progress and motivation for them. And also organize Rangoli, Mehandi, Painting, Essay Writing, and Quiz competitions from time to time at the government schools in around the railway corridor village.

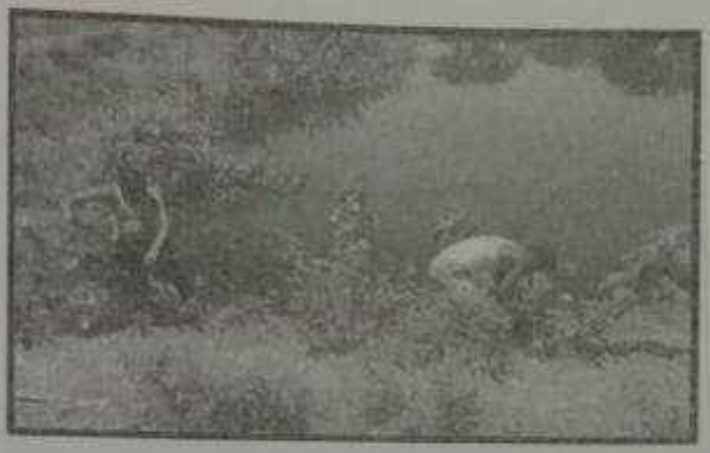
IX. Painting of Kurrupath temple has been completed



Photograph 34: Kurrupath temple

Painting work done by DB Power Ltd. We often worship in temples without knowing much about the significance of each of them. But it is important to acquaint ourselves with the mythology behind a temple, its significance and stories that relate to it. That would make our worship more meaningful.

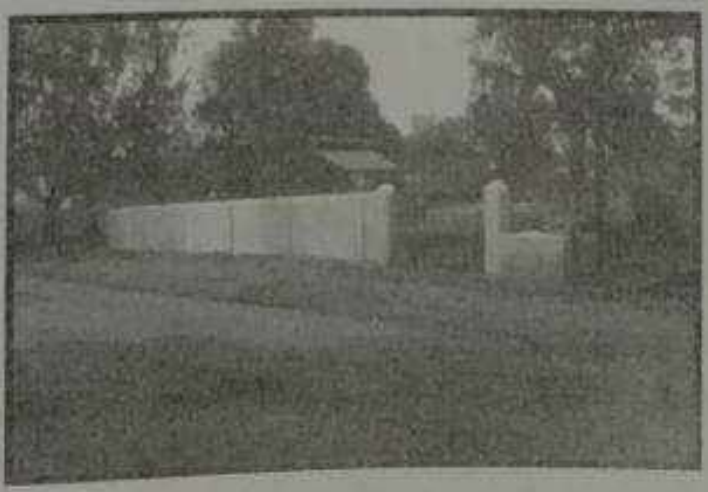
X. Cleaning of Dadu Pond has been done at Badadarha



Photograph 35: Cleaning of Dadu Pond

Water pond in rural area is more important because ponds are resource of rain water storage which can use for many purpose with an increased variability of monsoons and rapidly depleting groundwater tables, large parts of rural are reeling under water stress.

XI. Cleaning & Painting of cremation shed at Tundri



Photograph 36: Cleaning & Painting of cremation shed at Tundri

Cleaning & Painting of cremation shed at Tundri village by DB Power Ltd. Religious traditions show that cremation can be a moving, spiritual, and even creative choice, helping family members and loved ones along grieving journey.

XII. Organized Sundorkand path at Bodadarha, Rampur & in Tundri

Photograph 37: Organized Sundorkand path at Bodadarha, Rampur & in Tundri

India because our traditional and folk drama has very important and strict traditions in some cases. Indian traditional theatre is very popular among village folk Generally, the subject of these traditional folk theatre are of mythological-based ones mostly from the Ramayan, Mahabharata and from other Puranas The playwrights of these traditional folk theatre wrote these plays in a very simple manner which is very convenient to be performed on the stage.Organized Sundarkand path at Bodadarha, Rampur & in Tundri by DB Power Ltd for local people.

9. Conclusion

Indian companies are now expected to discharge their stakeholder responsibilities and societal obligations, along with their shareholder-wealth maximisation goal. Nearly all leading carporate in India are involved in corporate social responsibility (CSR) programmes in areas like education, health, livelihood creation, skill development, and empowerment of weaker sections of the society.[10]

The beginning of 21st century in India has seen the term CSR coming to the forefront of development of discussion. In recent times, the Corporate Social Responsibility is emerging as a significant feature of business philosophy, reflecting the impact of business on society in the context of sustainable development. CSR is a concept whereby companies decide voluntarily to contribute to a better society and a cleaner environment. It is represented by the contributions undertaken by companies to society through its business activities and its social investment. CSR has been making an increasingly prominent impact in the Indian social system by supplementing development projects

CSR can play a valuable role in ensuring that the invisible hand acts, as intended, to produce the social good. In addition, it seems clear that a CSR program can be a profitable element of corporate strategy, contributing to risk management and to the maintenance of relationships that are important to long-term profitability. In India many companies or industries have modified their policies, activities and are engaged into Corporate Social Responsibility (CSR) especially on rural development beyond their financial aspects.

9.1 Impact on Community

Chhattisgarh state is situated in the Central India and Raipur is the capital of Chhattisgarh. Chhattisgarh is the 10th largest state of India, with an area of 135,190 km2 and ranked as the 16th most-populated state of the country. Chhattisgarh is agricultural based state and its 80% population stay in rural area. Cooperation is a dynamic movement for the socio-economic and rural development. The cooperatives have strong local linkage in the rural area. The cooperatives covered 80% of the rural households and almost 95% villages in the state. The cooperatives which are the life blood of the state's economy and the mechanism for any development programs.

A. Rural Infrastructure Programme

In FY 2019-20 the DB power Limited has been started rural infrastructure programme The funds released under CSR activities by db power ltd. The main objective of the fund is to provide rural development and enabling environment. CSR enable them to complete ongoing rural infrastructure projects.

The importance of infrastructure for economic growth and development in rural area can hardly be overemphasized in a developing economy like India. With poor rural infrastructure, even a marginal improvement in its quantity and quality could significantly improve economic development and human well-being. Improving basic infrastructure, such as roads, transport, electricity, telecommunications, housing, health, water and sanitation, is essential for development and well-being of the rural population. The development of rural infrastructure could promote economic growth, improve the standard of living of the population and reduce the incidence of poverty by generating both farm and non-farm employment and earning opportunities, increasing productivity, providing access to basic goods and services and improving the health and physical condition of people.[1] In spite of several public initiatives for infrastructure development in rural area.

Under supervision of DB power ltd various rural infrastructure has been done which are construction of CC at Badadarha, Drilling of Bore well & installation of submersible pump near BC building Badadarha & Fulbandhiya village, Drilling of Bore well & Installation of Hand pump near LC (line crossing) gate 1,2,3 & 4 in respective area and also Amapali & Kunkuni villages, Leveling of premises of Cremation place by murrum near main road Tundri, Soil filling and leveling has been done in premises of Anganwadi Badadarha, Approach road of Dadu Pond & Village road Badadadrah and also Village road Tundri have been repaired by murrum at Badadarha, Repairing of main road Tundri has been done, Electric wiring has been done in common class room of Govt. Higher Secondary School, Sondka and Govt. Primary School Bansmuda, Kharsia, Repairing of Hand pump, Motor pump, Pipe line , Street light & Bio gas (61 HP-49 times, 13 MP-39 times, 11 times Pipeline , 69 Street light 216 times & 35 Biogas- 58 times). Due to all these works villagers able to get access drinking water and transportation has been developed in village level.

B. Educational and Skill Developmental Activities

This result emphasis that majority of the respondents were benefited by vocational training programmers under DB Power at village level. DB Power organized different education related programmes and vocational training which are Quiz competition on water and environment conservation in Govt Higher Secondary School, Kunkuni, Tailoring Training

Center is being run with 20 candidates, Certificate distributed of toiloring training center among 15 candidates at Tundri for motivation among young villagers. Organized awareness program among villagers of Badadarha & Tundri on Modern Technology Agriculture for better understating about technical uses in agriculture field.

C. Health, Hygiene & Soniation

The development of healthcare infrastructure in rural is poor and needs fundamental reforms in order to deal with emerging challenges. The development of infrastructure and health care facilities, the position of the workforce, and the quality of service delivery are important challenges that are confronting healthcare centres in rural. Some crucial works under DB Power under health, hygiene and sanitation in which Organized health camp (Total 68 camp- 3966 cases attended) at Project affected & Railway Corridor villages, Provided referral ambulance service (482 cases attended) of nearby villages of plant to improve health status and reduce morbidity level in rural area. Open Community health center (2142 cases attended) at Badadarha to provide primary health care service. Organized Sanitation awareness programme (46 times) and attended (1017 people) to create awareness among villagers. Organized awareness program on fire mitigation methodology and safe use of LPG cylinder at Badadarha to educate and create awareness among villagers how they could be use safely LPG cylinders in households and in this awareness program 52 people were participated the program. The only way which could lead to the goal of health inclusion is by incorporating impoverish needy rural population through community participation.

D. Women Empowerment through SHGs

The empowerment and autonomy of women and the improvement of their political, social, economic and health status is a highly important end in itself. In addition, it is essential for the achievement of sustainable development. The full participation and partnership of both women and men is required in productive and reproductive life, including shared responsibilities for the care and nurturing of children and maintenance of the household. In all parts of the world, women are facing threats to their lives, health and well- being as a result of being overburdened with work and of their lack of power and influence. In most regions of the world, women receive less formal education than men, and at the same time, women's own knowledge, abilities and

coping mechanisms often go unrecognized. The power relations that impede women's attainment of healthy and fulfilling lives operate at many levels of society, from the most personal to the highly public.

For women empowerment at community level different training programme are organized by DB Power for example: Training on Dairy Business among members of 10 SHG'S at Tundri village to economic enhancement of women. Organized training on Record keeping and Documentations among members of 5 SHG'S at Badadarha village for better understanding past work and assumption action plan work for future. The power relations that impede women's attainment of healthy and fulfilling lives operate at many levels of society, from the most personal to the highly public. Achieving change requires policy and programme actions that will improve women's access to secure livelihoods and economic resources, alleviate their extreme responsibilities with regard to housework, remove legal impediments to their participation in public life, and raise social awareness through effective programmes of education and mass communication. In addition, improving the status of women also enhances their decision-making capacity at all levels in all spheres of life.

E. Social & Welfare Programme

A social welfare system provides assistance to individuals and families in need. Under supervision of DB Power different program done for social welfare at village level which are 15 Chairs, 1 Almirah and 1 Table provided to Yuva Vikas samiti Badadarha and 4 chairs, 1 Almirah and 1 Table provided to Anganwadi Center because physical infrastructure of any institution are also more important to proper work. Organized seminar on utilization of Cow Dung among members of SHG and villagers of Badadarha, Rampur and Tundri at Urja Bhawan, to use bio fuel in different way this types of seminars are needed. Provided volleyball & net to youths , Badadarha for motivation and encouragement of rural youths. Cleaning of Dadu Pond has been done at Badadarha all we know in rural area still they are depended on pond water for different daily life routine cause of inadequate water in communities. However, DB Power done and leads to different work for rural development and improvement of their situation.

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Council of Applied Economic Research

Dainik Bhaskar GROUP

Fwd: IMPORTANT: Compliance of new emission norms for power plants notified on 07.12.2015 within the timelines specified in the directions issued by CPCB.

From: **Manu Namboothiri** <manu.namboothiri@dbpower.in>
Date: Fri, 6 Nov 2020 at 08:33
Subject: Re: IMPORTANT: Compliance of new emission norms for power plants notified on 07.12.2015 within the timelines specified in the directions issued by CPCB.
To: Sanjeev Paliwal <sanjeevpaliwal.cpcb@nic.in>
Cc: Balijepalli Subrahmanya Prasad <bs.prasad@dbpower.in>, Manoj Kumar Panda <manojkumar.panda@dbpower.in>, <nazim.cpcb@nic.in>

Sir,

As desired, Status of the compliance wrt Unit 2 and also Unit 1, is given herein.

S. No.	Direction	Status
i	ESP up-gradation	Respective emission norm is Complied
ii	FGD installation	• Contract awarded to Chinese EPC contractor M/s TUNA Corporation in Sep 2019. • Basic & design engineering completed, detailed engineering under progress. • Site mobilization and work at site was to commence during 1st quarter 2020, however, primarily delayed due to Covid'19 impact while other factors such as delay in a) approval of loan by some of the Banks, (b) collection of backlog of receivables from Discoms (to in turn infuse equity) and (c) regulatory approval by CERC, have also contributed to the delay.award, on 26.09.2019. • Completion of FGD project is 23 & 26 months from the approval from CERC and financial closure, respectively for unit#1 & 2. • Requested time extension due to Covid-19 pandemic impact.

<table>
<tr><td></td><td></td><td>Likely Commissioning dates keeping the above are as below
<table><tr><th>Unit</th><th>Timeline as per phasing plan</th><th>Time line extension requested</th><th>Extension in months (from CEA / CPCB phasing]</th></tr><tr><td>Unit#1</td><td>30.06.2021</td><td>31.12.2022</td><td>18 Months</td></tr><tr><td>Unit#2</td><td>30.09.2020</td><td>30.09.2022</td><td>24 Months</td></tr></table></td></tr>
<tr><td>iii</td><td>Installation of primary NOx control measures</td><td>During tendering, the Company had received only one proposal, from BHEL, for NOx control. As you are aware, the revised norm for NOx is 450 mg/Nm^3, in place of the earlier limit of 300 mg/Nm^3. As such, any decision on award for NOx control package has been reinitiated in line with the revised ceiling limits.</td></tr>
<tr><td>iv</td><td>Compliance status of new norm for respective parameters</td><td>Complied</td></tr>
</table>

2. Further, we wish to convey you that The Secretary, Ministry of Power conducted a one to one review of the status of compliance of New environment Norms, on 13th Oct 2020 and we were asked to send the revised timelines in order to complete FGD installation, for onward take up with MoEF. Enclosed herewith our letter to CEA / MoP in this regard.

We earnestly request CPCB to appropriately appraise the MoEFCC, the practical difficulties being faced by DB Power including the Covid-19 lockdown and may facilitate extension of 2 years in this regard.

Thanking You

Yours faithfully,

For **DB Power Ltd**

(Authorised signatory)

Manu Krishnan Namboothiri,
Head (Strategy, Power sales & Corporate Relationships)
Email: manu.namboothiri@dbpower.in, Mob: +91 7506256244, Land Line: +91 22 7156 6011

FGD Letter to CEA_ 151020.pdf
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D B POWER LIMITED

CIN: U40109MP2006PLC019008
Corporate Office: Naman Corporate Link, 3rd Floor, C-31 G Block, Bandra Kurla Complex, Bandra (E) Mumbai-400051
Tel No +91-22-3930 6000, Fax No +91-22-3930 6008

DBPL/CEA/FGD/15102020 **Date: 15.10.2020**

To,
Shri. Bikash Chandra Mallick,
Chief Engineer (TPR&M)
Central Electricity Authority,
R. K. Puram, Sector-1,
New Delhi - 110 066
E Mail: cetprm-cea@gov.in

Sub: FGD implementation status of DB Power (2X600MW) post review meeting held by MoP on 13.10.2020 on the status/timelines of implementation of emission control equipment's in Thermal Power Plants - reg

Ref: VC conducted by MoP & CEA on 13th Oct 2020

Sir,

We write with reference to the captioned review meeting, held by Secretary [Power], regarding status of FGD implementation by Thermal Power Generators across the country, including Private, Central and State Genco's.

As advised during the meeting, we are pleased to submit the following information w.r.t our Power Project:

Sl	Particulars	Response
1	Current status of FGD implementation	**Construction status:** Contract awarded to Chinese EPC contractor M/s TUNA Corporation in Sep 2019. Basic & design engineering completed, detailed engineering under progress. Site mobilization and work at site was to commence during 1st quarter 2020, however, primarily delayed due to Covid'19 impact while other factors such as delay in (a) approval of loan by some of the Banks, (b) collection of backlog of receiveables from Discoms (to in turn infuse equity) and (c) regulatory approval by CERC, have also contributed to the delay. **Status of Change in law approval by CERC**: Change in law against long term PPA petition filed in CERC [366/MP/2019 & 377/MP/2019] in Oct'19. Final hearing was done on 27th Aug'20 and order awaited.

D B POWER LIMITED

CIN: U40109MP2006PLC019008
Corporate Office: Naman Corporate Link, 3rd Floor, C-31 G Block, Bandra Kurla Complex, Bandra (E) Mumbai-400051
Tel No +91-22-3930 6000, Fax No +91-22-3930 6008

<table>
<tr><th>Sl</th><th>Particulars</th><th>Response</th></tr>
<tr><td></td><td></td><td>Funding Status: Lead lender (SBI) approved in Feb-20. Received sanctions from 54% of consortium lenders including lead lender for FGD total debt. Remaining sanctions are under progress. An early CERC order would facilitate draw down of debt fund.

Infusion of Equity: Await collection of backlog of receivables from Discoms to infuse equity, which is one of the pre-requisite to draw debt funds</td></tr>
<tr><td>2</td><td>Reasons for delay if any</td><td>a) Delay in financial closure [pending to tie up 46% of the Debt, expected tie-up by Feb 21]
b) Large dues with Discoms Viz Tangedco & RUVNL [over Rs 1400 Crs. dues as on Oct 20] is delaying our ability to infuse equity, a pre-requisite to draw debt funds.
c) Covid’19 lockdown and subsequent restrictions [site mobilisation was planned from April 20, which has been primarily delayed due to the Nationwide lock down imposed on 26th March 2020. Upon achieving Financial Closure (i.e. sanction of FGD debt by balance 46% lenders), CERC approval and realizing past dues from Discoms, it is proposed to release the advance to EPC contractor to mobilize at site to commence work

Altogether, the revised ‘Zero’ date for the project [which is the date of advance as per the contract] is expected as Jan 2021. Based on the best effort construction and commissioning schedule as per the contract, 21 months & 24 Months would be required for Unit II & I, respectively.

Unit I –By Dec 22 [24 Months]
Unit II –By Sep 22 [21 Months]</td></tr>
<tr><td>3</td><td>Revised expected timelines for:
a) NIT
b) Award of contract
c) Commissioning of FGD</td><td>a) Completed on 30.03.2018
b) Completed on 26.09.2019
c) Commissioning dates as below
<table>
<tr><th>Unit</th><th>Timeline as per phasing plan</th><th>Time line extension requested</th><th>Extension in months (from CEA phasing]</th></tr>
<tr><td>Unit#1</td><td>30.06.2021</td><td>31.12.2022</td><td>18 Months</td></tr>
<tr><td>Unit#2</td><td>30.09.2020</td><td>30.09.2022</td><td>24 Months</td></tr>
</table>
</td></tr>
</table>

Registered Office:
Office Block 1A, 5th Floor, Corporate Block, DB City Park, DB City Arera Hills, Opposite M. P. Nagar Zone – I, Bhopal – 462016 (M. P.)
Tel: +91-755-398 888 Fax: +91-755-267 5190

D B POWER LIMITED

CIN: U40109MP2006PLC019008
Corporate Office: Naman Corporate Link, 3rd Floor, C-31 G Block, Bandra Kurla Complex, Bandra (E) Mumbai-400051
Tel No +91-22-3930 6000, Fax No +91-22-3930 6008

We earnestly request CEA/ MoP to suitably appraise MoEF on the practical difficulties being faced by DB Power as enumerated above including the Covid-19 lockdown and facilitate extension of 2 years in this regard.

Thanking You

Yours faithfully,

For **DB Power Ltd**

(Authorised signatory)
Manu Krishnan Namboothiri,
Head (Strategy, Power sales & Corporate Relationships)
Email: manu.namboothiri@dbpower.in, Mob: +91 7506256244, Land Line: +91 22 7156 6011

DB Power Limited

CIN U40109MP2006PLC019006

Business Office : Village – Badadarha, Post – Kanwali, Dist – Janjgir – Champa, Chhattisgarh, PIN – 495695

Tel. : 07762-252569

No. DBPL/ENV/34 Date: 09.04.2021

To,

Additional Principal Chief Conservator of Forests (C)
Ministry of Environment and Forests, Climate Change
Regional Office(WCZ),Ground Floor
East Wing, New Secretariat Building,
Civil Line, Nagpur-440001

Sub: Fly ash generation and utilization report for the year 2020-21

Dear Sir,

Please find enclosed herewith fly ash generation and utilization report for the year 2020-21 for 2 X600 MW Thermal Power Plant located at Badadarha, Chhattisgarh.

This is for your information and record please.

Thanking you
Sincerely Yours,
For M/s. DB Power Limited

Head, Environment

CC: The Regional Officer, Chhattisgarh Environment Conservation Board
Vyapar Vihar, Near Pt. Dindayal Upadyay Garden
Dist: Bilaspur (C.G.)

The Superintending Engineer,
Chhattisgarh Environment Conservation Board,
Paryavas Bhavan, North Block Sector-19,
Atal Nagar, Raipur (C.G.) 492002

The Zonal officer, Central Pollution Control Board
Zonal Office (Central), 3rd Floor, Sahkar Bhawan,
North T.T. Nagar, Bhopal - 462 003

Divisional Head, IPC-II,
Central Pollution Control Board
East Arjun Nagar, Shahadara, Delhi-110032

Fly Ash NotificationS.O. 2804(E),3rd November, 2009 – Statutory Compliance Report for the period 01.04.2020 to 31.03.2021

S. No.	Item	Reply
1	Name of Thermal Power Station	DB Power Limited
2	Full address including District & Pin code	Village – Badadarha. PO – Kanwali, Dist. Janjgir – Champa, Chhattisgarh, Pin - 495695
3	E-mail address	manojkumar.panda@dbpower.in
4	Name of the Nodal Officer (not below the rank of DGM / Dy.CE / or equivalent) dealing with ash/environment management and designation	Hari Om Gupta Asst. Vice President – Fly Ash Management
5	Contact No.	9669611130
6	Email;	hari.om@dbpower.in
7	Total capacity of the Thermal Power Station (MW)along with unit-wise capacity break-up	1200 MW Unit 1 – 600 MW Unit 2 – 600 MW

A. Coal Consumption and Ash Generation in year 2020-2021(in tonnes)

8	Coal /Lignite Consumption	5818230
9	Average ash content in coal (annual)	45.47%
10	Bottom Ash Generation	526601
11	Fly AshGeneration	2119132
12	**Total Ash Generation (10 + 11)**	2645733

B. Ash utilization in year 2020-2021(in tonnes)

S. No.	Purpose for which ash is utilized	From ESP Dry Ash (1)	From Pond Ash (2)	From Bottom Ash (3)	Total (1+2+3)
13	Cement industry	536494	0	0	536494
14	Bricks/blocks/tiles and other ash based products	53662	0	0	53662
15	Road and flyover embankments	366571	0	0	366571
16	Reclamation of low lying area	42150	264842	0	306992
17	Back filling of mines	643878	690219	0	1334098

S. No.	Purpose for which ash is utilized	From ESP Dry Ash (1)	From Pond Ash (2)	From Bottom Ash (3)	Total (1+2+3)
18	Concrete/ mortar/ plaster	3044	0	0	3044
19	Agriculture	0	0	0	0
20	Exports	0	0	0	0
21	Others (please specify all avenues)	0	0	0	0
	Total B (13 to 21)	**1645800**	**955061**	**0**	**2600862**

C. Unutilised ash of year 2020-21 and previous years

22	Unutilised ash of year 2020-21 (in tonnes)	44871
23	Unutilised ash pertaining to previous years i.e. up to 31.03.2020 (in Million tonnes)	2.283984
24	Total unutilisedash up to 31.03.2021 (22 + 23) (in Million tonnes)	2.328855
	a. Quantity of Ash stored in Silos	0 (continues evacuation)
	b. Quantity of Ash stored in Ash Ponds	2.328855
	c. Quantity of Ash stored in any other manner (please specifytype of storage and dry/wet phase)	0

D. Reasons for not achieving 100% ash utilisation

1. During financial year 2020-21, the actual ash generated was 2645733 MT, actual ash utilised 2600862 MT. The percentage utilization is 98.3%.
2. During the lock down period of Codiv-19 pandemic, the movement of transport vehicles was totally disrupted and the movement of vehicles during the initial two months got totally stopped.
3. During the same period, the plant was running with partial loading and generating the ash.
4. We tried to recoup the short fall once the vehicle movement restarted and cement industries operations had resumed.
5. In spite of our best efforts, we could not utilise the short fall of 44871 MT during this FY 2020-21.

Signature and Seal of the Plant Head

D.B. POWER LTD. RAIGARH

Name : B S Prasad
Designation : President
Date : 09.04.2021

Annexure IV

Environment Monitoring Report

ENVIRONMENTAL DATA GENERATION

OF

DB POWER LIMITED

VILLAGE – BADADHARA,
JANJGIR – CHAMPA 495695
CHHATTISGARH INDIA

March - 2021

Prepared by

Ultimate
ENVIROLYTICAL SOLUTIONS

NABL Accredited; MOEF & CC Recognized; CECB Approved Laboratory
An ISO 9001:2015, ISO 18001:2007 & ISO 14001:2004 Certified Laboratory
Reg. Off. - HDD-272 Phase-3, Kabir Nagar, Raipur (C.G.)-492099
Ph-(0771)-4027777, ultimateenviro@gmail.com

Ultimate
ENVIROLYTICAL SOLUTIONS

HDD-272, Phase III - Near JP Chowk
Ring Road No -2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ultimatenvire@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer

To,
DB Power Limited,
2X600MW, Village - Badadhara,
District: Janjgir-Champa
(C.G.) 495695

REPORT NO	UES/TR/20-21/05056
LAB REF NO	UES/20 21/AAQM/04147
DATE OF SAMPLING	01/03/2021 to 26/03/2021
DATE OF RECEIPT	02/03/2021 to 27/03/2021
DATE OF REPORT	01/04/2021
DATE OF ANALYSIS	START:02/03/2021 END:31/03/2021

SAMPLE DETAILS

MONITORING FOR	AMBIENT AIR QUALITY MONITORING	CUSTOMER REF. NO. & DATE	9200002094, DATED:11.12.2020
SAMPLING LOCATION	BADADHARA VILLAGE		
DURATION OF SAMPLING	24 HOURS	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	AS PER METHOD REFERENCE		
SAMPLE QUANTITY/PACKING	FILTER PAPER (PM_{10}): 1X1 NO., FILTER PAPER ($PM_{2.5}$): 1X1 NO. SO_2: 30MLX1 NO. PVC BOTTLE, NO_2: 30MLX1 NO. PVC BOTTLE RUBBER BLADDER: 1X1 NO.		

Test Method and NAAQM Standard for Ambient Air Quality Monitoring

Parameter	Method Reference	NAAQM Standard
Particulate Matter size less than 10 microns (PM_{10})	IS 5182 (Part 23): 2006 & CPCB Guidelines Vol.-I	100
Particulate Matter size less than 2.5 microns ($PM_{2.5}$)	CPCB Guidelines Vol.-I	60
Sulphur Dioxide (SO_2)	IS 5182 (Part 2): 2001, RA 2006 & CPCB Guidelines Vol.-I	80
Nitrogen Dioxide (NO_2)	IS 5182 (Part 6): 2006 & CPCB Guidelines Vol.-I	80
Carbon Monoxide (CO)*	IS 5182(Part 10):1999, RA 2003	4.0
Mercury (Hg)	EPA Method IC-5	--

TEST REPORT

Date of Sampling	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO* mg/m³	Hg ng/m³
01.03.2021	58	32	16	22	1.2	N.D.
05.03.2021	66	38	18	26	1.0	N.D.
08.03.2021	62	30	12	28	1.1	N.D.
12.03.2021	64	36	16	22	0.8	N.D.
15.03.2021	50	32	10	24	1.2	N.D.
19.03.2021	68	34	14	20	1.0	N.D.
22.03.2021	66	38	22	26	1.2	N.D.
26.03.2021	78	32	18	28	0.8	N.D.

Remarks: * Duration of sampling for CO - 1 Hour, N.D. - Not Detected

Terms & conditions

- The report for publication, arbitration or as legal dispute is forbidden.
- Test sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.
- This is for information to the party has asked for above testing.

01/04/2021
PREPARED BY

For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
AUTHORIZED SIGNATORY

End of the test report

Ultimate
ENVIROLYTICAL SOLUTIONS

HDD-272, Phase III - Near JP Chowk
Ring Road No. 2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ultimateenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer			
To, **DB Power Limited,** **2X600MW, Village - Badadhara,** **District: Janjgir-Champa** **(C.G.) 495695**	REPORT NO	UES/TR/20-21/05057	
	LAB REF NO	UES/20-21/AAQM/04148	
	DATE OF SAMPLING	01/03/2021 to 26/03/2021	
	DATE OF RECEIPT	02/03/2021 to 27/03/2021	
	DATE OF REPORT	01/04/2021	
	DATE OF ANALYSIS	START:02/03/2021	END:31/03/2021

SAMPLE DETAILS

MONITORING FOR	AMBIENT AIR QUALITY MONITORING	CUSTOMER REF. NO. & DATE	4200002064, DATED:11.12.2020
SAMPLING LOCATION	RAMPUR VILLAGE		
DURATION OF SAMPLING	24 HOURS	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	AS PER METHOD REFERENCE		
SAMPLE QUANTITY/PACKING	FILTER PAPER (PM_{10}): 1X1 NO., FILTER PAPER ($PM_{2.5}$): 1X1 NO. SO_2: 30MLX1 NO. PVC BOTTLE, NO_2: 30MLX1 NO. PVC BOTTLE RUBBER BLADDER: 1X1 NO.		

Test Method and NAAQM Standard for Ambient Air Quality Monitoring

Parameter	Method Reference	NAAQM Standard
Particulate Matter size less than 10 microns (PM_{10})	IS 5182 (Part 23): 2006 & CPCB Guidelines Vol.-I	100
Particulate Matter size less than 2.5 microns ($PM_{2.5}$)	CPCBGuidelines Vol.-I	60
Sulphur Dioxide (SO_2)	IS 5182 (Part 2): 2001, RA 2006 & CPCB Guidelines Vol.-I	80
Nitrogen Dioxide (NO_2)	IS 5182 (Part 6): 2006 & CPCB Guidelines Vol.-I	80
Carbon Monoxide (CO)*	IS 5182(Part 10): 1999, RA 2003	4.0
Mercury (Hg)	EPA Method: TO-5	—

TEST REPORT

Date of Sampling	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO* mg/m³	Hg ng/m³
01.03.2021	56	38	14	28	1.0	N.D.
05.03.2021	54	32	18	26	1.2	N.D.
09.03.2021	62	30	16	20	0.8	N.D.
12.03.2021	68	34	12	24	1.0	N.D.
15.03.2021	74	28	18	22	1.2	N.D.
19.03.2021	78	30	15	24	0.6	N.D.
22.03.2021	66	34	18	22	1.0	N.D.
26.03.2021	58	40	12	28	1.1	N.D.

Remarks: * Duration of sampling for CO - 1 Hour, N.D. - Not Detected

Terms & conditions

- *The report for publication, advertisement or as legal dispute is forbidden.*
- *Test sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.*
- *This is for information as the party has asked for above test(s) only.*

01/04/2021
PREPARED BY

ULTIMATE ENVIROLYTICAL SOLUTIONS

For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
AUTHORIZED SIGNATORY

End of the test report

Ultimate
ENVIROLYTICAL SOLUTIONS

HDD-272, Phase III - Near JP Chowk
Ring Road No. 2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ulhmatenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer			
To, **DB Power Limited,** **2X600MW, Village - Badadhara,** **District: Janjgir-Champa** **(C.G.) 495695**	REPORT NO	UES/RR/20-21/06058	
	LAB REF NO	UES/20-21/AAQM/04149	
	DATE OF SAMPLING	01/03/2021 to 26/03/2021	
	DATE OF RECEIPT	02/03/2021 to 27/03/2021	
	DATE OF REPORT	01/04/2021	
	DATE OF ANALYSIS	START: 02/03/2021	END: 31/03/2021

SAMPLE DETAILS

MONITORING FOR	AMBIENT AIR QUALITY MONITORING	CUSTOMER REF. NO. & DATE	8200002084, DATED: 11.12.2020
SAMPLING LOCATION	TUNDRI VILLAGE		
DURATION OF SAMPLING	24 HOURS	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	AS PER METHOD REFERENCE		
SAMPLE QUANTITY/PACKING	FILTER PAPER (PM_{10}): 1X1 NO., FILTER PAPER ($PM_{2.5}$): 1X1 NO, SO_2: 50MLX1 NO. PVC BOTTLE, NO_2: 50MLX1 NO. PVC BOTTLE RUBBER BLADDER: 1X1 NO.		

Test Method and NAAQM Standard for Ambient Air Quality Monitoring

Parameter	Method Reference	NAAQM Standard
Particulate Matter size less than 10 microns (PM_{10})	IS 5182 (Part 23): 2006 & CPCB Guidelines Vol.-I	100
Particulate Matter size less than 2.5 microns ($PM_{2.5}$)	CPCBGuidelines Vol.-I	60
Sulphur Dioxide (SO_2)	IS 5182 (Part 2): 2001, RA 2006 & CPCB Guidolines Vol.-I	80
Nitrogen Dioxide (NO_2)	IS 5182 (Part 6): 2006 & CPCB Guidelines Vol.-I	80
Carbon Monoxide (CO)*	IS 5182(Part 10):1999, RA 2003	4.0
Mercury (Hg)	EPA Method IO-5	--

TEST REPORT

Date of Sampling	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO* mg/m³	Hg ng/m³
01.03.2021	78	28	22	26	0.6	N.D.
05.03.2021	64	32	16	20	0.8	N.D.
08.03.2021	82	28	18	24	1.2	N.D.
12.03.2021	68	32	12	22	1.0	N.D.
15.03.2021	76	30	10	28	0.8	N.D.
19.03.2021	60	36	16	20	1.0	N.D.
22.03.2021	78	28	10	26	1.2	N.D.
26.03.2021	72	22	12	22	1.0	N.D.

Remarks: * Duration of sampling for CO - 1 Hour, N.D. - Not Detected

Terms & conditions

- The report for jurisdiction, arbitration or as legal dispute is Kolkata.
- The sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.
- Test is for information as the party has asked for above test(s) only.

01/04/2021
PREPARED BY

For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
AUTHORIZED SIGNATORY

End of the test report

Ultimate
ENVIROLYTICAL SOLUTIONS

HDD-272, Phase III - Near JP Chowk,
Ring Road No.-2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ultimatenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer			
To, **DB Power Limited,** **2X600MW, Village - Badadhara,** **District: Janjgir-Champa** **(C.G.) 495695**	REPORT NO	UES/TR/20-21/05059	
	LAB REF NO	UES/20-21/AAQM/04150	
	DATE OF SAMPLING	01/03/2021 to 26/03/2021	
	DATE OF RECEIPT	02/03/2021 to 27/03/2021	
	DATE OF REPORT	01/04/2021	
	DATE OF ANALYSIS	START: 02/03/2021	END: 31/03/2021

SAMPLE DETAILS

MONITORING FOR	AMBIENT AIR QUALITY MONITORING	CUSTOMER REF. NO. & DATE	4200002084, DATED: 11.12.2020
SAMPLING LOCATION	KHAWALI VILLAGE		
DURATION OF SAMPLING	24 HOURS	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROTOCOL	AS PER METHOD REFERENCE		
SAMPLE QUANTITY/PACKING	FILTER PAPER ($PM_{2.5}$): 1X1 NO., FILTER PAPER (PM_{10}): 1X1 NO. SO_2: 30ML X1 NO. PVC BOTTLE, NO_2: 30ML X1 NO. PVC BOTTLE RUBBER BLADDER: 1X1 NO.		

Test Method and NAAQM Standard for Ambient Air Quality Monitoring

Parameter	Method Reference	NAAQM Standard
Particulate Matter size less than 10 microns (PM_{10})	IS 5182 (Part 23): 2006 & CPCB Guidelines Vol.-I	100
Particulate Matter size less than 2.5 microns ($PM_{2.5}$)	CPCBGuidelines Vol.-I	60
Sulphur Dioxide (SO_2)	IS 5182 (Part 2): 2001, RA 2006 & CPCB Guidelines Vol.-I	80
Nitrogen Dioxide (NO_2)	IS 5182 (Part 6): 2006 & CPCB Guidelines Vol.-I	80
Carbon Monoxide (CO)*	IS 5182(Part 10):1999, RA 2009	4.0
Mercury (Hg)	EPA Method IO-5	--

TEST REPORT

Date of Sampling	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO* mg/m³	Hg ng/m³
01.03.2021	86	44	12	20	1.2	N.D.
05.03.2021	80	30	18	26	C.8	N.D.
08.03.2021	78	36	16	20	1.2	N.D.
12.03.2021	84	32	12	26	1.0	N.D.
15.03.2021	80	38	16	26	C.8	N.D.
19.03.2021	86	46	12	24	1.2	N.D.
22.03.2021	80	42	10	22	0.6	N.D.
26.03.2021	78	40	18	28	1.2	N.D.

Remarks: * Duration of sampling for CO - 1 Hour, N.D. - Not Detected

Terms & conditions

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- This is for information as the party has asked for above testing.

01/04/2021
PREPARED BY

For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
AUTHORIZED SIGNATORY

End of the test report

Ultimate
ENVIROLYTICAL SOLUTIONS

HDD-272, Phase III - Near JP Chowk
Ring Road No.-2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ultimateenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer

To,
DB Power Limited,
2X600MW, Village - Badadhara,
District: Janjgir-Champa
(C.G.) 495695

REPORT NO	UES/TR/20-21/005060
LAS REF NO	UES/20-21/AAQM/04151
DATE OF SAMPLING	01/03/2021 to 15/03/2021
DATE OF RECEIPT	02/03/2021 to 16/03/2021
DATE OF REPORT	01/04/2021
DATE OF ANALYSIS	START: 02/03/2021 END: 31/03/2021

SAMPLE DETAILS

MONITORING FOR	AMBIENT AIR QUALITY MONITORING	CUSTOMER REF. NO. & DATE	8200002084, DATED: 21.12.2020
SAMPLING LOCATION	AAQM STATION NO.1		
DURATION OF SAMPLING	24 HOURS	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	AS PER METHOD REFERENCE		
SAMPLE QUANTITY/PACKING	FILTER PAPER (PM_{10}): 1X1 NO., FILTER PAPER ($PM_{2.5}$): 1X1 NO. SO_2: 30MLX1 NO. PVC BOTTLE, NO_2: 30MLX1 NO. PVC BOTTLE RUBBER BLADDER: 1X1 NO.		

TEST REPORT

PARAMETER	UNIT	METHOD REFERENCE	NAAQM STANDARD	RESULT	
				01.03.2021	15.03.2021
Particulate Matter size less than 10 microns (PM_{10})	$\mu g/m^3$	IS 5182 (Part 23) : 2006 & CPCB Guidelines Vol.-I	100	60.0	58.0
Particulate Matter size less than 2.5 microns ($PM_{2.5}$)	$\mu g/m^3$	CPCB Guidelines Vol.-I.	60	32.0	28.0
Sulphur Dioxide (SO_2)	$\mu g/m^3$	IS 5182 (Part 2) : 2001, RA 2006 &CPCB Guidelines Vol.-I	80	10.0	12.4
Nitrogen Dioxide (NO_2)	$\mu g/m^3$	IS 5182 (Part 6) : 2006 & CPCB Guidelines Vol.-I	80	22.0	26.0
Carbon Monoxide (CO) *	mg/m^3	IS 5182(Part 10):1999, RA 2003	4.0	0.8	0.6
Lead (Pb)	$\mu g/m^3$	CPCB Guidelines Vol-I and AAS Method	1.0	0.08	0.06
Nickel (Ni)	ng/m^3	CPCB Guidelines Vol-I and AAS Method	20	N.D.	N.D.
Arsenic (As)	ng/m^3	CPCB Guidelines Vol-I and AAS Method	6.0	N.D.	N.D.
Ozone (O_3) *	$\mu g/m^3$	CPCB Guidelines Vol-I	180	10.2	10.8
Ammonia (NH_3)	$\mu g/m^3$	CPCB Guidelines Vol-I	400	6.8	8.2
Benzene (C_6H_6)	$\mu g/m^3$	IS 5182 (Part 11):2006	5.0	N.D.	N.D.
Benzo(a) Pyrene	ng/m^3	IS 5182 (Part 12):2014	1.0	N.D.	N.D.

Terms & conditions

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- *Test sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.*
- *This is for information as the party has asked for above test only.*

01/04/2021

PREPARED BY

For ULTIMATE ENVIROLYTICAL SOLUTIONS

01/04/2021

AUTHORIZED SIGNATORY

End of the test report

Ultimate
ENVIROLYTICAL SOLUTIONS

HDD 272, Phase II - Near JP Chowk
Ring Road No -2, Kabir Nagar Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ultimatenvire@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer

To,
DB Power Limited,
2X600MW, Village - Badadhara,
District: Janjgir-Champa
(C.G.) 495695

REPORT NO	UES/TR/20-21/05061	
LAB REF NO	UES/20-21/AAQM/04152	
DATE OF SAMPLING	01/03/2021 to 15/03/2021	
DATE OF RECEIPT	02/03/2021 to 16/03/2021	
DATE OF REPORT	01/04/2021	
DATE OF ANALYSIS	START:02/03/2021	END:31/03/2021

SAMPLE DETAILS

MONITORING FOR	AMBIENT AIR QUALITY MONITORING	CUSTOMER REF. NO. & DATE	5200002094, DATED:11.12.2020
SAMPLING LOCATION	URJA AAQM STATION NO.- II		
DURATION OF SAMPLING	24 HOURS	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	AS PER METHOD REFERENCE		
SAMPLE QUANTITY/PACKING	FILTER PAPER (PM_{10}): 1X1 NO., FILTER PAPER ($PM_{2.5}$): 1X1 NO. SO_2: 30MLX1 NO. PVC BOTTLE, NO_2: 30MLX1 NO. PVC BOTTLE RUBBER BLADDER: 1X1 NO.		

TEST REPORT

PARAMETER	UNIT	METHOD REFERENCE	NAAQM STANDARD	RESULT	
				01.03.2021	15.03.2021
Particulate Matter size less than 10 microns (PM_{10})	µg/m³	IS 5182 (Part 23): 2006 & CPCB Guidelines Vol.-I	100	52.0	56.8
Particulate Matter size less than 2.5 microns ($PM_{2.5}$)	µg/m³	CPCB Guidelines Vol.-I.	60	28.0	26.0
Sulphur Dioxide (SO_2)	µg/m³	IS 5182 (Part 2): 2001, RA 2006 &CPCB Guidelines Vol.-I	80	12.0	16.0
Nitrogen Dioxide (NO_2)	µg/m³	IS 5182 (Part 6): 2006 & CPCB Guidelines Vol.-I	80	26.0	22.0
Carbon Monoxide (CO) *	mg/m³	IS 5182(Part 10):1999, RA 2063	4.0	1.0	0.84
Lead (Pb)	µg/m³	CPCB Guidelines Vol-I and AAS Method	1.0	0.05	0.04
Nickel (Ni)	ng/m³	CPCB Guidelines Vol-I and AAS Method	20	N.D.	N.D.
Arsenic (As)	ng/m³	CPCB Guidelines Vol-I and AAS Method	6.0	N.D.	N.D.
Ozone (O_3) *	µg/m³	CPCB Guidelines Vol-I	180	8.8	6.2
Ammonia (NH_3)	µg/m³	CPCB Guidelines Vol-I	400	10.2	16.2
Benzene (C_6H_6)	µg/m³	IS 5182 (Part 11):2016	5.0	N.D.	N.D.
Benzo (a) Pyrene	ng/m³	IS 5182 (Part 12):2004	1.0	N.D.	N.D.

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- *This is for information to the party has asked for above analysis only.*

01/04/2021
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For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
AUTHORIZED SIGNATORY

End of the test report

Ultimate
ENVIROLYTICAL SOLUTIONS

HDD-272, Phase II - Near JP Chowk
Ring Road No.-2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ultimatenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer

To,
DB Power Limited,
2X600MW, Village - Badadhara,
District: Janjgir-Champa
(C.G.) 495695

REPORT NO	UES/TR/20-21/05062	
LAB REF NO	UES/20-21/AAQM/04153	
DATE OF SAMPLING	01/03/2021 to 15/03/2021	
DATE OF RECEIPT	02/03/2021 to 16/03/2021	
DATE OF REPORT	01/04/2021	
DATE OF ANALYSIS	START: 02/03/2021	END: 31/03/2021

SAMPLE DETAILS

MONITORING FOR	AMBIENT AIR QUALITY MONITORING	CUSTOMER REF. NO. & DATE	6200002084, DATED: 11.12.2020
SAMPLING LOCATION	RAW WATER AREA AAQM STATION NO.- III		
DURATION OF SAMPLING	24 HOURS	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	AS PER METHOD REFERENCE		
SAMPLE QUANTITY/PACKING	FILTER PAPER (PM_{10}): 1X1 NO., FILTER PAPER ($PM_{2.5}$): 1X1 NO. SO_2: 30MLX1 NO. PVC BOTTLE, NO_2: 30MLX1 NO. PVC BOTTLE RUBBER BLADDER: 1X1 NO.		

TEST REPORT

PARAMETER	UNIT	METHOD REFERENCE	NAAQM STANDARD	RESULT	
				01.03.2021	15.03.2021
Particulate Matter size less than 10 microns (PM_{10})	$\mu g/m^3$	IS 5182 (Part 23): 2006 & CPCB Guidelines Vol.-I	100	58.0	54.0
Particulate Matter size less than 2.5 microns ($PM_{2.5}$)	$\mu g/m^3$	CPCB Guidelines Vol.-I.	60	26.0	22.0
Sulphur Dioxide (SO_2)	$\mu g/m^3$	IS 5182 (Part 2): 2001, RA 2006 &CPCB Guidelines Vol.-I	80	8.0	10.0
Nitrogen Dioxide (NO_2)	$\mu g/m^3$	IS 5182 (Part 6): 2006 & CPCB Guidelines Vol.-I	80	24.0	20.0
Carbon Monoxide (CO) *	mg/m^3	IS 5182(Part 10):1999, RA 2003	4.0	1.0	0.84
Lead (Pb)	$\mu g/m^3$	CPCB Guidelines Vol-I and AAS Method	1.0	N.D.	N.D.
Nickel (Ni)	ng/m^3	CPCB Guidelines Vol-I and AAS Method	20	N.D.	N.D.
Arsenic (As)	ng/m^3	CPCB Guidelines Vol-I and AAS Method	6.0	N.D.	N.D.
Ozone (O_3) *	$\mu g/m^3$	CPCB Guidelines Vol-I	180	12.6	14.2
Ammonia (NH_3)	$\mu g/m^3$	CPCB Guidelines Vol-I	400	10.8	18.2
Benzene (C_6H_6)	$\mu g/m^3$	IS 5182 (Part 11):2006	5.0	N.D.	N.D.
Benzo(a)Pyrene	ng/m^3	IS 5182 (Part 12):2014	1.0	N.D.	N.D.

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----------End of the test report----------

Ultimate
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Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer			
To, **DB Power Limited,** **2X600MW, Village - Badadhara,** **District: Janjgir-Champa** **(C.G.) 495695**	REPORT NO	UES/TR/20-21/05063	
	LAB REF NO	UES/20-21/AAQM/04154	
	DATE OF SAMPLING	01/03/2021 to 15/03/2021	
	DATE OF RECEIPT	02/03/2021 to 16/03/2021	
	DATE OF REPORT	01/04/2021	
	DATE OF ANALYSIS	START: 02/03/2021	END: 31/03/2021

SAMPLE DETAILS

MONITORING FOR	AMBIENT AIR QUALITY MONITORING	CUSTOMER REF. NO. & DATE	5200002064, DATED: 11.12.2020
SAMPLING LOCATION	AAQM STATION NO. IV		
DURATION OF SAMPLING	24 HOURS	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	AS PER METHOD REFERENCE		
SAMPLE QUANTITY/PACKING	FILTER PAPER (PM_{10}): 1X1 NO., FILTER PAPER ($PM_{2.5}$): 1X1 NO. SO_2: 30MLX1 NO. PVC BOTTLE, NO_2: 30MLX1 NO. PVC BOTTLE RUBBER BLADDER: 1X1 NO.		

TEST REPORT

PARAMETER	UNIT	METHOD REFERENCE	NAAQM STANDARD	RESULT	
				01.03.2021	15.03.2021
Particulate Matter size less than 10 microns (PM_{10})	$\mu g/m^3$	IS 5182 (Part 23): 2006 & CPCB Guidelines Vol.-I	100	78.0	72.0
Particulate Matter size less than 2.5 microns ($PM_{2.5}$)	$\mu g/m^3$	CPCB Guidelines Vol.-I.	60	36.0	32.0
Sulphur Dioxide (SO_2)	$\mu g/m^3$	IS 5182 (Part 2): 2001, RA 2006 &CPCB Guidelines Vol.-I	80	10.6	12.8
Nitrogen Dioxide (NO_2)	$\mu g/m^3$	IS 5182 (Part 6): 2006 & CPCB Guidelines Vol.-I	80	22.0	26.0
Carbon Monoxide (CO) *	mg/m^3	IS 5182(Part 10):1999, RA 2003	4.0	0.86	0.82
Lead (Pb)	$\mu g/m^3$	CPCB Guidelines Vol-I and AAS Method	1.0	N.D.	N.D.
Nickel (Ni)	ng/m^3	CPCB Guidelines Vol-I and AAS Method	20	N.D.	N.D.
Arsenic (As)	ng/m^3	CPCB Guidelines Vol-I and AAS Method	6.0	N.D.	N.D.
Ozone (O_3) *	$\mu g/m^3$	CPCB Guidelines Vol-I	180	18.4	22.0
Ammonia (NH_3)	$\mu g/m^3$	CPCB Guidelines Vol-I	400	10.6	12.0
Benzene (C_6H_6)	$\mu g/m^3$	IS 5182 (Part 11):2006	5.0	N.D.	N.D.
Benzo(a)Pyrene	ng/m^3	IS 5182 (Part 12):2014	1.0	N.D.	N.D.

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For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
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End of the test report

Ultimate
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Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer

To,
DB Power Limited,
2X600MW, Village - Badadhara,
District – Janjgir - Champa
(C.G.) 495695

REPORT NO	UES/TR/20-21/05064	
LAB REF NO	UES/20-21/ST/04155	
DATE OF SAMPLING	26/03/2021	
SAMPLING TIME	12:45 pm	
DATE OF RECEIPT	27/03/2021	
DATE OF REPORT	01/04/2021	
DATE OF ANALYSIS	START:27/03/2021	END:31/03/2021

SAMPLE DETAILS

MONITORING FOR	STACK EMISSION MONITORING
CUSTOMER REF. NO. & DATE	WO NO.: 6200002084.DATED: 11.12.2020
SAMPLING LOCATION	UNIT - I
OPERATING LOAD	582 MW
FUEL CONSUMPTION	470 TPH
SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	IS 11255 PART 1,2:1985 REAFFIRMED 2009; PART 3:2008, PART 7:2005 REAFFIRMED 2012, IS 5182 (PART 10) :2003
SAMPLE QUANTITY/PACKING	THIMBLE: 1 X 1 NO., SO2: 30 ML X 1 NO. PVC BOTTLE, NOX: 25 ML X 1 NO. PVC BOTTLE, RUBBER BLADDER: 1 X 1 NO., HG: 500ML X 1 NO. GLASS BOTTLE & 500ML X 3 NO.PVC BOTTLE.

TEST REPORT

Stack details

STACK IDENTITY	UNIT -I
STACK ATTACHED TO	BOP BOILER
MATERIAL OF CONSTRUCTION	MS / RCC
STACK HEIGHT ABOVE GROUND LEVEL (MTR.)	275
STACK DIAMETER/MTR.)	7.3
STACK SHAPE AT TOP	CIRCULAR
TYPE OF FUEL	COAL

Parameter	Unit	Result	Limit	Method Reference
FLUE GAS TEMPERATURE	°C	127	-	IS 11255 (Part 3):2008
FLUE GAS VELOCITY	M/s	28.6	-	IS 11255 (Part 3):2008
TOTAL GAS QUANTITY	Nm^3/h	3208777.9	-	IS 11255 (Part 3):2008
TOTAL PARTICULATE MATTER (TPM)	mg/Nm^3	44.2	50	IS 11255 (Part 1):1985, RA 2003
SULPHUR DIOXIDE (SO2)	mg/Nm^3	1342	200	IS 11255 (Part 2):1985, RA 2003
OXIDES OF NITROGEN (NOX)	mg/Nm^3	468	300	IS 11255 (Part 7):2005, RA 2012
CARBON MONOXIDE (CO)	mg/Nm^3	12.8	-	IS 13270 RA 2019
MERCURY (HG)	mg/Nm^3	0.006	0.03	USEPA Method No. 29

REMARKS: Results Are As Above

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01/04/2021
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End of the test report

Ultimate
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Name & Address Of The Customer

To,
DB Power Limited,
2X600MW, Village - Badadhara,
District – Janjgir - Champa
(C.G.) 495695

REPORT NO	UES/TR/20-21/05065	
LAB REF NO	UES/20-21/ST/04156	
DATE OF SAMPLING	26/03/2021	
SAMPLING TIME	12:24 pm	
DATE OF RECEIPT	27/03/2021	
DATE OF REPORT	01/04/2021	
DATE OF ANALYSIS	START:27/03/2021	END:31/03/2021

SAMPLE DETAILS

MONITORING FOR	STACK EMISSION MONITORING
CUSTOMER REF. NO. & DATE	WO NO.: 8200002084, DATED: 11.12.2020
SAMPLING LOCATION	UNIT - II
OPERATING LOAD	500 MW
FUEL CONSUMPTION	489 TPH
SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	IS 11255 PART 1,2:1985 REAFFIRMED 2009; PART 3:2008, PART 7:2005 REAFFIRMED 2012, IS 5182 (PART 10) :2003
SAMPLE QUANTITY/PACKING	THIMBLE: 1 X 1 NO., SO2: 50 ML X 1 NO. PVC BOTTLE, NOX: 25 ML X 1 NO. PVC BOTTLE, RUBBER BLADDER: 1 X 1 NO., HG: 500ML X 1 NO. GLASS BOTTLE & 500ML X 3 NO.PVC BOTTLE.

TEST REPORT

Stack details

STACK IDENTITY	UNIT -II
STACK ATTACHED TO	HRT BOILER
MATERIAL OF CONSTRUCTION	MS / RCC
STACK HEIGHT ABOVE GROUND LEVEL (MTR.)	275
STACK DIAMETER (MTR.)	7.3
STACK SHAPE AT TOP	CIRCULAR
TYPE OF FUEL	COAL

Parameter	Unit	Result	Limit	Method Reference
FLUE GAS TEMPERATURE	°C	124	-	IS 11255 (Part 3):2008
FLUE GAS VELOCITY	M/s	25.8	-	IS 11255 (Part 3):2008
TOTAL GAS QUANTITY	Nm^3/h	3029548.8	-	IS 11255 (Part 3):2008
TOTAL PARTICULATE MATTER (TPM)	mg/Nm^3	45.8	50	IS 11255 (Part 1):1985, RA 2003
SULPHUR DIOXIDE (SO2)	mg/Nm^3	1424	200	IS 11255 (Part 2):1985, RA 2003
OXIDES OF NITROGEN (NOX)	mg/Nm^3	482	300	IS 11255 (Part 7):2005, RA 2012
CARBON MONOXIDE (CO)	mg/Nm^3	12.6	-	IS 13270 RA 2019
MERCURY (HG)	mg/Nm^3	0.008	0.03	USEPA Method No. 29

REMARKS: N.D.-NOT DETECTED

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01/04/2021
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For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
AUTHORIZED SIGNATORY

End of the test report.....

Ultimate
ENVIROLYTICAL SOLUTIONS

HDD-272, Phase II - Near JP Chowk,
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Ph. : 0771 - 4027777 | Email : ultimateviro@gmail.com

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Name & Address Of The Customer			
To, **DB Power Limited,** **2X600MW, Village - Badadhara,** **District – Janjgir – Champa** **(C.G.) 495695**		REPORT NO.	UES/TR/20-21/05067
		LAB REF NO.	UES/20-21/N/04158
		DATE OF REPORT	01/04/2021
		DATE OF SAMPLING	15/03/2021 to 16/03/2021

SAMPLE DETAILS			
MONITORING FOR	NOISE LEVEL MONITORING	CUSTOMER REF. NO. & DATE	WO NO. : 9200052084, DATED: 11/12/2020
SAMPLING LOCATION	INSIDE PLANT & OUTSIDE PLANT (AS DESCRIBED BELOW)		
SAMPLE RECEIVED ON	MONITORING AT	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	MANUFACTURER'S INSTRUCTION		
SAMPLE QUANTITY/PACKING	NOT APPLICABLE		

TEST REPORT

LOCATION	UNIT	RESULT 15.03.2021	MAXIMUM EXPOSURE DURATION PER DAY 8 HRS. LIMIT
TG - I	dB(A)	82.2	85dB (Max)
TG - II	dB(A)	78.6	
BFP-I	dB(A)	70.2	
BFP – II	dB(A)	83.8	
Compressor House	dB(A)	82.4	
TAC Building	dB(A)	70.4	
DM Plant	dB(A)	82.0	
MUH – CHP	dB(A)	72.8	
Crusher – CHP	dB(A)	74.2	
Near Silo	dB(A)	70.5	

LOCATION	UNIT	RESULT		LIMIT (INDUSTRIAL ZONE)	
		DAY TIME 15.03.2021	NIGHT TIME 16.03.2021		
Inside Plant					
AAQM Station No.-I	dB(A)	48.4	45.2	75	70
Urja AAQMS - II	dB(A)	52.2	42.6		
Raw Water AAQMS- III	dB(A)	50.8	40.8		
Near Coal Yard (AAQMS-IV)	dB(A)	62.6	56.2		
Outside Plant					
Tundri Village	dB(A)	50.5	42.8	55	45
Kanwali Village	dB(A)	48.6	40.0		
Badadhara Village	dB(A)	42.0	44.6		
Baispali Village	dB(A)	52.8	46.2		

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01/04/2021
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01/04/2021
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End of the test report

Ultimate
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HDD-272, Phase II - Near JP Chowk
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Ph : 0771 - 4027777 | Email : ultimatenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

To,
DB Power Limited,
2X600MW, Village - Badadhara,
District: Janjgir-Champa
(C.G.) 495695

REPORT NO	UES/TR/20-21/05068
LAB REF NO	UES/20-21/W/04159
DATE OF SAMPLING	15/03/2021
DATE OF RECEIPT	16/03/2021
DATE OF REPORT	01/04/2021
DATE OF ANALYSIS	START:17/03/2021 END:31/03/2021

SAMPLE DETAILS

ORDER /REFERENCE:	WO NO.: 4200062064, DATED: 11/12/2021
SAMPLE TYPE	SEWAGE WATER
CUSTMER SAMPLE ID	1. STP-7 2. STP-8 3. STP-9 4. STP-12 5. STP-13
PACKING OF SAMPLE	5 L X 1 NO. PVC CAN, 2 L X 1 NO. GLASS BOTTLE
SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	IS:3025(PART 1):1987 RA 2003; APHA 22ND ED. 2012, 1060-B, 1-39

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result				
					STP-7	STP-8	STP-9	STP-12	STP-13
1.	pH	-	IS:3025:(Part-11): 1983, RA 2012	5.5 to 9.0	7.38	7.16	7.42	7.22	7.36
2.	Total Suspended Solids	mg/Lt	IS 3025:(Part-17): 1984, RA 2012	100	32.4	30.8	28.6	46.4	42.8
3.	Chemical Oxygen Demand (COD)	mg/Lt	IS:3025:(Part-58): 2006, RA 2012	250	84.0	94.0	88.0	64.0	86.0
4.	Biochemical Oxygen Demand (BOD)	mg/Lt	IS:3025:(Part-44): 1993RA 2014	30	14.2	12.0	10.8	12.6	10.4
5.	Oil & Grease	mg/Lt	IS 3025 (Part 39):1986	10.0	N.D.	N.D.	N.D.	N.D.	N.D.

Note: mg/lit.: milligram per liter.

REMARKS: N.D.- NOT DETECTED

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01/04/2021
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End of the test report

Ultimate
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HDD 272, Phase III - Near JP Chowk
Ring Road No -2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ultimateenviro@gmail.com

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To,	REPORT NO	UES/ER/20-21/05069
DB Power Limited,	LAB REF NO	UES/20-21/PZ/04160
2X600MW, Village - Badadhara,	DATE OF SAMPLING	25/03/2021
District – Janjgir - Champa	DATE OF RECEIPT	25/03/2021
(C.G.) 495695	DATE OF REPORT	01/04/2021

SAMPLE DETAILS

MONITORING FOR	PIEZOMETERIC LOCATION	CUSTOMER REF. NO. & DATE	WO NO. : 8200022084, DATED: 11/12/2020
SAMPLING LOCATION	1. NEAR SECURITY GATE 2. NEAR BRICK PLANT 3. NEAR ASH POND 4. NEAR HYDROGEN PLANT	SAMPLE COLLECTED BY	LABORATORY CHEMIST

TEST REPORT

Location	Latitude	Longitude	Unit	Result (Depth)
NEAR SECURITY GATE	21.912287	83.192842	Mtr.	1.86
NEAR BRICK PLANT	21.903071	83.194954	Mtr.	7.62
NEAR ASH POND	21.906693	83.198403	Mtr.	12.2
NEAR HYDROGEN PLANT	21.904379	83.186252	Mtr.	8.42

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End of the test report.....

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Name & Address Of The Customer			
To, **DB Power Limited,** **2X600MW, Village - Badadhara,** **District: Janjgir-Champa** **(C.G.) 495695**	REPORT NO	UES/TR/20-21/W/05070	
	LAB REF NO	UES/20-21/W/04161	
	DATE OF SAMPLING	15/03/2021	
	DATE OF RECEIPT	16/03/2021	
	DATE OF REPORT	01/04/2021	
	DATE OF ANALYSIS	START:16/03/2021	END:31/03/2021

SAMPLE DETAILS

SAMPLE TYPE	PIEZOMETERWATER		OTHER /REFERENCE:	WO NO.: 6200002084,DATED: 11/12/2020	
CUSTMER SAMPLE ID	1.NEAR SECURITY GATE 2.NEAR ASH POND 3.NEAR BRICK PLANT 4.NEAR HYDROGEN PLANT		SAMPLE CONDITION AT RECEIPT	OK	
PACKING OF SAMPLE	2 L X 1 NO. PVC CAN 1 L X 1 NO. PVC CAN 1 L X 1 NO. GLASS BOTTLE	SEALED	SAMPLE COLLECTED BY	LABORATORY CHEMIST	
SAMPLING PROCEDURE	IS:3025(PART 1):1987 RA 2003; APHA 22ND ED. 2012, 1060-B, 1-39		QUANTITY RECEIVED	3 DIN EACH	

REPORT NO. - 05070

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result			
					NEAR SECURITY GATE	NEAR ASH POND	NEAR BRICK PLANT	NEAR HYDROGEN PLANT
1	Colour	Hazen	IS:3025 (Part-4)	5 (max)	<1	<1	<1	<1
2	Turbidity	NTU	IS 3025:(Part-10)	1.0 (max)	0.62	1.25	5.62	0.94
3	pH	-	IS:3025:(Part-11)	6.5 To 8.5	7.46	7.28	7.62	7.20
4	Residual Chlorine	mg/Lit	IS 3025(part-26)	0.2 (max)	N.D.	N.D.	N.D.	N.D.
5	Total Dissolved Solids	mg/Lit	IS 3025:(Part-16)	500 (max)	156	296	228	124
6	Alkalinity Total (as $CaCO_3$)	mg/Lit	IS 3025:(Part-23)	200 (max)	60.0	72.0	68.0	54.0
7	Total Hardness (as $CaCO_3$)	mg/Lit	IS 3025:(Part-21)	200 (max)	120.0	202.0	164.0	152.0
8	Calcium (as Ca)	mg/Lit	IS 3025:(Part-40)	75 (max)	26.4	42.8	44.2	38.4
9	Magnesium (as Mg)	mg/Lit	IS 3025:(Part-46)	30 (max)	6.4	10.4	10.7	9.3
10	Chloride (as Cl)	mg/Lit	IS 3025:(Part-32)	250 (max)	21.9	34.9	30.9	22.9
11	Sulphate (as SO_4)	mg/Lit	IS 3025:(Part-24)	200 (max)	28.4	46.2	32.8	36.9
12	Nitrate (NO_3)	mg/Lit	IS 3025(part-34)	45 (max)	1.2	1.0	1.8	3.2
13	Boron (as B)	mg/Lit	IS 3025(part-57)	0.5 (max)	N.D.	N.D.	N.D.	N.D.
14	Iron (as Fe)	mg/Lit	IS 3025(part-53)	0.3 (max)	N.D.	N.D.	N.D.	N.D.
15	Fluoride (as F)	mg/Lit	IS 3025(part 60)	1.0 (max)	0.11	0.16	0.10	0.12
16	Manganese (as Mn)	mg/Lit	IS 3025(part-59)	0.1 (max)	N.D.	N.D.	N.D.	N.D.
17	Lead (as Pb)	mg/Lit	IS 3025(part-47)	0.01 (max)	N.D.	N.D.	N.D.	N.D.
18	Zinc (as Zn)	mg/Lit	IS 3025(part-49)	5.0 (max)	0.18	0.10	0.16	0.06
19	Copper (as Cu)	mg/Lit	IS 3025(part 42)	0.05 (max)	N.D.	N.D.	N.D.	N.D.
20	Aluminium (as Al)	mg/Lit	IS 3025(part-55)	0.03 (max)	N.D.	N.D.	N.D.	N.D.
21	Mercury (as Hg)	mg/Lit	IS 3025(part-48)	0.001 (max)	N.D.	N.D.	N.D.	N.D.
22	Arsenic (as As)	mg/Lit	IS 3025(part-37)	0.01 (max)	N.D.	N.D.	N.D.	N.D.
23	Selenium (as Se)	mg/Lit	IS 3025(part-56)	0.1 (max)	N.D.	N.D.	N.D.	N.D.
24	Chromium (as Cr)	mg/Lit	Annex J of IS:13428	0.001 (max)	N.D.	N.D.	N.D.	N.D.
25	Sulphide (as S)	mg/Lit	APHA 23rd Ed.2012,4500^{-2}-C,4-175 & F 4-176	0.01 (max)	N.D.	N.D.	N.D.	N.D.

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HDD 272, Phase III - Near JP Chowk
Ring Road No.-2, Kabir Nagar, Raipur (C.G.) - 492099
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Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Reference No. - 05979

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result			
					NEAR SECURITY GATE	NEAR ASH POND	NEAR BRICK PLANT	NEAR HYDROGEN PLANT
26	Cyanide (as CN)	mg/Lit	IS 3025(part-27)	0.05 (max)	N.D.	N.D.	N.D.	N.D.
27	Anionic Detergent (as MBAS)	mg/Lit	Annex K of IS:13428	0.02 (max)	N.D.	N.D.	N.D.	N.D.
28	Phenolic Compound (as C_6H_5OH)	mg/Lit	IS 3025(part-43)	0.001 (max)	N.D.	N.D.	N.D.	N.D.
29	Poly-nuclear Aromatic Hydrocarbon (PAH)	µg/Lit	APHA 22nd Ed.2012,6440-6-93	0.0001 (max)	N.D.	N.D.	N.D.	N.D.
30	Mineral Oil	mg/Lit	IS 3025 (part-39):1991,RA 2003, Ed. 2.1	0.05 (max)	N.D.	N.D.	N.D.	N.D.
MICROBIOLOGICAL ANALYSIS								
1	Total Coliforms	MPN/ 100 ML	IS:1622:1981:RA:2019	Shall not be detectable in any 100 ml sample	Absent	Absent	Absent	Absent
2	E - Coli	MPN/ 100 ML	IS:1622:1981:RA:2019	Shall not be detectable in any 100 ml sample	Absent	Absent	Absent	Absent
PESTICIDES ANALYSIS								
1	p,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
2	o,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
3	p,pDDE	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
4	p,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
5	O,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
6	Gamma-HCH (Lindane)	µg/L	US EPA 508-1995	2	N.D.	N.D.	N.D.	N.D.
7	Alpha-HCH	µg/L	US EPA 508-1995	0.01	N.D.	N.D.	N.D.	N.D.
8	Beta-HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.	N.D.	N.D.
9	Delta HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.	N.D.	N.D.
10	Alpha-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.	N.D.
11	Beta-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.	N.D.
12	Endosulfansulphate	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.	N.D.
13	Monocrotophos	µg/L	US EPA 8141A-1994	1	N.D.	N.D.	N.D.	N.D.
14	Ethion	µg/L	US EPA 8141A-1994	3	N.D	N.D.	N.D.	N.D.
15	Chlorpyrifos	µg/L	US EPA 8141A-1994	30	N.D	N.D	N.D.	N.D.
16	Phorate	µg/L	US EPA 8141A-1994	2	N.D.	N.D.	N.D.	N.D.
17	Phoratesulphoxide	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
18	Phoratesulphone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
19	2,4-D	µg/L	US EPA 515.1 1995	30	N.D.	N.D.	N.D.	N.D.
20	Alachlor	µg/L	US EPA 508- 1995	20	N.D.	N.D.	N.D.	N.D.
21	Atrazine	µg/L	US EPA 532-2000	2	N.D.	N.D.	N.D.	N.D.
22	Methyl parathion	µg/L	US EPA 8141A-1994	0.3	N.D.	N.D.	N.D.	N.D.
23	Methyl paraoxon	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.

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REPORT NO. :- 05070

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result			
					NEAR SECURITY GATE	NEAR ASH POND	NEAR BRICK PLANT	NEAR HYDROGEN PLANT
24	Malathion	µg/l	US EPA 8141A-1994	190	N.D.	N.D.	N.D.	N.D.
25	Malaoxon	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
26	Aldrin	µg/L	US EPA 508- 1995	0.03	N.D.	N.D.	N.D.	N.D.
27	Dieldrin	µg/L	US EPA 508-1995	0.03	N.D.	N.D.	N.D.	N.D.

Note: mg/lit.: milligram per liter.

REMARKS:N.D.- NOT DETECTED

Terms & conditions

- *The report for publication, arbitration or as legal dispute is forbidden.*
- *Test sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.*
- *This is for information as the party has asked for above test(s) only.*

01/04/2021
PREPARED BY

ULTIMATE ENVIROLYTICAL SOLUTIONS

For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
AUTHORIZED SIGNATORY

End of the test report

Ultimate
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To,	REPORT NO.	UES/TR/20-21/05071
DB Power Limited,	LAB REF NO.	UES/20-21/W/04162
2X600MW, Village - Badadhara,	DATE OF SAMPLING	15/03/2021
District: Janjgir-Champa	DATE OF RECEIPT	16/03/2021
(C.G.) 495695	DATE OF REPORT	01/04/2021
	DATE OF ANALYSIS	START:16/03/2021 END:31/03/2021

SAMPLE DETAILS

ORDER /REFERENCE:	WO NO. : 8200002084, DATED: 11/12/2020
CUSTOMER SAMPLE ID / SAMPLING LOCATION	1. POND WATER TUNDRI VILLAGE 2. POND WATER KANHALI VILLAGE 3. POND WATER (RAW WATER AREA) 4. POND WATER BADADARA VILLAGE
SAMPLE TYPE	SURFACE WATER
SAMPLE COLLECTED BY	LABORATORY CHEMIST
PACKING OF SAMPLE	1 L X 1 NO. PVC CAN, 1 L X 1 NO. GLASS BOTTLE
SAMPLING PROCEDURE	IS:3025(PART 1):1987 RA 2003; APHA 22ND ED.2012, 1060-B, 1-39

REPORT NO. - 05071

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result			
					Pond Water Tundri Village	Pond Wactrik mwali Village	Pond Water (Raw Water Area)	Pond Water Badadara Village
1	Colour	Hazen	IS:3025:(Part-4)	5 (max)	18	25	10	15
2	Turbidity	NTU	IS 3025:(Part-10)	1.0 (max)	16.4	35.0	24.2	26.4
3	pH	-	IS:3025:(Part-11)	6.5 To 8.5	7.10	7.25	7.12	7.42
4	Residual Chlorine	mg/Lit	IS 3025(part-26)	0.2 (max)	N.D.	N.D.	N.D.	N.D.
5	Total Dissolved Solids	mg/Lit	IS 3025:(Part-16)	500 (max)	146	428	142	186
6	Alkalinity Total (as $CaCO_3$)	mg/Lit	IS 3025:(Part-23)	200 (max)	60	98	62	72
7	Total Hardness (as $CaCO_3$)	mg/Lit	IS 3025:(Part-21)	200 (max)	164	212	188	174
8	Calcium (as Ca)	mg/l lit	IS 3025:(Part-40)	75 (max)	34.6	58.8	36.4	46.2
9	Magnesium (as Mg)	mg/Lit	IS 3025:(Part-46)	30 (max)	8.4	14.2	8.8	11.2
10	Chloride (as Cl)	mg/Lit	IS 3025 (Part-32)	250 (max)	25.9	42.9	20.9	16.9
11	Sulphate (as SO_4)	mg/Lit	IS 3025 (Part-24)	200 (max)	22.6	28.4	32.2	38.4
12	Nitrate (NO_3)	mg/Lit	IS 3025(part-34)	45 (max)	1.8	2.6	2.0	6.8
13	Boron (as B)	mg/Lit	IS 3025(part-57)	0.5 (max)	N.D.	N.D.	N.D.	N.D.
14	Iron (as Fe)	mg/Lit	IS 3025(part-53)	0.3 (max)	N.D.	N.D.	N.D.	N.D.
15	Fluoride (as F)	mg/Lit	IS 3025(part-60)	1.0 (max)	0.09	0.11	0.16	0.12
16	Manganese (as Mn)	mg/Lit	IS 3025(part-59)	0.1 (max)	N.D.	N.D.	N.D.	N.D.
17	Lead (as Pb)	mg/Lit	IS 3025(part-47)	0.01 (max)	N.D.	N.D.	N.D.	N.D.
18	Zinc (as Zn)	mg/Lit	IS 3025(part-49)	5.0 (max)	0.24	0.24	0.46	0.22
19	Copper (as Cu)	mg/Lit	IS 3025(part-42)	0.05 (max)	N.D.	N.D.	N.D.	N.D.
20	Aluminium (as Al)	mg/Lit	IS 3025(part-55)	0.03 (max)	N.D.	N.D.	N.D.	N.D.
21	Mercury (as Hg)	mg/Lit	IS 3025(part-48)	0.001(max)	N.D.	N.D.	N.D.	N.D.
22	Arsenic (as As)	mg/Lit	IS 3025(part-37)	0.01 (max)	N.D.	N.D.	N.D.	N.D.
23	Selenium (as Se)	mg/Lit	IS 3025(part-56)	0.1 (max)	N.D.	N.D.	N.D.	N.D.
24	Chromium (as Cr)	mg/Lit	Annex J of IS:13428	0.001(max)	N.D.	N.D.	N.D.	N.D.
25	Sulphide (as S)	mg/Lit	APHA 22nd Ed.2012,4500-S-C,4-175 & F 4-178	0.01 (max)	N.D.	N.D.	N.D.	N.D.

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REPORT NO. - 05071

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result			
					Pond Water (Lundri Village	Pond Water (Kanaval Village	Pond Water (Raw Water Area)	Pond Water Barladera Village
26	Cyanide (as CN)	mg/Lit	IS 3025(part-27)	0.05 (max)	N.D.	N.D.	N.D.	N.D.
27	Anionic Detergent (as MBAS)	mg/Lit	Annex K of IS:13428	0.02 (max)	N.D.	N.D.	N.D.	N.D.
28	Phenolic Compound (as C_6H_5OH)	mg/Lit	IS 3025(part-43)	0.001(max)	N.D.	N.D.	N.D.	N.D.
29	Poly nuclear Aromatic Hydrocarbon (PAH)	µg/Lit	APHA 22nd Ed.2012,6440-B-93	0.0001(max)	N.D.	N.D.	N.D.	N.D.
30	Mineral Oil	mg/Lit	IS 3025 (part-39):1991,RA 2003, Fcl. 2.1	0.05 (max)	N.D.	N.D.	N.D.	N.D.
MICROBIOLOGICAL ANALYSIS								
1	Total Coliforms	MPN/ 100 ML	IS:1622:1981:RA: 2014	Shall not be detectable in any 100 ml sample	Absent	Absent	Absent	Absent
2	E – Coli	MPN/ 100 ML	IS:1622:1981:RA: 2014	Shall not be detectable in any 100 ml sample	Absent	Absent	Absent	Absent
PESTICIDES ANALYSIS								
1	p,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
2	o,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
3	p,pDDE	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
4	p,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
5	O,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
6	Gamma HCH (Lindane)	µg/L	US EPA 508-1995	2	N.D.	N.D.	N.D.	N.D.
7	Alpha-HCH	µg/L	US EPA 508-1995	0.01	N.D.	N.D.	N.D.	N.D.
8	Beta-HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.	N.D.	N.D.
9	Delta HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.	N.D.	N.D.
10	Alpha-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.	N.D.
11	Beta-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.	N.D.
12	Endosulfansulphate	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.	N.D.
13	Monocrotophos	µg/L	US EPA 8141A-1994	1	N.D.	N.D.	N.D.	N.D.
14	Ethion	µg/L	US EPA 8141A-1994	3	N.D.	N.D.	N.D.	N.D.
15	Chloropyrifos	µg/L	US EPA 8141A-1994	30	N.D.	N.D.	N.D.	N.D.
16	Phorate	µg/L	US EPA 8141A-	2	N.D.	N.D.	N.D.	N.D.

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REPORT NO. - 05072

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result			
					Pond Water Tundri Village	Pond Water Nawtrka awali Village	Pond Water (Raw Water Area)	Pond Water Badadara Village
			1994					
17	Phoratesulphoxide	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
18	Phoratesulphone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
19	2,4-D	µg/L	US EPA 515.1-1995	30	N.D.	N.D.	N.D.	N.D.
20	Alachlor	µg/L	US EPA 508- 1995	20	N.D.	N.D.	N.D.	N.D.
21	Atrazine	µg/L	US EPA 532-2000	2	N.D.	N.D.	N.D.	N.D.
22	Methyl parathion	µg/L	US EPA 8141A-1994	0.3	N.D.	N.D.	N.D.	N.D.
23	Methyl paraxone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
24	Malathion	µg/L	US EPA 8141A-1994	190	N.D.	N.D.	N.D.	N.D.
25	Malaoxon	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
26	Aldrin	µg/L	US EPA 508- 1995	0.03	N.D.	N.D.	N.D.	N.D.
27	Dieldrin	µg/L	US EPA 508-1995	0.03	N.D.	N.D.	N.D.	N.D.

Note: mg/L: milligram per liter.

REMARKS:N.D.- NOT DETECTED

Terms & conditions

- *The report for publication, arbitration or as legal dispute is forbidden.*
- *Test sample will be retained for 15 days after issue of report unless otherwise agreed with customer.*
- *This is for information as the party has asked for analysis only.*

01/04/2021
PREPARED BY

For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
AUTHORIZED SIGNATORY

End of the test report

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To,
DB Power Limited,
2X600MW, Village - Badadhara,
District: Janjgir-Champa
(C.G.) 495695

REPORT NO.	UES/TR/20-21/05072	
LAB REF NO.	UES/20-21/W/04153	
DATE OF SAMPLING	15/03/2021	
DATE OF RECEIPT	16/03/2021	
DATE OF REPORT	01/04/2021	
DATE OF ANALYSIS	START: 16/03/2021	END: 31/03/2021

SAMPLE DETAILS

ORDER /REFERENCE:	WO NO. : 6200002094, DATED: 11/12/2020
CUSTMER SAMPLE ID / SAMPLING LOCATION	1. MAND RIVER WATER 2. PATHRI NALA 3. OUTSIDE DRAIN NEAR AWRS
SAMPLE TYPE	SURFACE WATER
SAMPLE COLLECTED BY	LABORATORY CHEMIST
PACKING OF SAMPLE	1 L X 1 NO. PTC CAN, 1 L X 1 NO. GLASS BOTTLE
SAMPLING PROCEDURE	IS:3025(PART 1):1987 RE 2003; APHA 22ND ED.2012, 1060-B, 1-39

REPORT NO. - 05072

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result		
					Mand River Water	Pathr Nala	Outside Drain near AWRS
1	Colour	Hazen	IS:3025:(Part-4)	5 (max)	25	15	2.5
2	Turbidity	NTU	IS 3025:(Part-10)	1.0 (max)	46.8	22.	16.4
3	pH	-	IS:3025:(Part-11)	6.5 To 8.5	7.26	7.18	7.64
4	Residual Chlorine	mg/Lit	IS 3025(part-26)	0.2 (max)	N.D.	N.D.	N.D.
5	Total Dissolved Solids	mg/Lit	IS 3025:(Part-16)	500 (max)	164	188	168
6	Alkalinity Total (as $CaCO_3$)	mg/Lit	IS 3025:(Part-23)	200 (max)	52.0	72.0	98.0
7	Total Hardness (as $CaCO_3$)	mg/Lit	IS 3025:(Part-21)	200 (max)	86.0	122.0	138.0
8	Calcium (as Ca)	mg/Lit	IS 3025:(Part-40)	75 (max)	22.4	32.8	36.4
9	Magnesium (as Mg)	mg/Lit	IS 3025:(Part-46)	30 (max)	5.4	7.9	88.4
10	Chloride (as Cl)	mg/Lit	IS 3025:(Part-32)	250 (max)	16.9	14.9	12.9
11	Sulphate (as SO_4)	mg/Lit	IS 3025:(Part-24)	200 (max)	22.2	16.4	28.4
12	Nitrate (NO_3)	mg/Lit	IS 3025(part-34)	45 (max)	2.8	4.0	2.2
13	Boron (as B)	mg/Lit	IS 3025(part-57)	0.5 (max)	N.D.	N.D.	N.D.
14	Iron (as Fe)	mg/Lit	IS 3025(part-53)	0.3 (max)	N.D.	N.D.	N.D.
15	Fluoride (as F)	mg/Lit	IS 3025(part-60)	1.0 (max)	0.18	0.24	0.16
16	Manganese (as Mn)	mg/Lit	IS 3025(part-59)	0.1 (max)	N.D.	N.D.	N.D.
17	Lead (as Pb)	mg/Lit	IS 3025(part-47)	0.01 (max)	N.D.	N.D.	N.D.
18	Zinc (as Zn)	mg/Lit	IS 3025(part-49)	5.0 (max)	0.16	0.12	0.11
19	Copper (as Cu)	mg/Lit	IS 3025(part-42)	0.05 (max)	N.D.	N.D.	N.D.
20	Aluminium (as Al)	mg/Lit	IS 3025(part-55)	0.03 (max)	N.D.	N.D.	N.D.
21	Mercury (as Hg)	mg/Lit	IS 3025(part-48)	0.001 (max)	N.D.	N.D.	N.D.
22	Arsenic (as As)	mg/Lit	IS 3025(part-37)	0.01 (max)	N.D.	N.D.	N.D.
23	Selenium (as Se)	mg/Lit	IS 3025(part-56)	0.1 (max)	N.D.	N.D.	N.D.
24	Chromium (as Cr)	mg/Lit	Annex 1 of IS:13428	0.001 (max)	N.D.	N.D.	N.D.
25	Sulphide (as S)	mg/Lit	APHA 22nd Ed.2012,4500-S2-C,4-175 & F 4-178	0.01 (max)	N.D.	N.D.	N.D.

Ultimate
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HDD-272, Phase III - Near JP Chowk
Ring Road No.-2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 I Email : ultimateenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

REPORT NO. 08072

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result		
					Mand River Water	Pathr Nala	Outside Drain near AWRS
26	Cyanide (as CN)	mg/Lit	IS 3025(part-27)	0.05 (max)	N.D.	N.D.	N.D.
27	Anionic Detergent (as MBAS)	mg/Lit	Annex K of IS:13428	0.02 (max)	N.D.	N.D.	N.D.
28	Phenolic Compound (as C_6H_5OH)	mg/Lit	IS 3025(part-43)	0.001 (max)	N.D.	N.D.	N.D.
29	Poly-nuclear Aromatic Hydrocarbon (PAH)	µg/Lit	APHA 22nd Ed.2012,6440-6-93	0.0001 (max)	N.D.	N.D.	N.D.
30	Mineral Oil	mg/Lit	IS 3025(part-39):1991,RA 2003, Ed. 2.1	0.05 (max)	N.D.	N.D.	N.D.
MICROBIOLOGICAL ANALYSIS							
1	Total Coliforms	MPN/ 100 ML	IS:1622:1981:RA:2014	Shall not be detectable in any 100 ml sample	Absent	Absent	Absent
2	E – Coli	MPN/ 100 Ml	IS:1622:1981:RA:2014	Shall not be detectable in any 100 ml sample	Absent	Absent	Absent
PESTICIDES ANALYSIS							
1	p,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.
2	o.p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.
3	p,pDDE	µg/L	US FPA 508-1995	1	N.D.	N.D.	N.D.
4	p,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.
5	O,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.
6	Gamma-HCH (Lindane)	µg/L	US EPA 508-1995	2	N.D.	N.D.	N.D.
7	Alpha-HCH	µg/L	US EPA 508-1995	0.01	N.D.	N.D.	N.D.
8	Beta-HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.	N.D.
9	Delta HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.	N.D.
10	Alpha-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.
11	Beta-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.
12	Endosulfansulphate	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.
13	Monocrotophos	µg/L	US EPA 8141A-1994	1	N.D.	N.D.	N.D.
14	Ethion	µg/L	US EPA 8141A-1994	3	N.D.	N.D.	N.D.
15	Chloropyrifos	µg/L	US EPA 8141A-1994	30	N.D.	N.D.	N.D.
16	Phorate	µg/L	US EPA 8141A-1994	2	N.D.	N.D.	N.D.
17	Phoratesulphoxide	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.
18	Phoratesulphone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.

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REPORT NO. - 05072

TEST REPORT

Sr. No.	Parameter	Unit	Methed Reference	Limits as per Consent	Result		
					Mand River Water	Pathr Nala	Outside Drain near AWRS
19	2,4-D	µg/L	US EPA 515.1-1995	30	N.D.	N.D.	N.D.
20	Alachlor	µg/L	US EPA 508- 1995	20	N.D.	N.D.	N.D.
21	Atrazine	µg/L	US EPA 532-2000	2	N.D.	N.D.	N.D.
22	Methyl parathion	µg/L	US EPA 8141A-1994	0.3	N.D.	N.D.	N.D.
23	Methyl paraxone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.
24	Malathion	µg/L	US EPA 8141A-1994	190	N.D.	N.D.	N.D.
25	Malaoxon	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.
26	Aldrin	µg/L	US EPA 508- 1995	0.03	N.D.	N.D.	N.D.
27	Dieldrin	µg/L	US EPA 508 1995	0.03	N.D.	N.D.	N.D.

Note µg/lit.- milligram per liter.

REMARKS:N.D.- NOT DETECTED

Terms & conditions

- *The report for publication, arbitration or as legal dispute is forbidden.*
- *Test sample will be returned for 15 days after issue of test report unless otherwise agreed with customer.*
- *This is for information as the party has asked for above test(s) only*

01/04/2021
PREPARED BY

ULTIMATE ENVIROLYTICAL SOLUTIONS

For ULTIMATE ENVIROLYTICAL SOLUTIONS

01/04/2021
AUTHORIZED SIGNATORY

End of the test report

Ultimate
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Ring Road No.-2, Kabir Nagar, Raipur (C.G.) 492099
Ph : 0771 - 4027777 | Email : ultimateenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

To,
DB Power Limited,
2X600MW, Village - Badadhara,
District: Janjgir-Champa
(C.G.) 495695

REPORT NO.	UES/TR/20-21/05073
LAB REF NO.	UES/20-21/W/04164
DATE OF SAMPLING	15/03/2021
DATE OF RECEIPT	16/03/2021
DATE OF REPORT	01/04/2021
DATE OF ANALYSIS	START:16/03/2021 END:31/03/2021

SAMPLE DETAILS

ORDER /REFERENCE:	WO NO.: 8200002084, DATED: 11/12/2020
CUSTOMER SAMPLE ID / SAMPLING LOCATION	1. ASH DUMP SIDE GUDELI 2. ASH DUMP SIDE SIRIYAGARH
SAMPLE TYPE	SURFACE WATER
SAMPLE COLLECTED BY	LABORATORY CHEMIST
PACKING OF SAMPLE	1 L X 1 NO. PC CAN, 1 L X 1 NO. GLASS BOTTLE
SAMPLING PROCEDURE	IS:3025(PART 1):1987 RA 2003; APHA 22ND ED.2012, 1060-B, 1-39

REPORT NO. - 05073

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result	
					Ash Dump Side Gudeli	Ash Dump Side Siriyagarh
1	Colour	Hazen	IS:3025:(Part-4)	5 (max)	5	15
2	Turbidity	NTU	IS 3025:(Part-10)	1.0 (max)	32.8	22.4
3	pH	-	IS:3025:(Part-11)	6.5 To 8.5	7.16	7.28
4	Residual Chlorine	mg/Lit	IS 3025(part-26)	0.2 (max)	N.D.	N.D.
5	Total Dissolved Solids	mg/Lit	IS 3025:(Part-16)	500 (max)	132	188
6	Alkalinity Total (as $CaCO_3$)	mg/Lit	IS 3025:(Part-23)	200 (max)	56.	78
7	Total Hardness (as $CaCO_3$)	mg/Lit	IS 3025:(Part-21)	200 (max)	82.0	112
8	Calcium (as Ca)	mg/Lit	IS 3025:(Part-40)	75 (max)	26.4	22.8
9	Magnesium (as Mg)	mg/Lit	IS 3025:(Part-46)	30 (max)	6.4	2.2
10	Chloride (as Cl)	mg/Lit	IS 3025:(Part-32)	250 (max)	12.9	16.9
11	Sulphate (as SO_4)	mg/Lit	IS 3025:(Part-24)	200 (max)	22.4	18.4
12	Nitrate (NO_3)	mg/Lit	IS 3025(part-34)	45 (max)	4.2	3.8
13	Boron (as B)	mg/Lit	IS 3025(part-57)	0.5 (max)	N.D.	N.D.
14	Iron (as Fe)	mg/Lit	IS 3025(part-53)	0.3 (max)	N.D.	N.D.
15	Fluoride (as F)	mg/Lit	IS 3025(part-60)	1.0 (max)	0.21	0.11
16	Manganese (as Mn)	mg/Lit	IS 3025(part-59)	0.1 (max)	N.D.	N.D.
17	Lead (as Pb)	mg/Lit	IS 3025(part-47)	0.01 (max)	N.D.	N.D.
18	Zinc (as Za)	mg/Lit	IS 3025(part-49)	5.0 (max)	0.11	0.16
19	Copper (as Cu)	mg/Lit	IS 3025(part-42)	0.05 (max)	N.D.	N.D.
20	Aluminium (as Al)	mg/Lit	IS 3025(part-55)	0.03 (max)	N.D.	N.D.
21	Mercury (as Hg)	mg/Lit	IS 3025(part-48)	0.001 (max)	N.D.	N.D.
22	Arsenic (as As)	mg/Lit	IS 3025(part-37)	0.01 (max)	N.D.	N.D.
23	Selenium (as Se)	mg/Lit	IS 3025(part-56)	0.1 (max)	N.D.	N.D.
24	Chromium (as Cr)	mg/Lit	Annex J of IS:13428	0.001 (max)	N.D.	N.D.
25	Sulphide (as S)	mg/Lit	APHA 22nd Ed.2012,4500-S-C,4-175 & F 4-178	0.01 (max)	N.D.	N.D.
26	Cyanide (as CN)	mg/Lit	IS 3025(part-27)	0.05 (max)	N.D.	N.D.
27	Anionic Detergent	mg/Lit	Annex K of IS:13428	0.02 (max)	N.D.	N.D.

Ultimate
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HDD-272 Phase II - Near JP Chowk
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Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

REPORT NO. - 05979

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result	
					Ash Dump Side Gudeli	Ash Dump Side Siriyagarh
	(as MBAS)					
28	Phenolic Compound (as C_6H_5OH)	mg/Lit	IS 3025(part-43)	0.001 (max)	N.D.	N.D.
29	Poly-nuclear Aromatic Hydrocarbon (PAH)	µg/Lit	APHA 22nd Ed.2012,6440-6-93	0.0001 (max)	N.D.	N.D.
30	Mineral Oil	mg/Lit	IS 3025 (part-39):1991,RA 2003, Ed. 2.1	0.05 (max)	N.D.	N.D.
MICROBIOLOGICAL ANALYSIS						
1	Total Coliforms	MPN/ 100 ML	IS:1622:1981:RA:2014	Shall not be detectable in any 100 ml sample	Absent	Absent
2	E – Col	MPN/ 100 ML	IS:1622:1981:RA:2014	Shall not be detectable in any 100 ml sample	Absent	Absent
PESTICIDES ANALYSIS						
1	p,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.
2	o,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.
3	p,pDDE	µg/L	US EPA 508-1995	1	N.D.	N.D.
4	p,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.
5	O,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.
6	Gamma-HCH (Lindane)	µg/L	US EPA 508-1995	2	N.D.	N.D.
7	Alpha-HCH	µg/L	US EPA 508-1995	0.01	N.D.	N.D.
8	Beta-HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.
9	Delta HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.
10	Alpha-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.
11	Beta-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.
12	Endosulfansulphate	µg/L	US EPA 508-1995	0.4	N.D.	N.D.
13	Monocrotophos	µg/L	US EPA 8141A-1994	1	N.D.	N.D.
14	Ethion	µg/L	US EPA 8141A-1994	3	N.D.	N.D.
15	Chloropyrifos	µg/L	US EPA 8141A-1994	30	N.D.	N.D.
16	Phorate	µg/L	US EPA 8141A-1994	2	N.D.	N.D.
17	Phoratesulphoxide	µg/L	US EPA 8141A-1994	-	N.D.	N.D.
18	Phoratesulphone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.
19	2,4-D	µg/L	US EPA 515.1-1995	30	N.D.	N.D.

Ultimate
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Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

REPORT NO. - 05373

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result	
					Ash Dump Side Gudeli	Ash Dump Side Siriyagarh
20	Alachlor	µg/L	US EPA 508- 1995	20	N.D.	N.D.
21	Atrazine	µg/L	US EPA 532-2000	2	N.D.	N.D.
22	Methyl parathion	µg/L	US EPA 8141A-1994	0.3	N.D.	N.D.
23	Methyl paraxone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.
24	Malathion	µg/L	US EPA 8141A-1994	190	N.D.	N.D.
25	Malaoxon	µg/L	US EPA 8141A-1994	-	N.D.	N.D.
26	Aldrin	µg/L	US EPA 508- 1995	0.03	N.D.	N.D.
27	Dieldrin	µg/L	US EPA 508-1995	0.03	N.D.	N.D.

Note: mg/lit.: milligram per liter.

REMARKS:N.D.- NOT DETECTED

Terms & conditions

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- *This is for information as the party has asked for above work only*

01/04/2021
PREPARED BY

ULTIMATE ENVIROLYTICAL SOLUTIONS RAIPUR (C.G.)

For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
AUTHORIZED SIGNATORY

End of the test report

Ultimate
ENVIROLYTICAL SOLUTIONS

HDD-272, Phase III - Near JP Chowk
Ring Road No. 2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ultimateenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

To,
DB Power Limited,
2X600MW, Village - Badadhara,
District: Janjgir-Champa
(C.G.) 495695

REPORT NO.	UES/IR/20-21/05074
LAB REF NO.	UES/20-21/W/04165
DATE OF SAMPLING	15/03/2021
DATE OF RECEIPT	16/03/2021
DATE OF REPORT	01/04/2021
DATE OF ANALYSIS	START:16/03/2021 | END:31/03/2021

SAMPLE DETAILS

ORDER /REFERENCE:	WO NO.: 8200002084, DATED: 11/12/2020
CUSTOMER SAMPLE ID / SAMPLING LOCATION	1. ASH WATER RECOVERY POND 2. COAL SETTLING POND
SAMPLE TYPE	SURFACE WATER
SAMPLE COLLECTED BY	LABORATORY CHEMIST
PACKING OF SAMPLE	2 X 2 LTR PVC CAN, 1 X 1 LTR GLASS BOTTLE
SAMPLING PROCEDURE	IS:3025(PART 1):1987 RA 2003; APHA 22ND ED.2012, 1060-B, 1-39

REPORT NO. - 05074

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result	
					Ash Water Recovery Pond	Coal Settling Pond
1	Colour	Hazen	IS:3025:(Part-4)	5 (max)	10	20
2	Turbidity	NTU	IS 3025:(Part-10)	1.0 (max)	32.6	18.4
3	pH	-	IS:3025:(Part-11)	6.5 To 8.5	7.26	7.46
4	Residual Chlorine	mg/Lit	IS 3025(part-26)	0.2 (max)	N.D.	N.D.
5	Total Dissolved Solids	mg/Lit	IS 3025:(Part-16)	500 (max)	148	198
6	Alkalinity Total (as $CaCO_3$)	mg/Lit	IS 3025:(Part-23)	200 (max)	76.0	88.0
7	Total Hardness (as $CaCO_3$)	mg/Lit	IS 3025:(Part 21)	200 (max)	112.0	128.0
8	Calcium (as Ca)	mg/Lit	IS 3025:(Part-40)	75 (max)	26.4	32.8
9	Magnesium (as Mg)	mg/Lit	IS 3025:(Part-46)	30 (max)	6.4	7.9
10	Chloride (as Cl)	mg/Lit	IS 3025:(Part-32)	250 (max)	16.9	21.9
11	Sulphate (as SO_4)	mg/Lit	IS 3025:(Part-24)	200 (max)	26.4	22.7
12	Nitrate (NO_3)	mg/Lit	IS 3025(part-34)	45 (max)	2.8	3.4
13	Boron (as B)	mg/Lit	IS 3025(part-57)	0.5 (max)	N.D.	N.D.
14	Iron (as Fe)	mg/Lit	IS 3025(part-53)	0.3 (max)	N.D.	N.D.
15	Fluoride (as F)	mg/Lit	IS 3025(part-60)	1.0 (max)	0.16	0.10
16	Manganese (as Mn)	mg/Lit	IS 3025(part-59)	0.1 (max)	N.D.	N.D.
17	Lead (as Pb)	mg/Lit	IS 3025(part-47)	0.01 (max)	N.D.	N.D.
18	Zinc (as Zn)	mg/Lit	IS 3025(part-49)	5.0 (max)	N.D.	N.D.
19	Copper (as Cu)	mg/Lit	IS 3025(part-42)	0.05 (max)	N.D.	N.D.
20	Aluminium (as Al)	mg/Lit	IS 3025(part 55)	0.03 (max)	N.D.	N.D.
21	Mercury (as Hg)	mg/Lit	IS 3025(part-48)	0.001 (max)	N.D.	N.D.
22	Arsenic (as As)	mg/Lit	IS 3025(part-37)	0.01 (max)	N.D.	N.D.
23	Selenium (as Se)	mg/Lit	IS 3025(part-56)	0.1 (max)	N.D.	N.D.
24	Chromium (as Cr)	mg/Lit	Annex J of IS:13428	0.001 (max)	N.D.	N.D.
25	Sulphide (as S)	mg/Lit	APHA 22nd Ed.2012,4500-S-C,4-175 & F 4-178	0.01 (max)	N.D.	N.D.
26	Cyanide (as CN)	mg/Lit	IS 3025(part-27)	0.05 (max)	N.D.	N.D.
27	Anionic Detergent (as MBAS)	mg/Lit	Annex K of IS:13428	0.02 (max)	N.D.	N.D.
28	Phenolic Compound (as C_6H_5OH)	mg/Lit	IS 3025(part-43)	0.001 (max)	N.D.	N.D.
29	Poly-nuclear Aromatic Hydrocarbon (PAH)	µg/Lit	APHA 22nd Ed.2012,5440-6-93	0.0001 (max)	N.D.	N.D.

Ultimate
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Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

REPORT NO. - 06974

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result	
					Ash Water Recovery Pond	Coal Settling Pond
30	Mineral Oil	mg/Lit	IS 3025 (part-39):1991,RA 2003, Ed. 2.1	0.05 (max)	N.D.	N.D.
MICROBIOLOGICAL ANALYSIS						
1	Total Coliforms	MPN/100 ML	IS:1622:1981:RA:2014	Shall not be detectable in any 100 ml sample	Absent	Absent
2	E - Coli	MPN/100 ML	IS:1622:1981:RA:2014	Shall not be detectable in any 100 ml sample	Absent	Absent
PESTICIDES ANALYSIS						
1	p,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.
2	o,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.
3	p,pDDE	µg/L	US EPA 508-1995	1	N.D.	N.D.
4	p,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.
5	O,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.
6	Gamma-HCH (Lindane)	µg/L	US EPA 508-1995	2	N.D.	N.D.
7	Alpha-HCH	µg/L	US EPA 508-1995	0.01	N.D.	N.D.
8	Beta-HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.
9	Delta HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.
10	Alpha-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.
11	Beta-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.
12	Endosulfansulphate	µg/L	US EPA 508-1995	0.4	N.D.	N.D.
13	Monocrotophos	µg/L	US EPA 8141A-1994	1	N.D.	N.D.
14	Ethion	µg/L	US EPA 8141A-1994	3	N.D.	N.D.
15	Chloropyrifos	µg/L	US EPA 8141A-1994	30	N.D.	N.D.
16	Phorate	µg/L	US EPA 8141A-1994	2	N.D.	N.D.
17	Phoratesulphoxide	µg/L	US EPA 8141A-1994	-	N.D.	N.D.
18	Phoratesulphone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.
19	2,4-D	µg/L	US EPA 515.1-1995	30	N.D.	N.D.
20	Alachlor	µg/L	US EPA 508- 1995	20	N.D.	N.D.

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Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

REPORT NO. - 05074

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result	
					Ash Water Recovery Pond	Coal Settling Pond
21	Atrazine	µg/L	US EPA 532-2000	2	N.D.	N.D.
22	Methyl parathion	µg/L	US EPA 8141A-1994	0.3	N.D.	N.D.
23	Methyl paraxone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.
24	Malathion	µg/L	US EPA 8141A-1994	190	N.D.	N.D.
25	Malaoxon	µg/L	US EPA 8141A-1994	-	N.D.	N.D.
26	Aldrin	µg/L	US EPA 508- 1995	0.03	N.D.	N.D.
27	Dieldrin	µg/L	US EPA 508-1995	0.03	N.D.	N.D.

Note: mg/lit. : milligram per liter.

REMARKS: N.D.- NOT DETECTED

Terms & conditions

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- *Test sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.*
- *This is for information to the party has asked for above test(s) only*

01/04/2021
PREPARED BY

ULTIMATE ENVIROLYTICAL SOLUTIONS

For ULTIMATE ENVIROLYTICAL SOLUTIONS
01/04/2021
AUTHORIZED SIGNATORY

End of the test report

Ultimate
ENVIROLITICAL SOLUTIONS

HDD-272, Phase III - Near JP Chowk
Ring Road No.-2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ultimateenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

To,
DB Power Limited,
2X600MW, Village - Badadhara,
District: Janjgir-Champa
(C.G.) 495695

REPORT NO.	UES/TR/20-21/05075
LAB REF NO.	UES/20-21/W/04166
DATE OF SAMPLING	15/03/2021
DATE OF RECEIPT	16/03/2021
DATE OF REPORT	01/03/2021
DATE OF ANALYSIS	START: 16/03/2021 END: 31/03/2021

SAMPLE DETAILS

ORDER /REFERENCE:	WO NO.: 8200092564, DATED: 11/12/2020
CUSTMER SAMPLE ID / SAMPLING LOCATION	1. HAND PUMP WATER TUNDRI VILLAGE 2. HAND PUMP WATER RAMPUR VILLAGE 3. BOREWELL WATER KANWALI VILLAGE 4. BOREWELL WATER BAISPALI VILLAGE
SAMPLE TYPE	DRINKING WATER &GROUND WATER
SAMPLE COLLECTED BY	LABORATORY CHEMIST
PACKING OF SAMPLE	2 L X 1 NO. PVC CAN, 1 L X 1 NO. GLASS BOTTLE
SAMPLING PROCEDURE	IS:3025(PART 1):1987 RA 2003; APHA 22ND ED.2012, 1060-B, 1-39

REPORT NO. = 05075

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result			
					Hand Pump Water Tundri Village	Hand Pump Water Rampur Village	Borewell Water Kanwali Village	Borewell water Baispali village
1	Colour	Hazen	IS:3025:(Part-4)	5 (max)	<1	<1	<1	<1
2	Turbidity	NTU	IS 3025:(Part-10)	1.0 (max)	0.46	0.78	0.24	0.76
3	pH	-	IS:3025:(Part-11)	6.5 To 8.5	7.14	7.28	7.62	7.42
4	Residue Chorine	mg/Lt	IS 3025(part-26)	0.2 (max)	N.D.	N.D.	N.D.	N.D.
5	Total Dissolved Solids	mg/Lt	IS 3025:(Part-16)	500 (max)	102.0	136.0	196	180
6	Alkalinity Total (as $CaCO_3$)	mg/Lt	IS 3025:(Part-23)	200 (max)	36.0	58.0	44.0	68.0
7	Total Hardness (as $CaCO_3$)	mg/Lt	IS 3025:(Part-21)	200 (max)	78.0	92.0	120.0	134.0
8	Calcium (as Ca)	mg/Lt	IS 3025:(Part-40)	75 (max)	18.4	22.6	26.8	42.4
9	Magnesium (as Mg)	mg/Lt	IS 3025:(Part-46)	30 (max)	4.4	5.4	6.5	10.3
10	Chloride (as Cl)	mg/Lt	IS 3025:(Part-32)	250 (max)	26.9	28.9	20.9	32.9
11	Sulphate (as SO_4)	mg/Lt	IS 3025:(Part-24)	200 (max)	22.4	20.8	19.8	24.8
12	Nitrate (NO_3)	mg/Lt	IS 3025(part-34)	45 (max)	2.4	6.8	2.2	4.5
13	Boron (as B)	mg/Lt	IS 3025(part-57)	0.5 (max)	N.D.	N.D.	N.D.	N.D.
14	Iron (as Fe)	mg/Lt	IS 3025(part-53)	0.3 (max)	N.D.	N.D.	N.D.	N.D.
15	Fluoride (as F)	mg/Lt	IS 3025(part-60)	1.0 (max)	0.06	0.04	0.10	0.08
16	Manganese (as Mn)	mg/Lt	IS 3025(part-59)	0.1 (max)	N.D.	N.D.	N.D.	N.D.
17	Lead (as Pb)	mg/Lt	IS 3025(part-47)	0.01 (max)	N.D.	N.D.	N.D.	N.D.
18	Zinc (as Zn)	mg/Lt	IS 3025(part-49)	5.0 (max)	N.D.	N.D.	N.D.	N.D.
19	Copper (as Cu)	mg/Lt	IS 3025(part-42)	0.05 (max)	N.D.	N.D.	N.D.	N.D.
20	Aluminium (as Al)	mg/Lt	IS 3025(part-55)	0.03 (max)	N.D.	N.D.	N.D.	N.D.
21	Mercury (as Hg)	mg/Lt	IS 3025(part-48)	0.001 (max)	N.D.	N.D.	N.D.	N.D.
22	Arsenic (as As)	mg/Lt	IS 3025(part-37)	0.01 (max)	N.D.	N.D.	N.D.	N.D.
23	Selenium (as Se)	mg/Lt	IS 3025(part-56)	0.1 (max)	N.D.	N.D.	N.D.	N.D.
24	Chromium (as Cr)	mg/Lt	Annex J of IS:13428	0.001 (max)	N.D.	N.D.	N.D.	N.D.
25	Sulphide (as S)	mg/Lt	APHA 22nd Ed.2012,4500-S-C,4-175 & F 4-178	0.01 (max)	N.D.	N.D.	N.D.	N.D.
26	Cyanide (as CN)	mg/Lt	IS 3025(part-27)	0.05 (max)	N.D.	N.D.	N.D.	N.D.

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REPORT NO. - 05075

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result			
					Hand Pump Water Tundri Village	Hand Pump Water Rampur Village	Borewell Water Kanwali Village	Borewell water Baispali village
27	Anionic Detergent (as MBAS)	mg/Lit	Annex K of IS:13428	0.02 (max)	N.D.	N.D.	N.D.	N.D.
28	Phenolic Compound (as C_6H_5OH)	mg/Lit	IS 3025(part-43)	0.001 (max)	N.D.	N.D.	N.D.	N.D.
29	Poly-nuclear Aromatic Hydrocarbon (PAH)	µg/Lit	APHA 22nd ed.2012,6440-B-93	0.0001 (max)	N.D.	N.D.	N.D.	N.D.
30	Mineral Oil	mg/Lit	IS 3025 (part-39):1991,RA 2003, Ed. 2.1	0.05 (max)	N.D.	N.D.	N.D.	N.D.
MICROBIOLOGICAL ANALYSIS								
1	Total Coliforms	MPN/ 100 ML	IS:1622:1981:RA:2014	Shall not be detectable in any 100 ml sample	Absent	Absent	Absent	Absent
2	E - Coli	MPN/ 100 ML	IS:1622:1981:RA:2014	Shall not be detectable in any 100 ml sample	Absent	Absent	Absent	Absent
PESTICIDES ANALYSIS								
1	p,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
2	o,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
3	p,pDDE	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
4	p,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
5	O,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.	N.D.
6	Gamma-HCH (Lindane)	µg/L	US EPA 508-1995	2	N.D.	N.D.	N.D.	N.D.
7	Alpha-HCH	µg/L	US EPA 508-1995	0.01	N.D.	N.D.	N.D.	N.D.
8	Beta-HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.	N.D.	N.D.
9	Delta HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.	N.D.	N.D.
10	Alpha-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.	N.D.
11	Beta-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.	N.D.
12	Endosulfansulphate	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.	N.D.
13	Monocrotophos	µg/L	US EPA 8141A-1994	1	N.D.	N.D.	N.D.	N.D.
14	Ethion	µg/L	US EPA 8141A-1994	3	N.D.	N.D.	N.D.	N.D.
15	Chloropyrifos	µg/L	US EPA 8141A-1994	30	N.D.	N.D.	N.D.	N.D.
16	Phorate	µg/L	US EPA 8141A-1994	2	N.D.	N.D.	N.D.	N.D.
17	Phoratesulphoxide	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
18	Phoratesulphone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
19	2,4-D	µg/L	US EPA 515.1-1995	30	N.D.	N.D.	N.D.	N.D.
20	Alachlor	µg/L	US EPA 508- 1995	20	N.D.	N.D.	N.D.	N.D.
21	Atrazine	µg/L	US EPA 532-2000	2	N.D.	N.D.	N.D.	N.D.

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REPORT NO. - 05075

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result			
					Hand Pump Water Tundri Village	Hand Pump Water Rampur Village	Borewell Water Kaswali Village	Borewell water Baispali village
22	Methyl parathion	µg/L	US EPA 8141A-1994	0.3	N.D.	N.D.	N.D.	N.D.
23	Methyl paraxone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
24	Malathion	µg/L	US EPA 8141A-1994	190	N.D.	N.D.	N.D.	N.D.
25	Malaoxon	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.	N.D.
26	Aldrin	µg/L	US EPA 508- 1995	0.03	N.D.	N.D.	N.D.	N.D.
27	Dieldrin	µg/L	US EPA 508-1995	0.03	N.D.	N.D.	N.D.	N.D.

Note: mg/lit.- milligram per liter.

REMARKS: N.D. NOT DETECTED

Terms & conditions

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- *Test sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.*
- *This is for information as the party has asked for above test(s) only*

01/04/2021
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To,
DB Power Limited,
2X600MW, Village - Badadhara,
District: Janjgir–Champa
(C.G.) 495695

REPORT NO.	UES/TR/20-21/05076
LAB REF NO.	UES/20-21/W/04167
DATE OF SAMPLING	15/03/2021
DATE OF RECEIPT	16/03/2021
DATE OF REPORT	01/03/2021
DATE OF ANALYSIS	START: 16/03/2021 END: 31/03 /2021

SAMPLE DETAILS

ORDER /REFERENCE:	WO NO.: 8200002084, DATED: 11/12/2020
CUSTMER SAMPLE ID / SAMPLING LOCATION	1. PORTABLE WATER TANK 2. ASH DUMP SIDE BOREWELL WATER GUDELI 3. ASH DUMP SIDE BOREWELL WATER SIRIYAGARH
SAMPLE TYPE	GROUND WATER
SAMPLE COLLECTED BY	LABORATORY CHEMIST
PACKING OF SAMPLE	1 L & 2 L HD. PVC CAN, 1 L & 2 L HD. GLASS BOTTLE
SAMPLING PROCEDURE	IS: 3025 (PART 1) :1987 RA 2003; APHA 22ND ED.2012, 1060-B, 1-39

REPORT NO. - 05076

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result		
					Portable water tank	Ash dump side Borewell gudeli	Ash dump side Borewell water siriyagarh
1	Colour	Hazen	IS:3025:(Part-4)	5 (max)	<1	<1	<1
2	Turbidity	NTU	IS 3025:(Part-10)	1.0 (max)	0.62	0.54	0.89
3	pH	-	IS:3025:(Part-11)	6.5 To 8.5	7.98	7.26	7.78
4	Residual Chlorine	mg/Lit	IS 3025(part-26)	0.2 (max)	N.D.	N.D.	N.D.
5	Total Dissolved Solids	mg/Lit	IS 3025:(Part-16)	500 (max)	468	198	468
6	Alkalinity Total (as $CaCO_3$)	mg/Lit	IS 3025:(Part-23)	200 (max)	184	72.0	164.0
7	Total Hardness (as $CaCO_3$)	mg/Lit	IS 3025:(Part-21)	200 (max)	224.0	164.0	288
8	Calcium (as Ca)	mg/Lit	IS 3025:(Part-40)	75 (max)	64.4	26.8	96.0
9	Magnesium (as Mg)	mg/Lit	IS 3025:(Part-46)	30 (max)	15.6	6.5	23.3
10	Chloride (as Cl)	mg/Lit	IS 3025:(Part-32)	250 (max)	120.0	36.9	102.9
11	Sulphate (as SO_4)	mg/Lit	IS 3025:(Part-24)	200 (max)	69.4	26.4	68.0
12	Nitrate (NO_3)	mg/Lit	IS 3025(part-34)	45 (max)	6.8	3.8	6.2
13	Boron (as B)	mg/Lit	IS 3025(part-57)	0.5 (max)	N.D.	N.D.	N.D.
14	Iron (as Fe)	mg/Lit	IS 3025(part-53)	0.3 (max)	N.D.	N.D.	N.D.
15	Fluoride (as F)	mg/Lit	IS 3025(part-60)	1.0 (max)	0.12	0.18	0.10
16	Manganese (as Mn)	mg/Lit	IS 3025(part-59)	0.1 (max)	N.D.	N.D.	N.D.
17	Lead (as Pb)	mg/Lit	IS 3025(part-47)	0.01 (max)	N.D.	N.D.	N.D.
18	Zinc (as Zn)	mg/Lit	IS 3025(part-49)	5.0 (max)	0.31	0.48	0.36
19	Copper (as Cu)	mg/Lit	IS 3025(part-42)	0.05 (max)	N.D.	N.D.	N.D.
20	Aluminium (as Al)	mg/Lit	IS 3025(part-55)	0.03 (max)	N.D.	N.D.	N.D.
21	Mercury (as Hg)	mg/Lit	IS 3025(part-48)	0.001 (max)	N.D.	N.D.	N.D.
22	Arsenic (as As)	mg/Lit	IS 3025(part-37)	0.01 (max)	N.D.	N.D.	N.D.
23	Selenium (as Se)	mg/Lit	IS 3025(part-56)	0.1 (max)	N.D.	N.D.	N.D.
24	Chromium (as Cr)	mg/Lit	Annex I of IS:13428	0.001 (max)	N.D.	N.D.	N.D.
25	Sulphide (as S)	mg/Lit	APHA 22nd Ed.2012,4500-S2-C,4-175 & F 4-178	0.01 (max)	N.D.	N.D.	N.D.
26	Cyanide (as CN)	mg/Lit	IS 3025(part-27)	0.05 (max)	N.D.	N.D.	N.D.

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REPORT NO. - 05076

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result		
					Portable water tank	Ash dump side Borewell gaddi	Ash dump side Borewell water siriyagarh
27	Anionic Detergent (as MBAS)	mg/Lt	Annex K of IS:13428	0.02 (max)	N.D.	N.D.	N.D.
28	Phenolic Compound (as C_6H_5OH)	mg/Lt	IS 3025(part-43)	0.001 (max)	N.D.	N.D.	N.D.
29	Poly-nuclear Aromatic Hydrocarbon (PAH)	µg/Lit	APHA 22nd Ed.2012,6440-6-93	0.0001 (max)	N.D.	N.D.	N.D.
30	Mineral Oil	mg/Lit	IS 3025 (part-39):1991,RA 2003, Ed. 2.1	0.05 (max)	N.D.	N.D.	N.D.
MICRBIOLOGICAL ANALYSIS							
1	Total Coliforms	MPN/ 100 ML	IS:1622:1981:RA:2014	Shall not be detectable in any 100 ml sample	Absent	Absent	Absent
2	E – Coli	MPN/ 100 ML	IS:1622:1981:RA:2014	Shall not be detectable in any 100 ml sample	Absent	Absent	Absent
PESTICIDES ANALYSIS							
1	p,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.
2	o,p DDT	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.
3	p,pDDE	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.
4	p,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.
5	O,p DDD	µg/L	US EPA 508-1995	1	N.D.	N.D.	N.D.
6	Gamma-HCH (Lindane)	µg/L	US EPA 508-1995	2	N.D.	N.D.	N.D.
7	Alpha-HCH	µg/L	US EPA 508-1995	0.01	N.D.	N.D.	N.D.
8	Beta-HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.	N.D.
9	Delta HCH	µg/L	US EPA 508-1995	0.04	N.D.	N.D.	N.D.
10	Alpha-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.
11	Beta-Endosulfan	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.
12	Endosulfansulphate	µg/L	US EPA 508-1995	0.4	N.D.	N.D.	N.D.
13	Monocrotophos	µg/L	US EPA 8141A-1994	1	N.D.	N.D.	N.D.
14	Ethion	µg/L	US EPA 8141A-1994	3	N.D.	N.D.	N.D.
15	Chloropyrifos	µg/L	US EPA 8141A-1994	30	N.D.	N.D.	N.D.
16	Phorate	µg/L	US EPA 8141A-1994	2	N.D.	N.D	N.D.
17	Phoratesulphoxide	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.
18	Phoratesulphone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.
19	2,4-D	µg/L	US EPA 515.1-1995	30	N.D.	N.D.	N.D.
20	Alachlor	µg/L	US EPA 508- 1995	20	N.D.	N.D.	N.D.
21	Atrazine	µg/L	US EPA 532-2000	2	N.D.	N.D.	N.D.

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REPORT NO. - 05076

TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Limits as per Consent	Result		
					Portable water tank	Ash dump side Borewell gudeli	Ash dump side Borewell water siriyagarh
22	Methyl parathion	µg/L	US EPA 8141A-1994	0.3	N.D.	N.D.	N.D.
23	Methyl paraxone	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.
24	Malathion	µg/L	US EPA 8141A-1994	190	N.D.	N.D.	N.D.
25	Malaoxon	µg/L	US EPA 8141A-1994	-	N.D.	N.D.	N.D.
26	Aldrin	µg/L	US EPA 508- 1995	0.03	N.D.	N.D.	N.D.
27	Dieldrin	µg/L	US EPA 508-1995	0.03	N.D.	N.D.	N.D.

Note: mg/lit.: milligram per liter.

REMARKS:N.D.- NOT DETECTED

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01/04/2021
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End of the test report.....

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Name & Address Of The Customer	REPORT NO	UES/ER/20 21/05077
To, **DB Power Limited,** **2X600MW, Village - Badadhara,** **District: Janjgir-Champa** **(C.G.) 495695**	LAB REF NO	UES/20-21/W/04168
	DATE OF SAMPLING	25/03/2021
	DATE OF RECEIPT	26/03/2021
	DATE OF REPORT	01/04/2021
	DATE OF ANALYSIS	START:26/03/2021 END:31/03/2021

SAMPLE DETAILS

SAMPLE TYPE	BOILER BLOWDOWN	ORDER /REFERENCE:	PO NO. : 5200002004, DATED: 11/12/2020
CUSTOMER SAMPLE ID	BOILER BLOWDOWN	SAMPLE CONDITION AT RECEIPT	OK
PACKING OF SAMPLE	3 X 1 NO. PVC CAN 2 X 1 NO. PVC CAN SEALED 1 X 1 NO. GLASS BOTTLE	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	IS:3025(PART I):1987 RA 2003; APHA 22ND ED. 2012, 1060-B, 1-39	QUANTITY RECEIVED	5 LTR

Boiler Blow down Sample Analysis Report

TEST REPORT

Sr. No.	Parameter	Unit	Result	Limits as per Consent	Method Reference
1	Suspended Solids	mg/L	4.0	100	APHA 22nd Ed. 2012, 2540-D, 2-66
2	Copper Total (as Cu)	mg/L	N.D.	1.0	APHA 22nd Ed. 2012, 3111-B, 3-18
3	Iron Total (as Fe)	mg/L	N.D.	1.0	APHA 22nd Ed. 2012, 3111-B, 3-18
4	Oil & Grease	mg/L	N.D.	20	IS 3025 (Part 39):1991, RA 2003, Ed. 2.1

Note: mg/lit.:milligram per liter.

REMARKS:N.D.- NOT DETECTED

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01/04/2021
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Name & Address Of The Customer			
To, **DB Power Limited,** **2X600MW, Village - Badadhara,** **District: Janjgir-Champa** **(C.G.) 495695**	REPORT NO	UES/IR/20-21/05078	
	LAB REF NO	UES/20-21/W/04169	
	DATE OF SAMPLING	25/03/2021	
	DATE OF RECEIPT	26/03/2021	
	DATE OF REPORT	01/04/2021	
	DATE OF ANALYSIS	START: 26/03/2021	END: 31/03/2021

SAMPLE DETAILS

SAMPLE TYPE	CONDENSER COOLING WATER	ORDER /REFERENCE:	WO NO.: 8200002084, DATED: 11/12/2020
CUSTMER SAMPLE ID	CONDENSER COOLING WATER	SAMPLE CONDITION AT RECEIPT	OK
PACKING OF SAMPLE	3 X 2 X 1 NO. PVC CAN 3 X 2 X 1 NO. PVC CAN 3 X 2 X 1 NO. GLASS BOTTLE (HOAD)	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	IS: 3025 (PART I) :1987 RA 2003; APHA 22ND ED. 2012, 1060-B, 1-39	QUANTITY RECEIVED	5 LTR

Condenser Cooling Water Sample Analysis Report

TEST REPORT

Sr. No.	Parameter	Unit	Result	Limits as per Consent	Method Reference
1	Temperature	°C	25.8	Not More than 5°C higher than the intake water temperature	IS 3025 (Part-9):1983, RA 2002
2	pH	-	7.11	6.5 To 8.5	APHA 22nd Ed.2012,4500-H+-B, 4-92
3	Free Available Chlorine	mg/Lit	0.1	0.5	APHA 22nd Ed.2012,4500-Cl-G, 4 - 69

Note: mg/lt.: milligram per liter.

REMARKS:N.D.- NOT DETECTED

Terms & conditions

- *The report for publication, arbitration or as legal dispute is forbidden.*
- *Test sample will be retained for 15days after issue of test report unless otherwise agreed with customer.*
- *This is for information as the party has asked for above test(s) only.*

01/04/2021

PREPARED BY

ULTIMATE ENVIROLYTICAL SOLUTIONS PVT. LTD.

For ULTIMATE ENVIROLYTICAL SOLUTIONS

01/04/2021

AUTHORIZED SIGNATORY

End of the test report

Ultimate
ENVIROLYTICAL SOLUTIONS

HDD-272, Phase III - Near JP Chowk
Ring Road No.-2, Kabir Nagar, Raipur (C.G.) - 492099
Ph : 0771 - 4027777 | Email : ultimateenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer			
To, **DB Power Limited,** **2X600MW, Village - Badadhara,** **District: Janjgir-Champa** **(C.G.) 495695**	REPORT NO	UES/TR/20-21/05079	
	LAB REF NO	UES/20-21/W/04170	
	DATE OF SAMPLING	25/03/2021	
	DATE OF RECEIPT	26/03/2021	
	DATE OF REPORT	01/04/2021	
	DATE OF ANALYSIS	START: 26/03/2021	END: 31/03/2021

SAMPLE DETAILS

SAMPLE TYPE	EFFLUENT WATER	ORDER /REFERENCE:	WO NO. : 9200002084, DATED: 11/12/2020
CUSTMER SAMPLE ID	INTAKED WATER OF ANRS	SAMPLE CONDITION AT RECEIPT	OK
PACKING OF SAMPLE	2 L X 2 NO. PVC CAN 1 L X 2 NO. PVC CAN 1 L X 2 NO. GLASS BOTTLE — SEALED	SAMPLE COLLECTED BY	LABORATORY CHEMIST
SAMPLING PROCEDURE	IS: 3025 (PART 1) :1987 RA 2003; APHA 22ND ED. 2012, 1060-B, 1-39	QUANTITY RECEIVED	5 LTR

TEST REPORT

Sr. No.	Parameter	Unit	Result	Limits as per Consent	Method Reference
1	Temperature	°C	25.8	Not More than 5°C higher than the intake water temperature	IS 3025 (Part-9):1983, RA 2002
2	pH	-	7.42	5.5 To 9.0	APHA 22nd Ed.2012,4500-H+-B, 4-92
3	Total Suspended Solid	mg/Lit	64.0	100	APHA 22nd Ed.2012,2540-D, 2-66
4	Chemical Oxygen Demand (COD)	mg/Lit	74.0	250	APHA 22nd Ed.2012, 5520-B, 5-17
5	Biochemical Oxygen Demand (BOD 3 Days 27°C)	mg/Lit	12.6	30	IS 3025 (Part 44):1993, RA 2003
6	Oil & Grease	mg/Lit	1.2	10	IS 3025 (Part 39):1991, RA 2003, Ed 2.1
7	Phosphate (as PO_4)	mg/Lit	N.D.	5.0	APHA 22nd Ed.2012, 4500-PO_4

Note: mg/lt:milligram per liter.

REMARKS: N.D.-NOT DETECTED

Terms & conditions

- *The report for publication, arbitration or as legal dispute is forbidden.*
- *Test sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.*
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01/04/2021

PREPARED BY

ULTIMATE ENVIROLYTICAL SOLUTIONS RAIPUR (C.G.)

For ULTIMATE ENVIROLYTICAL SOLUTIONS

01/04/2021

AUTHORIZED SIGNATORY

End of the test report

HYDROGEOLOGICAL INVESTIGATION REPORT

OF M/S DB POWER LIMITED

BADADARHA VILLAGE, BLOCK- DABHRA

DISTRICT–JANJGIR-CHAMPA,CHHATTISGARH-495695

PREPARED BY

ENVIBA ENVIRONMENTAL SERVICES

EW-19, INDRAPRASTHA COLONY, RAIPURA, RAIPUR, CHHATTISGARH

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STUDY TEAM

Project Leader: Mr. Jagmohan kumar chandra (Director & Environmental Expert.)

Team members:

1. **Mr. Radha Raman Nayak (Regd. Hydrogeologist, Raipur)**
2. **Mr. Suresh Kumar Sinha (Regd. Hydrogeologist, Raipur)**

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INTRODUCTION

DB Power Limited is a coal-based thermal power plant located at Village: Badadarha, Block: Dabhra, Janjgir-Champa district in the state of Chhattisgarh. The plant has produced thermal power having capacity of 1200 MW (2*600 MW). Ministry of Coal, Govt. of India has allocated permanent Coal linkage of 2,497 MTPA from SECL Chaal, Baroud, Dipika, Gevra, kusmunda and Manikpur mines area and from MCL Vasundhara & Kuklda mines to fulfill the requirement for 1200 MW capacity. Water requirement for the project is getting fulfilled from river Mahanadi, which is flowing at a distance of 23 KM from the plant site. The power plant is operationg since 2014. The Project was awarded to BHEL for BTG and L & T for BOP and completed the project within time frame.

1.1 OBJECTIVE AND SCOPE OF WORK

1.1.1 Objective and Scope

The broad objective of the present study is to establish the hydrogeological environment of the project area and study the impact on ground water and suggest strategies for mitigation.

The scope of work includes following points

1. Conducting comprehensive hydrogeological studies, chemical analysis of ground and surface water samples from the buffer zone of 05 km radius and particularly downstream side of ash dyke and its impact on the water regime for DBPL, 2 X 600 MW, at Badadarha, Block- Dabhra, District-Janjgir-Champa, DB Power Limited.
2. Survey and hydrological data collection of key wells of 05 km radius are from the boundary of plant (buffer zone) of existing open wells/bore wells/piezometers and determine and record for each location including extermination of coordinates of the points by GPS and its plotting on map and water levels, pre & post monsoon levels. Yields, use, aquifer tapped etc.
3. Comprehensive hydrogeological assessment studies of the buffer zone discussing its geomorphology, digitized elevation model, geology, nature of water bearing formation sand depth to water table, long term ground water recharge, present ground water exploitation and present status of ground water development.
4. Collection of samples of ground water and few surface samples from the buffer zone for chemical analysis which parameters comprising pH, Color, EC, TDS, Chloride, Sulphate, Calcium, Magnesium, Fluoride, Nitrate, Bicarbonate, Carbonate, Total

Hardness, Total alkalinity and all the heavy and toxic elements including Hg.

5. Preparation of ground water quality report of 05 km radius area of buffer zone based the results of chemical analysis and its different maps showing the different contour maps on important constituents.
6. Hydrological and drainage studies of buffer zone, delineation of its catchment area, catchment yields, particularly of watershed covering the ash dyke.
7. Preparation of ground water contour map of 5 km radius area showing the Ground water flow direction and hydraulic gradient.
8. Submission of draft report covering the findings of the investigations, original data and recommendations for future monitoring.
9. Submission of final report after incorporation of user observations.

1.1.2 Approach and Methodology

To fulfill the above objectives, especially Hydrogeological study in the area, following approach has been adapted as given below:

A detailed Hydrogeological investigation was carried out in & around Plant within 05 km of radius for both Core & Buffer Zone for evaluating the impact of project activity on ground water storage in the area.

Collection and collation of supplementary data viz. soils, geology, geomorphology, drainage etc. for interpretation.

Establishment of observation stations for water level measurements in different seasons as well as water sample collection for determining the quality aspects.

Pumping test data & its interpretation for knowing the hydrogeological parameters, etc.

Evaluation of present ground water scenario as well as future course of action for protecting the natural environment.

2. GENERAL DESCRIPTION OF THE AREA

2.1 LOCATION

M/S DB Power Limited is a 1200 MW (2 X 600 MW) thermal power plant at Village: Badadarha, Taluka: Dabhra, Dist:.Janjgir-Champar, Chhattisgarh.

The co-ordinates of the Plant are 21°55'33.38"N - 21°54'14.08"N latitudes and 83°11'5214"E to 83°10'45.12"E longitudes. For the present study, an area of 05 km of radius has been demarcated which lies between 21°57'10.40"N - 21°57'47.54"N latitudes and 83°14'15.58"Eto83°08'26.19"E longitudes and falls under the Survey of India Toposheet No. 64 O/1 (1:50000 scale).The location map of the project site and toposheet of study area is given in **Fig. 2.1, 2.2** and the Satellite image map of the area is given in **Fig. 2.3**.

2.2 ACCESSIBILITY

The area is well connected by metaled and un-metaled road as well as Rail networks. Kharsia Railway station, on Mumbai- Howrah Broad Gauge main line of the South-Eastern-Central Railway is situated around 13 km North- Eastern direction from plant site. Jharsuguda is nearest Airport and is about 117 km from the study area which is also approachable by road and rail. The block head quarter is Dabhra.

2.3 DEMOGRAPHY

There are 21 villages within 5 km radius of plant area. The total population as per 2011 Census is 29024 (for 05 km radius buffer zone). Scheduled Caste population of the study area (05km) is 5352 and Scheduled Tribe is 6824, Percentage of literacy is 78.08%.The workers those actually engaged in occupation are 13927. A population detail is presented in table 2.1.

Table 2.1 Population details as per census 2011

Name	No_HH	TOT_P	TOT_M	TOT_F	P_SC	P_ST	P_LIT	TOT_ WORK _P
Kharsia - Raigarh								
Adajhar	164	663	314	349	15	0	74.55 %	355
Karpipali	202	712	351	361	73	21	77.71%	264
Kuarmauha	162	666	330	336	152	175	76.32 %	267
Jaimura	404	1,398	691	707	207	275	77.42 %	358
Amapali	83	318	150	168	0	109	71.94 %	91

Basnajhar	361	1,549	790	759	198	518	76.02 %	634
Basanpali	149	582	293	289	107	145	82.08 %	201
Ful Bandhiya	218	797	394	403	431	222	90.65 %	338
Pandripani	211	823	420	403	139	181	77.50 %	320
Sondka	333	1,115	557	558	251	90	82.31 %	325
Tayang	194	730	365	365	68	253	79.85 %	323
Dabhra – Jangir Champa								
Badadarha	436	1,634	857	777	187	276	75.07 %	1,076
Dhurkot	546	2,378	1,200	1,178	1,107	137	67.80 %	1,090
Dumarpali	277	866	448	418	162	151	81.27 %	312
Kanwali	657	2,499	1,244	1,255	232	1,435	70.50 %	1,170
Khairmuda	204	916	469	447	136	95	69.11 %	423
Komi	281	1,118	572	546	137	378	70.89 %	566
Kenapali	323	1,283	664	619	595	84	78.09 %	702
Saraipali	158	456	217	239	69	157	78.16 %	176
Tundri	1,074	3,810	1,936	1,874	327	1,583	74.55 %	1,760
Jaijaipur – Jangir Champa								
Odekera	1,020	4,711	2,345	2,366	759	539	69.56 %	3,176
Total	**7457**	**29024**	**14607**	**14417**	**5352**	**6824**	**78.08%**	**13927**

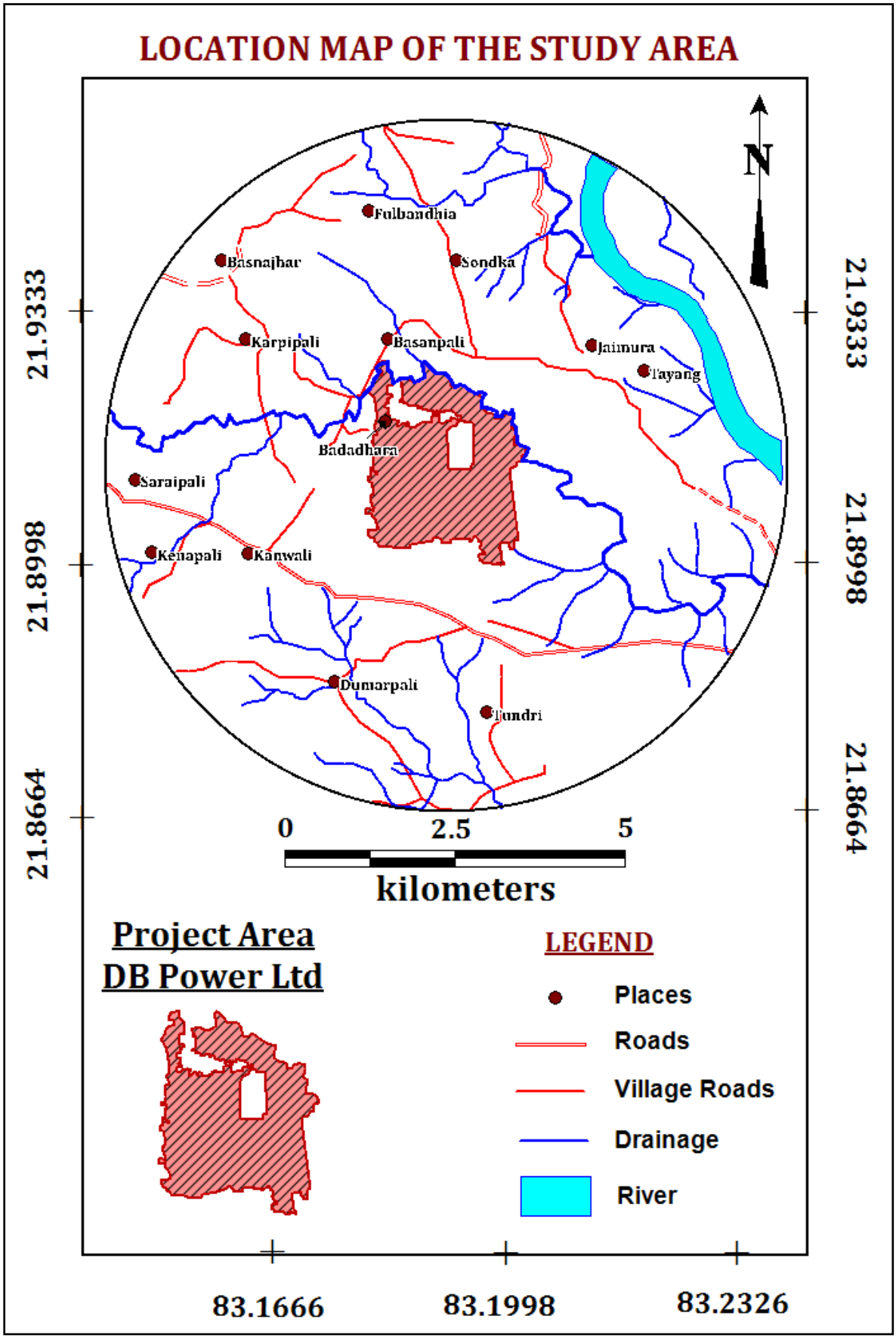


Fig 2.1: Location map the Study area

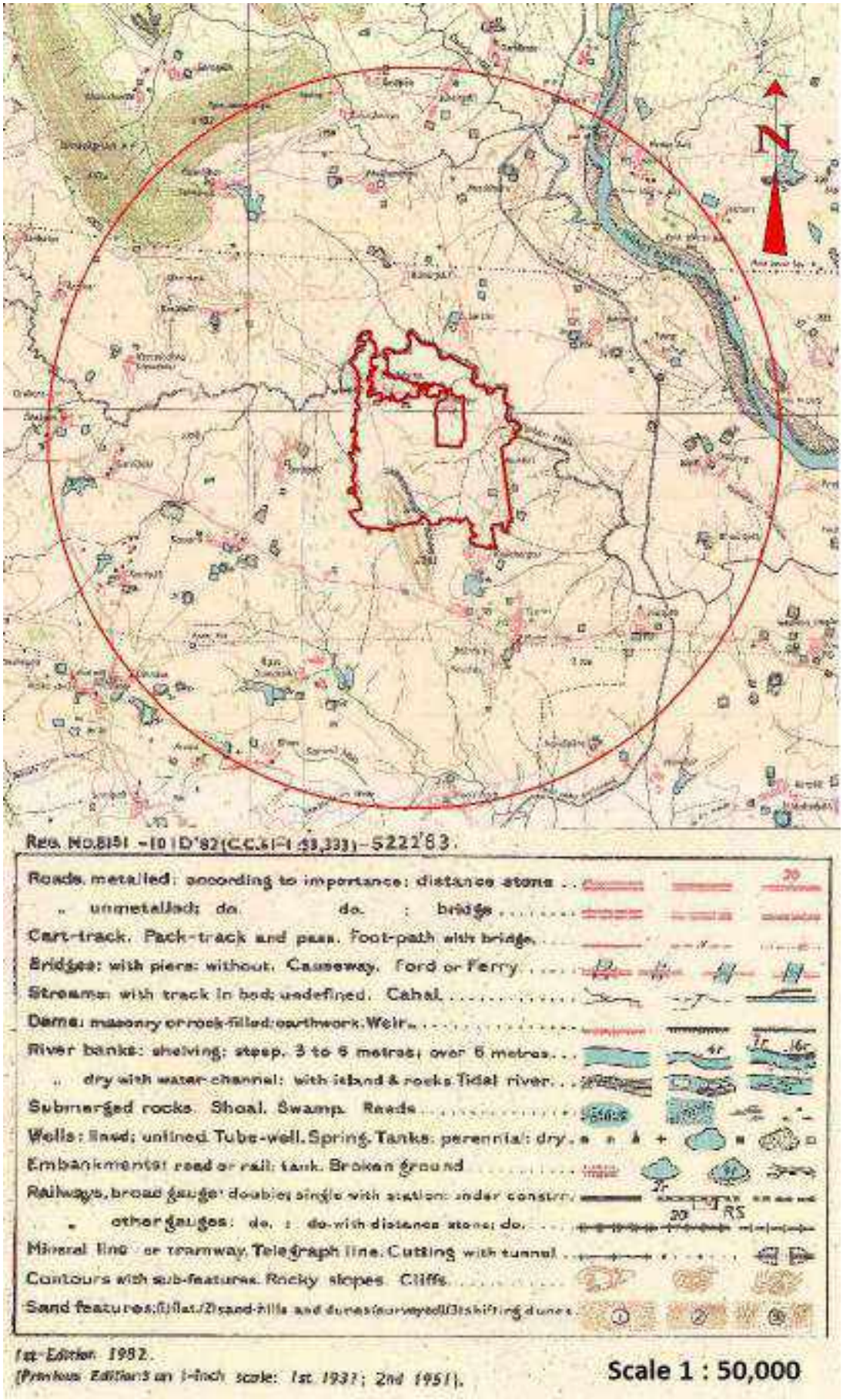


Fig 2.2: Top sheet (1:50000) of the Study area

Fig 2.3: Satellite of the Study area

Fig 2.4: Satellite Map of the Project area

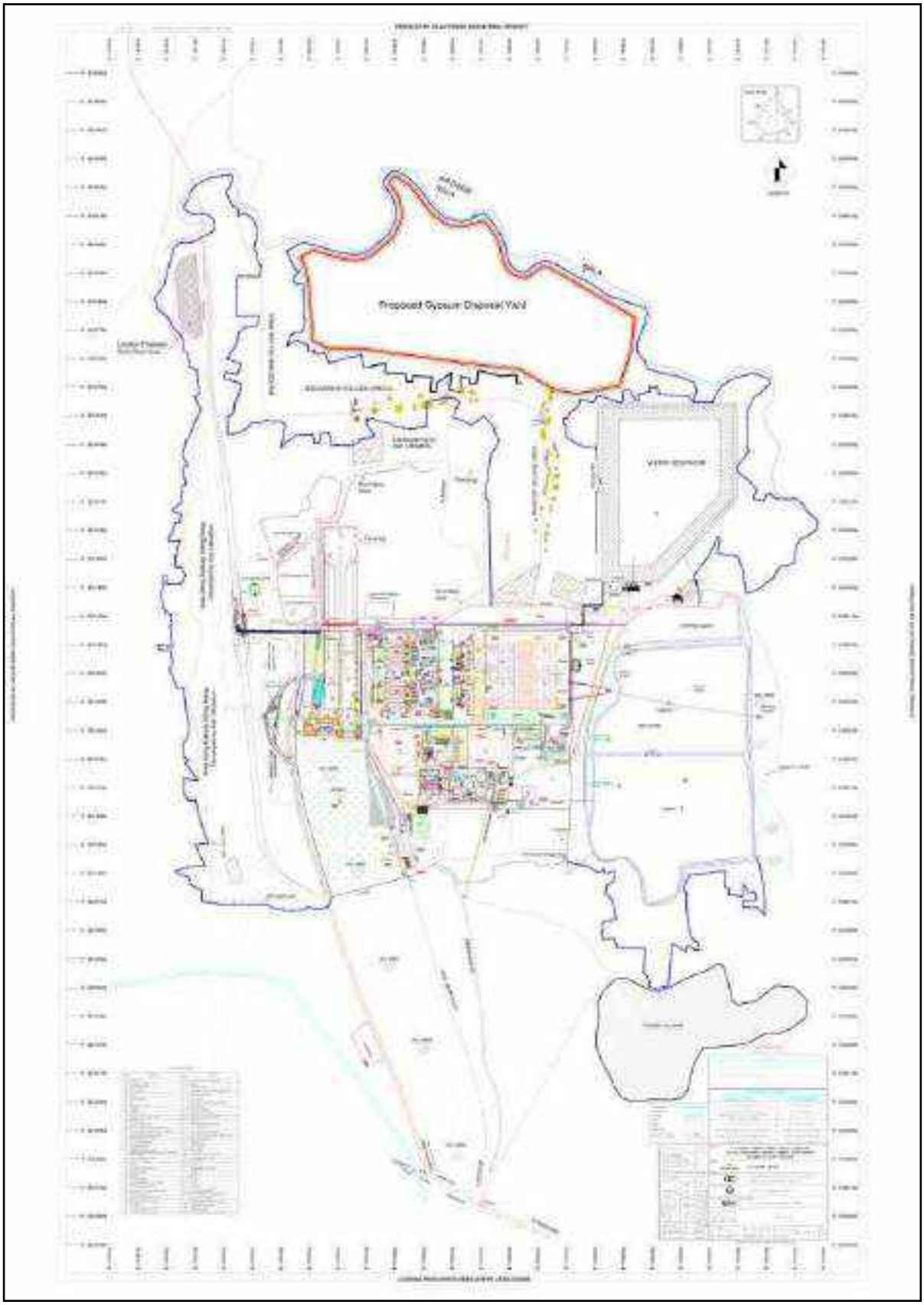


Fig 2.5: Plant Layout

2.4 LAND USE

The Land use / Land cover map for the project area has been prepared using satellite image, the current data will also enable assessing the impact on land use pattern in the study area due to the proposed project activity. Survey of India topo-sheet on 1:50000 scales has been used as a reference map for preparation of base layer data like road, rail network, village and project site and also for geo referencing of satellite image. Land use / Land cover map preparation.

Hybrid technique has been used i.e. visual interpretation and digital image processing for identification of different land use and vegetation cover classes based on spectral signature of geographic feature. Spectral signature represents various land use class. Image interpretation keys are developed based on image characteristics like color, tone, size, shape, texture, pattern, shadow, association etc, which enables interpretation of satellite images for ground feature. Training sites are then assigned based on their spectral signature and interpretation elements. Following classes have been used for the Land use. Land covers Map: Water Bodies, Plantation, Crop Land, Fallow Land, Industry, Human Settlement, Open Scrub, Vegetation, Open waste land, dense scrub & Mine Quarry. The land use/land cover details of the lease and study area are given below in **Table 2.2,** which has been presented in **Fig 2.6**.

Out of the total area taken for the study, nearly 538.79 ha is covered by forested area, only 992.91ha is covered by irrigated area, 9085.95 ha is covered by non-irrigated area. Culturable waste land area comes around 60.20 ha while 520 ha area is covered by area not available for cultivation. The details of land use pattern in the study area within 5 km radius are summarized as below in the **Table 2.2** & Fig **2.6.**

Table 2.2: Land use Pattern of the Study Area (05 km radius from the Project site)

SN	Land use	Area (in Sq KM)	Percentage
1	Agricultural Land-Crop Land-Kharif Crop	90.8595	73.06
2	Agricultural Land-Crop Land-Zaid Crop	3.80495	3.06
3	Agricultural Land-Crop Land-Two crop area	9.92907	7.98
4	Agricultural Land-Fallow-Current Fallow	0.60202	0.48
5	Forest-Deciduous (Dry/Moist/Thorn)-Dense/Closed	5.38796	4.33
6	Wastelands-Scrub land-Open scrub	5.20509	4.19
7	Wastelands-Sandy area-Riverine	1.53606	1.24
8	Build Up-Mining / Industrial area	1.69411	1.36

9	Build Up-Built Up (rural)-Built Up Area (Rural)	2.67511	2.15
10	Build Up-Built Up (Urban)-Transportation	0.140471	0.11
11	Waterbodies-Reservoir/Tanks- Perennial	2.52319	2.03
	Total	124.357531	100

Source: Satellite Imagery

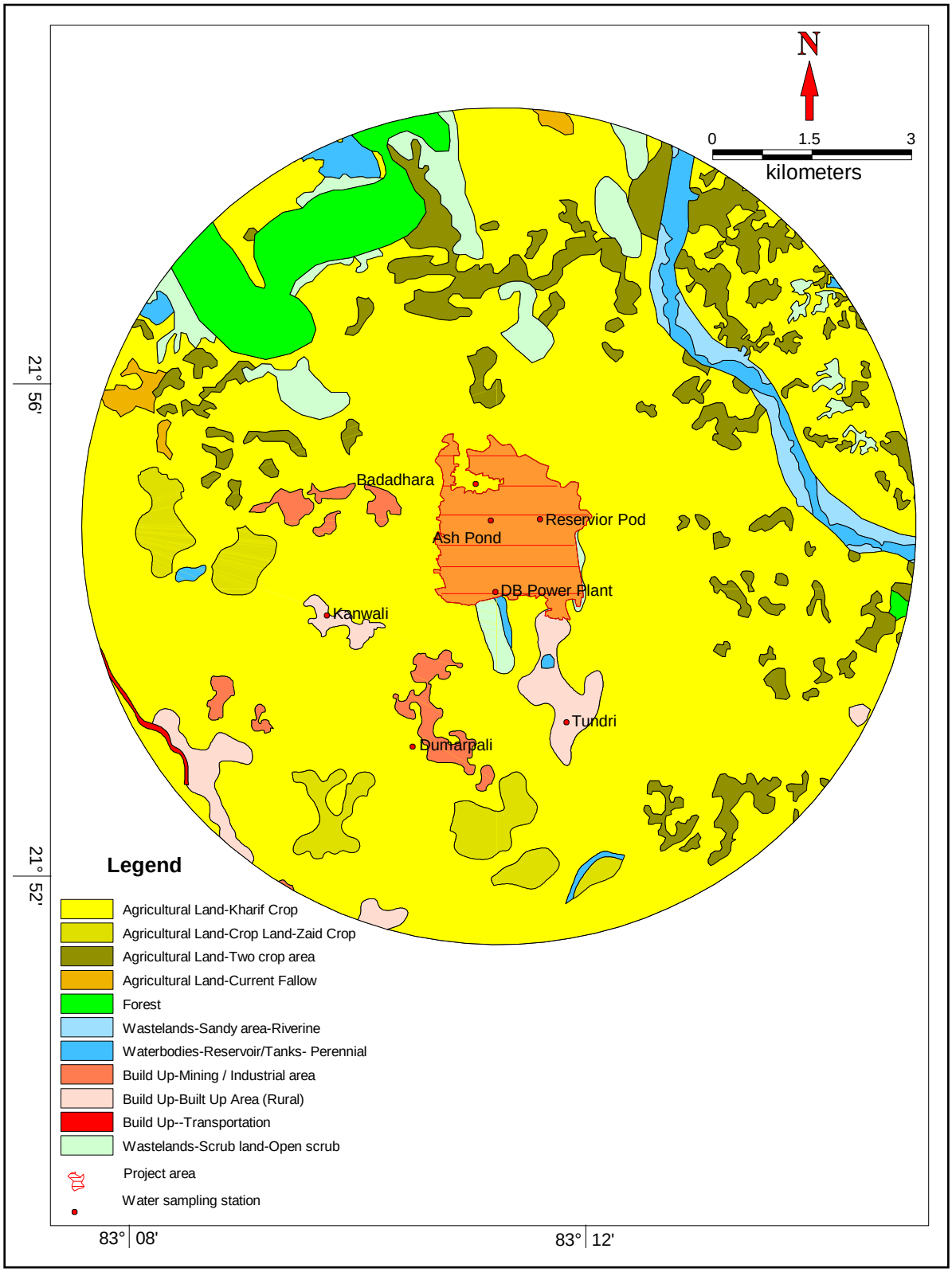


Fig 2.6: Land use map the Study area

2.5 CROPPING PATTERNOF THESTUDYAREA

The study area represents agricultural plain and Green fields and lot of agricultural activities in the surroundings of villages are noticed. Base line data collected from Agriculture Department, Raipur and observed that majority of the area around the 05 Km. radius from the project site is distributed with following crops:

Kharif Crops: - Peddy, Cotton, Wheat, Maize, Jowar, Moong, Sunflower, Soyabean, Groundnut.

Rabi Crops- Gram Wheat, Jow, Tarameera, Sarson, Bhindi, Channa, Pea, Tomato, Palak, Raddish.

Cropping pattern of the area depends upon the climatological conditions and need of the local population of the area. Sometimes cropping pattern may get changed during construction and operational phase because of particular requirement of specified anthropogenic activities.

The study area shows typical agro climatic conditions. In spite of the agriculture being depend mainly on monsoon and underground water, cultivation is the major occupation of this region. The land is mono culture in nature besides the above- mentioned crops, banana, papaya, bar, ginger, methi, tomato, carrots, soya beans etc. are also grown in the area. The growth season of major crops are as shown in table 2.3 given below:-

Table 2.3: Growth seasons of major crops

S.NO.	NAMEOFCROP	PLANTATION MONTH	HARVEST SEASON
1.	PEDDY	JUNE-JULY	OCTOBER
2.	WHEAT	JAN.	MAY
3.	JOWAR	JULY	OCT. -NOV.
4.	COTTON	APRIL	JULY-AUGUST

Most of the crops are grown on small farms (located near the village wells) where generally the work is done manually. A very little mechanized (with tractor) cultivation is also seen at times in certain areas.

2.6 CLIMATE AND SOILS

2.6.1 Climate:

The area enjoys tropical climate with hot summer followed by well-distributed rainfall through South-West monsoon season. The winter commences from December and last till the end of February. The period from March to the end of May is hot season. The monsoon season starts from the middle of June and last till the end of September. The average daily annual normal temperature for the area is 32° C. During the summer Season humidity is lowest i.e. about 32% and is highest during the South-West Monsoon period i.e. about 80%.. About 94 percent of the annual rainfall is received during the period June to October, July and August being the rainiest months. The variation in annual rain fall from year to year is very large on an average the reared 50- 60 rainy days in a year**.** There is only one observatory located in Raipur which is about 240 km away from the study area maintained by Indian Meteorology Department.

2.6.2 Rainfall

During the Year 2009 to 2019 the maximum rainfall recorded 1398.4 mm in the year 2016 and minimum rainfall 866.5 mm had been recorded in the year 2017. Details are as shown in **Table 2.4**. In this year very low rainfall recorder, although ground water of this area falls under safe zone as well as forest is very dense, but precipitation was comparably too less. The average rainfall for last eleven year is average 1106.34 mm. Out of the total annual rainfall about 90% of the takes place during the South West Monsoon i.e. among the months June to September. Only 8% of the rainfall takes place during the Winter Season from October to February while only 2% of the rainfall takes place during summer Season.

Table 2.4: Annual Rain Fall (2009-2019)

Sl No	Year	Rain fall (in MM)
1	**2009**	**963.7**
2	**2010**	**916.6**
3	**2011**	**884.5**
4	**2012**	**1348.1**
5	**2013**	**1146.7**
6	**2014**	**1423.9**
7	**2015**	**1027.7**
8	**2016**	**1398.4**
9	**2017**	**866.5**
10	**2018**	**1036.6**
11	**2019**	**1157.1**
12	**2020**	**1400.0**

2.7 SOILS

Only one soil categories are present in the study area namely Ultisols, (red & yellow Soils) Soil map of the study area is presented in **Fig 2.7**.

i. 2.7.1: Ultisols

The Indian equivalent of this soil found in study area is Lateritic and red yellow soil. It is exposed in all parts in the area. It is the ultimate product of continuous weathering of minerals in a humid climate. This is a highly weathered and leached acid soil with high levels of clay below top layer. They are characterized by a humus-rich surface horizon and by a layer of clay that has migrated below the surface horizon. This soil has variety of clay minerals but in many cases the dominant mineral is Kaolinite. This clay has good bearing capacity and no shrink-swell property. They are red to yellow in color and are quite acidic having pH less than 5. The red and yellow color results from the accumulation of iron oxide which is highly insoluble in water.

Alluvial Soils are found along the river course.

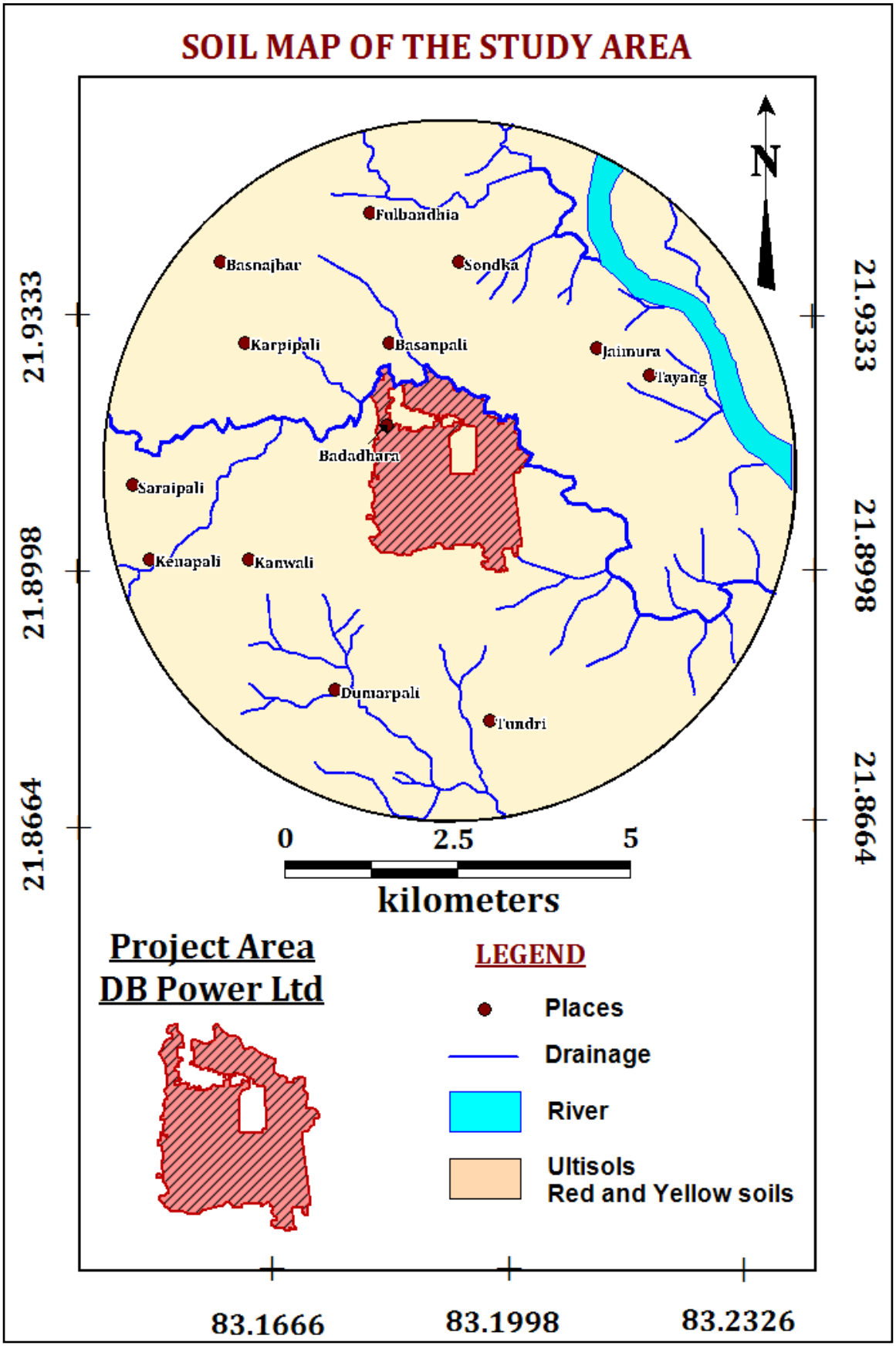


Fig 2.7: Soil map of the Study area

2.8 .DRAINAGE AND GEOMORPHOLOGY

2.8.1 Drainage

The area is drained by tributaries of Mand River. Mand River is flows from North to South-East Direction of project area. Thus the project area is in the interfluves zone of Dantar Nala, Pathari Nala & Mand River. The Mand River is a tributary of the Mahanadi in India. It joins the Mahanadi in Chandarpur, in Chhattisgarh, 28 km from the Odisha border and before the river reaches the Hirakud Dam. This tributary system comes under Mahanadi basin. The drainage pattern in the area is sub-parallel and dendritic in nature with medium drainage density indicating the formations in the area are moderately porous& permeable in nature and are having moderate surface run-off. The drainage density in the central part near to project area is low as compare to remaining area. The drainage map of the study area is presented in **Fig 2.8**.

The study area is characterized by flat undulating terrain with regional slope to the north-east. The average elevation in the southern portion is around 270 m while in the central parts is 310 m amsl. The average land slope of the area is works out about 4m per km from top sheets (1:50000 scale), Survey of India.

Drainage network are universal feature of landscape on the earth. Various environmental factors such as climate, relief, lithology, and vegetation play a considerable role in the development of drainage basin. Watershed geomorphology helps in understanding the physical and hydrological behavior of the river regime.

2.8.2 Geomorphology:

Geo-morphologically the study area comes under Pediplain, Denudation Hills & Floods Plan. The Physiography of the basin is controlled by geological formations namely Sandstone and shale.

The rocks were exposed to renewed post depositional activities and were subjected to intensive and extensive sedimentation, peneplanation and denudation during Pre-Quaternary and Quaternary time. In response to lithology of rocks, the alchemical composition, the irrelative deposition, tectonic setup, they were chiseled into various geomorphic and hydro-geomorphic surfaces; in this case Pediplain and Denudation hills. The feature Denudation Hills are formed in the north-western part of the study area. This unit is controlled by fractures, joints and lineaments. Flood Plain is also developed along the river courses. It is formed by extensive deposition of alluvium by major river system. This unit is normally flat/gently undulating land

surface and located along river courses. The elevation of the study area is 210-225 m amsl. Generally the slope is towards the eastern side of the study area.

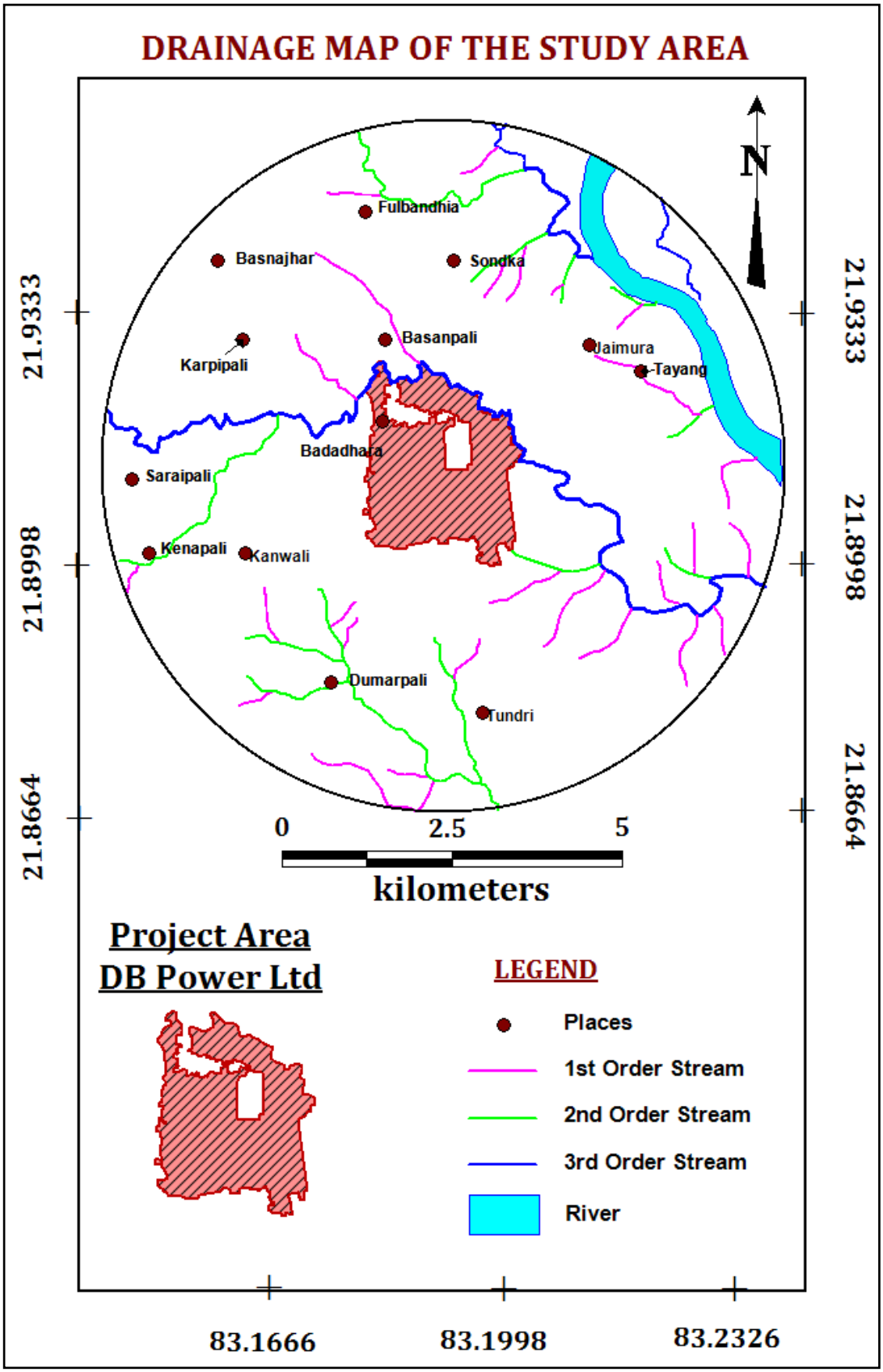


Fig 2.8: Drainage map of the Study area

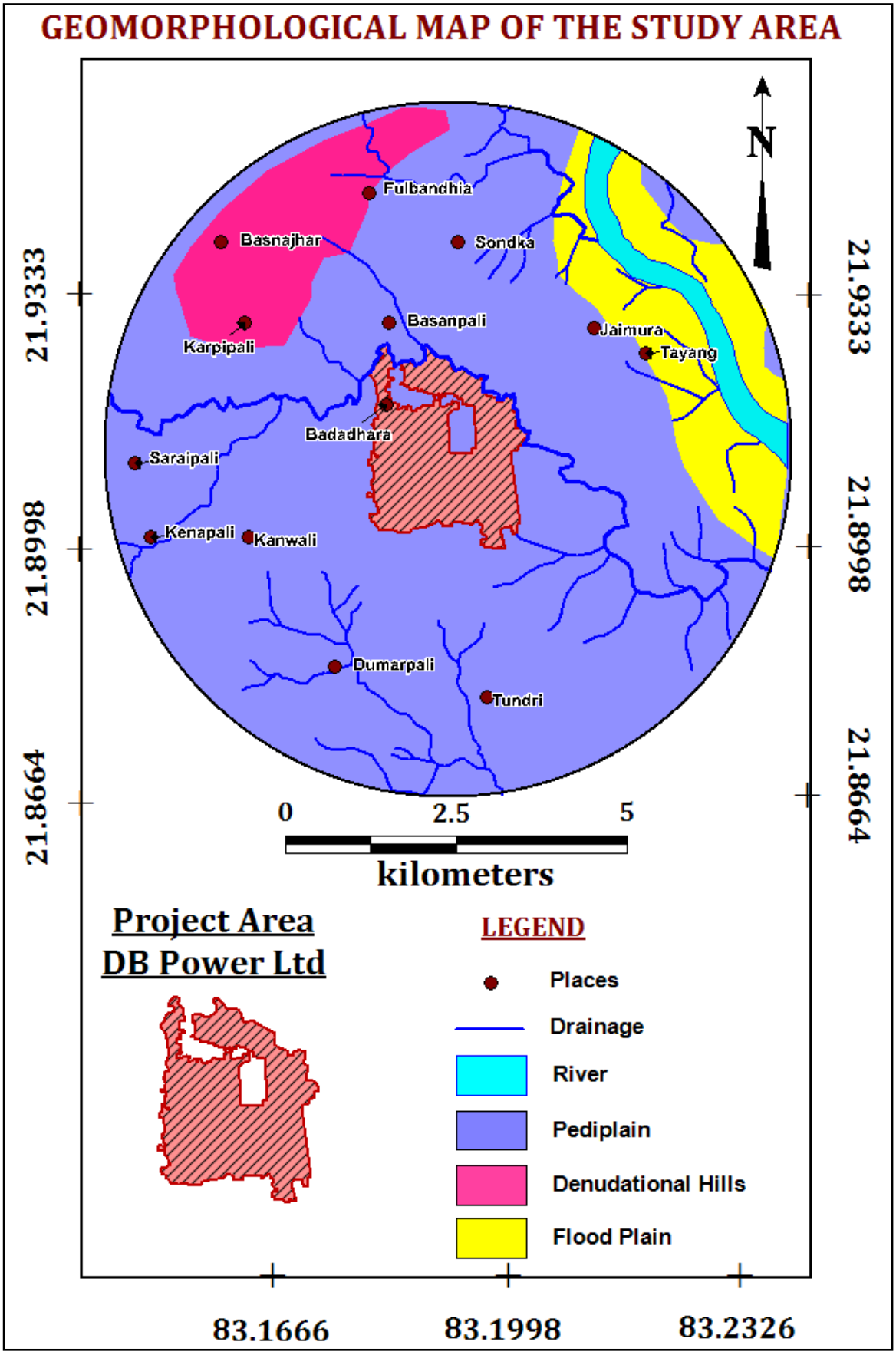


Fig 2.9: Geomorphological map the Study area

3. GEOLOGY

The rocks of the Chhattisgarh super group represented by limestone, Sandstone and shale. A thin layer of alluvium/ laterite belonging to Quaternary period is found on the top surface**.** The generalized stratigraphic sequence of formation in and around the area is given in **Table 3.1** below.

Table-3.1 Generalized stratigraphic sequence of Janjgir-Champa District

Age	Supergroup	Group	Formation	Lithology
QUATERNARY	Recent to sub-recent		Alluvium and Laterite	Sand, Silt, Clay and lateritic Soil
PROTEROZOIC	Chhattisgarh Supergroup	Raipur Group	Maniyarifm	Gypsiferous Shale
			Hirrifm	Dolomitic limestone
			Tarengafm	Shale & Dolomite
			Chandifm	Limestone & Shale
			Gunderdehifm	Shale
			Raigarh	**Shale,Limest.,Sandstone & Conglomerate**
			Charmuriafm	Limestone & Shale
		Chandrapur Group	Kanspatharfm	Sandstone, Siltstone Shale &Conglomerate
			Choparadihfm	
			Lohardifm	
		Bilari group Sonakhan gr Baya group	Intrusive, lakhadabri, Jonk&Chikhali	Quartz veins, basic dyke, Meta basalt Schist & Gneisses
ARCHAEAN	Basement crystallines- Granite, gneisses ,granulite and Amphibolite			

ii. 3.1.1 Basement Crystalline:

The basement crystallines belongs to Archaean age mainly consists of Granite, gneisses, granulite, phyllites and amphibolites. At places it is intruded by quartz veins. The overlying sedimentaries belongs to Chhattisgarh Super group of rocks. The contact between the Achaeans and the sedimentaries is faulted along the western margin of the basin.

iii. 3.1.2 Chhattisgarh Super group:

The crescent shaped Chhattisgarh basin within the Central Indian Craton can be subdivided into a small Baradwarproto-basin in the east and main Hirriproto -basin in the west. The entire succession of Chhattisgarh super group is divided into three groups. Lowermost Pairi group consists of sandstone, conglomerate, limestone and shale overlies unconformably on crystalline group and developed in the Baradwarproto-basin. The middle Chandrapur group un- conformably overlying the Singhora group or older basement and consists of arenite formations and third is Raipur group at the top, comprising argillite-carbonate suite of rock.

iv. 3.1.2.1 Chandrapur group:

The sequence of Chandrapur group shows a variable thickness ranging from 20 m to as much as 90 m. The maximum thickness is attained in SE part of the basin, thinning westward as well as NE side and directly overlying the crystalline basement.

v. 3.1.2.2 Raipur group:

The Raipur group comprising of predominantly argillite sequence conformably overlies the Chandrapur group with a gradational contact. The group has been subdivided into six sub-division representing three cycles of carbonate-argillite sediments as follows

Charmuria formation- dominantly carbonate sequence and is conformably overlain by Gunderdehi formation.

Gunderdehi formation- dominantly a calcareous argillite purple coloured shale with intercalated limestone is dominant member.

Chandi formation- comprise a major stromatolytic limestone sequence developed around southern side of Hirri sub-basin as arcuate outcrop pattern and is medium to course grained dolomitic limestone.

Tarenga formation- conformably overlies the Chandi formation and comprise cherty shale, calcareous shale and argillaceous dolomite, green and white clay.

Hirri formation- conformably overlies the Tarenga formation in south and Pandaria formation(coalesce of Charmuria, Gunderdehi, Chandi and tarenga formation) in the north. At places intra-formational conglomerate, dolomite and black shale contained gypsum as layer parallel to bedding.

Maniyari formation- named after the river along which the rock is best developed. It represents the closing phase of deposition in Chhattisgarh basin and consists of lower gypsiferous grey siltstone and shale followed by reddish brown calcareous and non-calcareous shale with limestone and dolomite.

vi. Recent to sub-recent:

3.1.3.1 Laterite:

Insitu and rolled laterite occurs at many places in isolated patches. These are blanket deposits and few centimeters to few meters in thickness. The ferruginous rock formations of Chhattisgarh Supergroup are responsible for the formation of thin capping of laterite due to leaching and concentration of iron oxide from sandstone of Chandrapur group and also of shale of Raipur group.

3.1.3.2 Alluvium:

The alluvium consists of sand, silt and clay. The sands are fine to coarse grained and poorly sorted. The alluvial soils are mostly of residual in nature and are the weathered products of shale and limestone. The thickness of soil varies from few centimeters to over 10m in places.

3.2 LOCAL GEOLOGY:

The area is underlain by thin layer alluvial/laterite belonging to Quaternary period. Thick pile of rocks belonging to Raipur group of Younger Proterozoic period consisting of shale, underlie the alluvial sediments **(Fig 3.1).** The formation have general strike in NE-SW direction with very low dips of 2°to 3° due NW. Two sets of vertical joints trending in N50°E- S50°W and NE-SW direction are prominent in the area. The gap between joint plain is large from few centimeters to 5meters and are mostly interconnected. The lithological characters of various formations present in the study area are described as follows:

3.2.1: Raigarh Formation: The formation is widely developed in Baradwar sub-basin, comprising dominantly friable calcareous purple shale with limestone intercalations. The formation can be classified into a lower shale flaggy carbonate-arenite member which is followed upward by a purple calcareous shale member. Unlike Hirri sub-basin, the bedded flaggy limestone gradually changes in its outcrop width and further east it pinches out occurring as pockets and lenses in the purple shale above the Chandarpur arenite. At places, arenite lenses and bands are also present in the member. The upper member is mainly purple calcareous shale with limestone as well as arenite lenses. Mud cracks and ripple marks are the common structures. One of the mappablearenite members is Dhurkotarenite occurring within the shale and comprises conglomerates and sandstone. Conglomerate consists of clasts of quartz, shale, jasper and chert embedded in siliceous matrix. This grades to a sandstone which is coarse to medium grained containing argillaceous and calcareous matrix. The dark grey dolomite in subsurface grades to light grey to cement limestone. A thin friable green sandstone unit occurs in SariaBorda area of Baramkela block. They also described presence of dolostone around Raigarh town. Some Stromatolitic limestones within this formation in Raigarh district indicate extension of Bamandih Formation upto Raigarh district. In the study area there are two types of rock formation are found.

1. Raigarh Sandstone

2. Raigarh Shale

Raigarh Sandstone is found in the central, Northern and North-Western part of the study area.

Raigarh Shale is found in Southern, Eastern and western part of the study area.

vii. 3.2.2: Soil/Alluvium:

Along The river course is underlain by alluvial residual soil covers which are loam and sandy loam. The thickness of overburden varies from 2 to 6 m. In order to understand the geological sequence fully well in the project site geological map of study area are present in **Fig 3.1.**

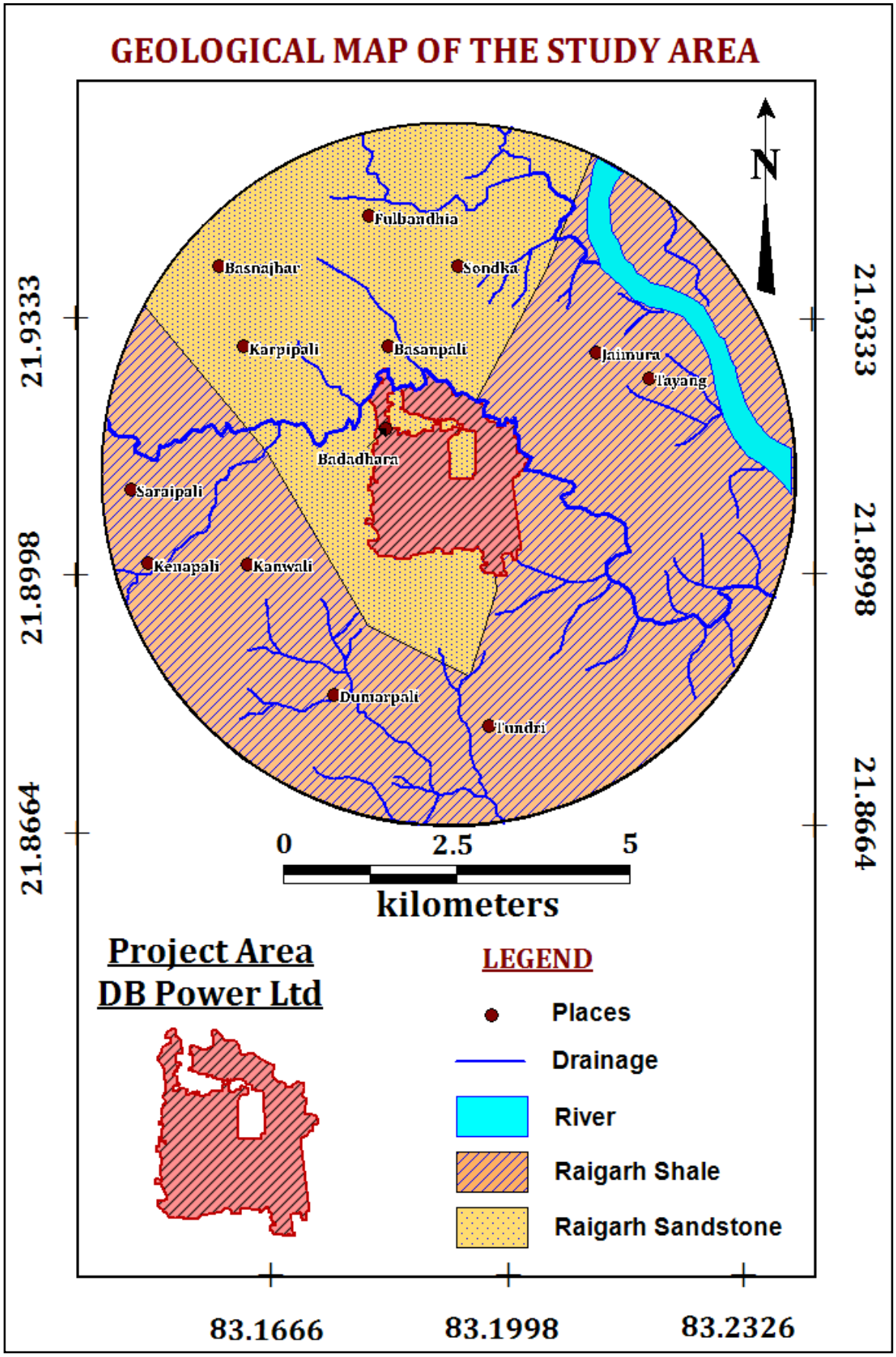


Fig 3.1: Geological map of the Study area

4. HYDROGEOLOGY

4.1 INTRODUCTION

Ground water occurrence is highly influenced by underlying geological formations and their hydro-geological characteristic. Weathered and fractured zones present in the rocks or formation provides scope of ground water occurrence, storage and its movement. Hydrogeology of the area broadly describes the disposition of aquifers, occurrence of ground water its movement, yield potential of water bearing formations, groundwater regime conditions in space and time etc. Detailed hydro-geological investigation has been carried out in and around the project area for elucidating the hydrogeology and establishing the interrelationships between various hydraulic parameters.

4.2 GROUND WATER OCCURRENCE AND AQUIFER SYSTEMS

In the study area, ground water occurs under phreatic or unconfined condition in weathered portion of rocks and semi-confined to confined conditions in fractures/cavernous part of rocks i.e. Sandstone and shale at depths. The shallow aquifers occur within an average depth of 25 m. The configuration of water table in the shallow aquifer follows the topography due to which the ground water movement is generally towards valleys or topographic low. The water bodies such as tanks, canals and streams also influence the occurrence and movement of ground water in shallow aquifers. The shallow aquifers of the area are mostly developed by way of dug wells in the area with depth ranges from 7 to 16 m. In general the yield of dug wells ranges from 25 to 40m^3/day. Deeper aquifer in the area mainly formed of Raipur group of rocks constituted of Raigarh formation comprising Sandstone and shale. The deeper aquifers of the area are mostly developed by way of bore wells with depth range from 50 to 80 m. In general, the yield of bore wells ranges from 1 to 5 lps.

4.3 WATER TABLE CONFIGURATION AND FLOW DIRECTION

The flow direction is of two directions i.e. in western, central and northern part of the study area it is towards East Direction and in southern part of the study area it is towards North-East direction indicating the surface water divide in the central portion of the study area near to project area.

The water table elevation in the study area ranges between 210 to 225 mamsl indicating more or less the plain terrain. North-Eastern part of the area is having low altitude of water table elevation i.e. 210 mamsl while water table elevation increases to western side & is maximum i.e. 225 mamsl. The gradient of water table is variable. In the area the yield ranges between1 to 5 lps in Central, Northern, North-Eastern & North-western indicating the area is covered by Sandstone while in major part of the area it is below 1 lps which is covered with shale. Contour map & Hydrogeological map is given at **Fig.4.1 and 4.2 r**espectively.

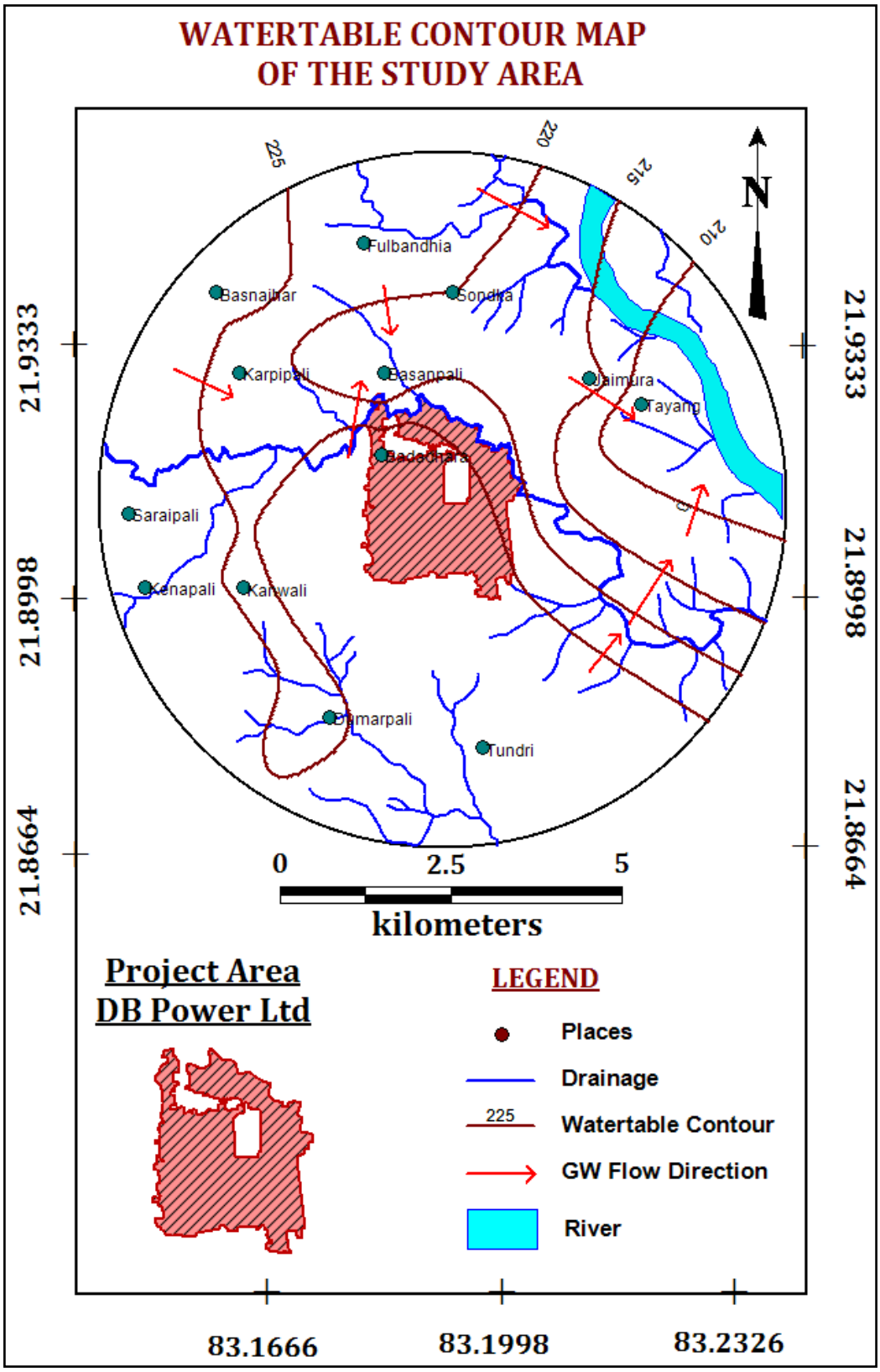


Fig 4.1 Water table contour and ground water flow direction

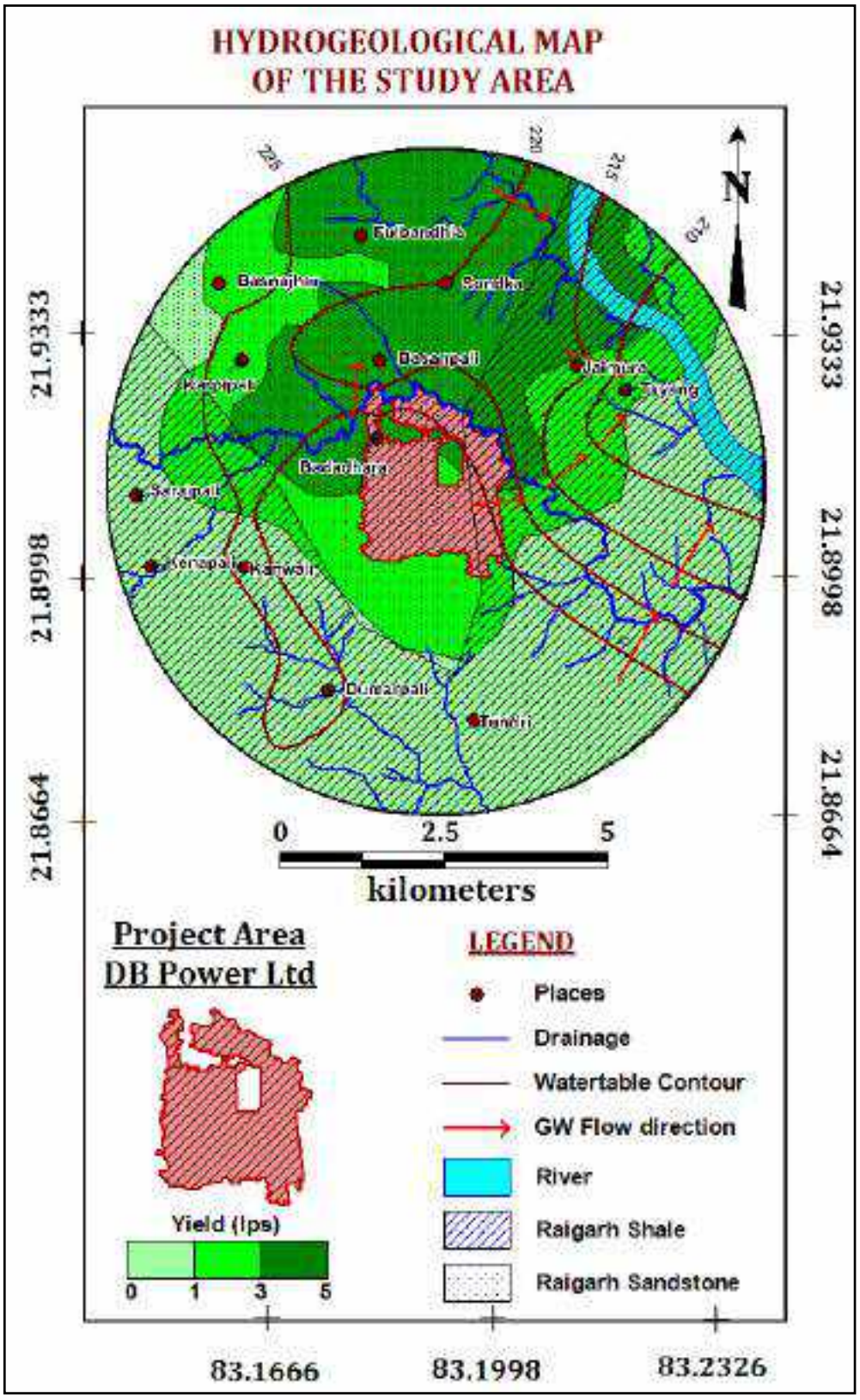
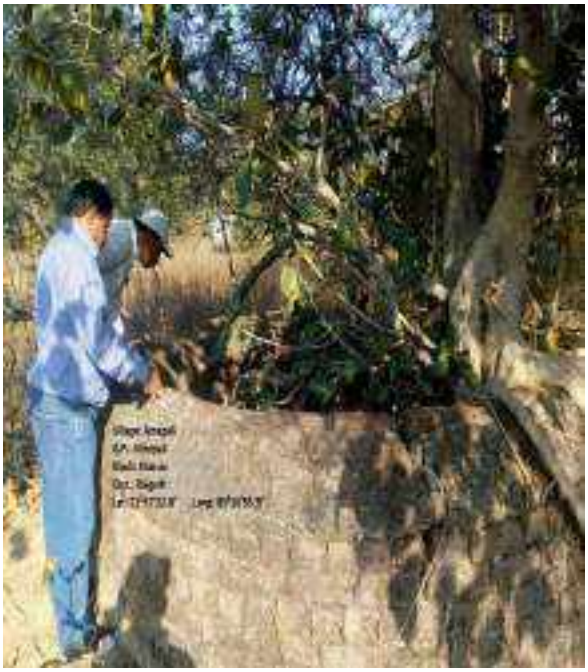


Fig 4.2: Hydrogeological Map of the Study area

4.4 GROUND WATER REGIME MONITORING

The monitoring of ground water regime is of immense help in management of the water resources as well as protecting the ground water storage. Such study envisages regular monitoring of water level at selected locations to observe the changes in ground water level and variation in ground water quality with respect to time and space. It is pertinent to say that any development of ground water resources in a particular area would bring changes in ground water regime if input to the ground water system is not balanced with output from the same system.

The study aims to observe the changes in ground water levels and quality with respect to the ground water development, which in turn would help in identifying the appropriate measures to be adopted for artificial recharge to ground water and neutralize the impact of the excessive ground water development. In the present report, the monitored data has been presented and the overall picture of ground water regime behavior due to continuous abstraction of ground water has been analyzed for the year 2019-20. Ground water regime monitoring was carried out two times in a year i.e. May, and November. The water level data of the month of May and November are taken as levels of pre-monsoon and post-monsoon respectively, Data presented and analysed for pre and postmonsoon water level data. The photographs of the some monitoring stations are indicated in **plate: I**, which was taken during the collection of water level of ground water in all four seasons.




Village: Fulbaodhia
G.P.: Pandripani
Block: Kharsia
Dist.: Raigarh
Lat: 21°56'47.1" , Long: 83°13'48.1"


Village: Jaimura
G.P.: Jaimura
Block: Kharsia
Dist.: Raigarh
Lat: 21°55'49.4" , Long: 83°12'42.9"


Village: Karpipali
G.P.: Kanmura
Block: Kharsia
Dist.: Raigarh
Lat: 21°55'46.0" , Long: 83°09'45.1"


Village:Kenapali
G.P.: Kenapali
Block: Dabhra
Dist.: Janjgir-Champa
Lat: 21°54'04.7" , Long: 81°08'57.2"


Village: Tundri
G.P.: Tundri
Block: Dabhra
Dist.: Janjgir-Champa

4.4.1 Distribution of monitoring stations

To study the change in ground water regime in and around study area, total of 14 monitoring wells were established at different locations for regular monitoring of ground water level. The basic details of these monitoring wells are presented in **Table 4.1** and their distribution is presented in **Fig 4.3.**

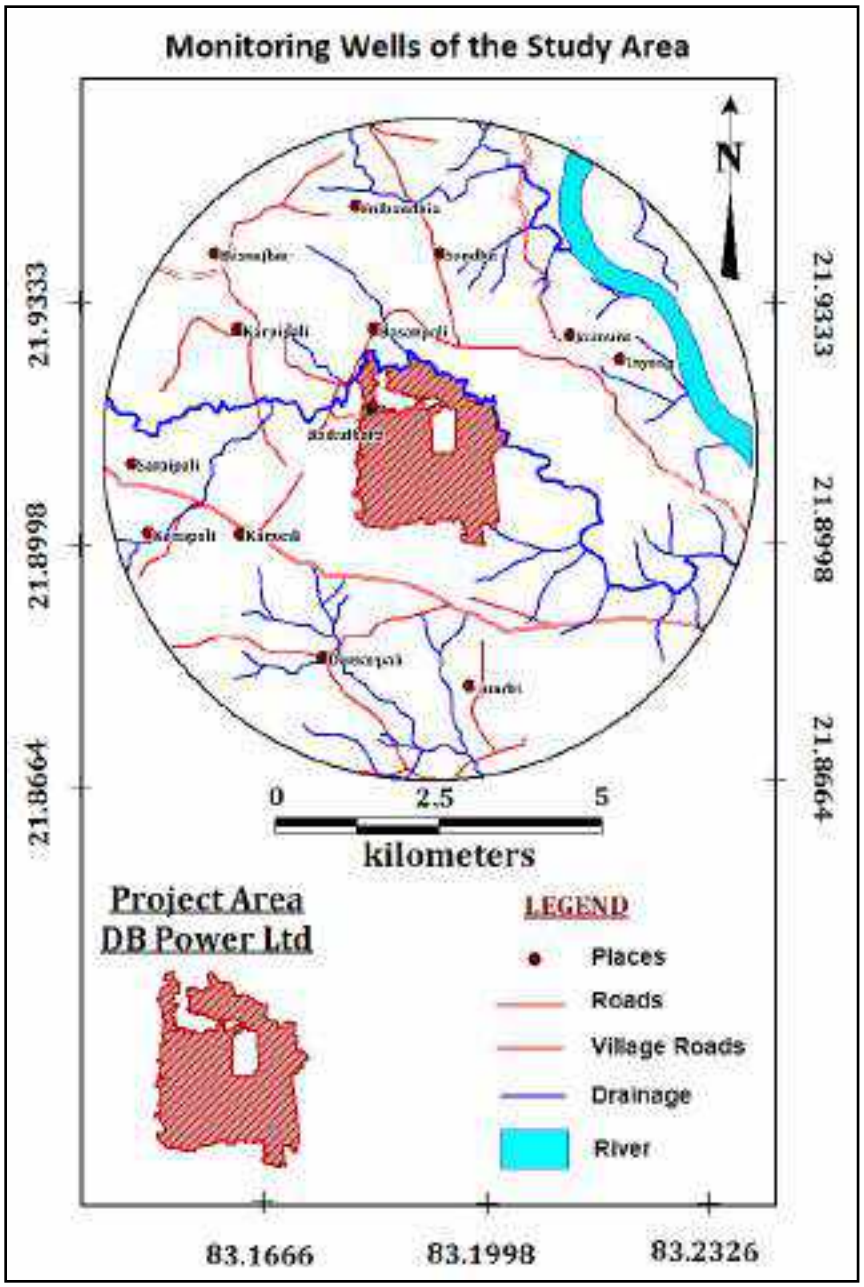


Fig 4.3: location of monitoring wells of the Study area

Table 4.1 : Basic details of established monitoring wells

Sl No.	Village	G.P.	Block	District	RL Of ground level (mamsl)	DIA (m)
1	Amapali	Kherpali	Kharsia	Raigarh	232	3.90
2	Sondka	Sondka	Kharsia	Raigarh	233	5inch
3	Badadhara	Badadhara	Dabhra	Jangir-Champa	231	4.8
4	Basnajhar	Basnajhar	Kharsia	Raigarh	241	6inch
5	Fulbandhia	Pandripani	Kharsia	Raigarh	232	2.2
6	Karpipali	Kanmuna	Kharsia	Raigarh	234	6inch
7	Tundri	Tundri	Dabhra	Jangir-Champa	236	5.5
8	Basanpali	Sondka	Kharsia	Raigarh	223	3.65
9	Kenapali	Kenapali	Dabhra	Jangir Champa	237	4.90
10	Saraipali	Saraipali	Dabhra	Jangir-Champa	239	3.13
11	Kanwali	Kanwali	Dabhra	Jangir-Champa	232	3.1
12	Dumarpali	Dumarpali	Dabhra	Jangir-Champa	232	2.6
13	Tayang	Jaimura	Kharsia	Raigarh	221	2
14	Jaimura	Jaimura	Kharsia	Raigarh	224	2.4

5. ANALYSIS OF WATER LEVELS

5.1 INTRODUCTION

Ground water levels or piezometric heads is resultant of all input and output to ground water system with defined boundaries. Ground water is a dynamic system. The parameters required to be monitored during ground water regime monitoring are ground water level or piezometric heads and chemical quality. These are subject to change due to natural and or anthropogenic causes with respect to dime and space. Rainfall, natural recharge to ground water, ground water draft and seepage from surface water bodies plays important roles in changes in ground water level fluctuations. The quality of water is being recharge, nature of host rock and dilution/concentration of ground water impacts the changes in ground water quality. Monitoring of ground water quality and temperature are one of the essential components for ground water regime monitoring. The monitored data is analyzed in time and space to assess the changes and a relationship is established to determine the impact of ground water development and recharge to the system.

5.2 GROUND WATER LEVELS:

The configuration of the water table depends upon by topography, geology, climate, water yielding and water bearing properties of rocks in the zones of aeration and saturation, which control ground water recharge. The upper surface of the zone of saturation is the water table. In case of wells penetrating confined aquifers, the water level represents the pressure or piezometric head at that point. Ground water monitoring network planning is basic step for ground water regime monitoring and further, for assessment of groundwater resources and planning for development and management programs. The groundwater, being hidden resource can only be analyzed through its signatures in the form of water level fluctuations. The systematic and regular monitoring of groundwater levels can bring out the changes taking place in the regime. The data so generated are of immense help for regional groundwater flow modeling for planning and management of ground water resources and its sustainability. Modeling provides necessary information to the user agencies to frame contingency plans in case of unfavorable groundwater recharge situation.

The data have also immense utility in implementing the legal provisions of groundwater regulation, and to substantiate expert advice in legal issues arising out of conflicting interests of ground water

users. Ground water regime data of different seasons have been collected for the year 2020, analyzed for every set of measurements and discussed with maps in following sections.

viii. 5.2.1 Analysis of water levels (2020)

The water level data collected two times during the year 2020 from the observation wells in core zone as well as buffer zone is presented in **Table 5.1.**

Table 5.1: Depth to water levels monitored in the study area (during 2020)

Sl No.	Village	Latitudes	Longitudes	Post monsoon depth to water 2020 level (mbgl)	Pre monsoon depth to water level 2020 (mbgl)	Fluctuation May 2020 Vs Nov 2020 (m)	RL of pre monsoon water level (mamsl)
1	Amapali	N 21º57’32.8”	83º10’55.9”	3.60	8.68	5.08	223.32
2	Sondka	N 21º56’23.8”	83º11’33.4”	8	13	5	220
3	Badadhara	21º55’07.28”	83º10’57.1”	1.6	3.40	1.8	227.6
4	Basnajhar	21º56’23.8”	83º09’32.9”	9.10	13.18	4.08	227.82
5	Fulbandhia	21º56’47.1”	83º10’48.1”	6.1	9.144	3.044	222.856
6	Karpipali	21º55’46.0”	83º09’45.1”	8.90	13.16	4.26	220.84
7	Tundri	21º52’48.7”	83º11’48.6”	1.6	4.30	2.7	231.7
8	Basanpali	21º55’46.1”	83º10’58.4”	3.8	6.11	2.31	216.89
9	Kenapali	21º54’04.7”	83º08’57.2”	4.40	8.31	3.91	228.69
10	Saraipali	21º54’39.4”	83º08’48.8”	4.90	7.41	2.51	231.59
11	Kanwali	21º54’04.3”	83º09’46.9”	4.99	7.30	2.31	224.7

Sl No.	Village	Latitudes	Longitudes	Post monsoon depth to water 2020 level (mbgl)	Pre monsoon depth to water level 2020 (mbgl)	Fluctuation May 2020 Vs Nov 2020 (m)	RL of pre monsoon water level (mamsl)
12	Dumarpali	21º53'03.1"	83º10'30.8"	3.91	7.33	3.42	224.67
13	Tayang	21º55'31.1"	83º13'09.4"	8.1	13.11	5.01	207.89
14	Jaimura	21º55'43.4"	83º12'42.9"	4.3	7.2	2.9	216.8

5.2.1.1 Post-monsoon Depth to Water level (November' 2020)

The depth to water level map has been prepared based on ground water monitoring data of Nov 2020. On perusal of the data and map given at Fig.5.1, it is observed that the overall depth to water level remains between 1.6 and 9.10 meters below ground level. The post-monsoon depths to water level range of 4 to 6 mbgl are observed at Kenapali, Saraipali, Jaimura & Kanwali villages. Ground water levels more than 6 mbgl are observed in the villages Tayang, Karpipali, Fulbandhia & Basnajhar Villages. Water level less than 4 mbgl are observed in the remaining parts of the study area.

5.2.1.2 Pre-monsoon Depth to Water level (May' 2020)

The depth to water level map has been prepared based on ground water monitoring data of May 2020. From the perusal of Table 5.1, it is observed that the overall depth to water level remains between 3.40 to 13.18 meters below ground level. The pre-monsoon depth to water levels ranges Below 5 mbgl is observed in Badadhara & tundri villages. Water levels is between 5 - 10 mbgl are observed in the villages namely Amapali, Basanpali, Saraipali, Kanwali, Dumerpali & Jaimura villages. Water level greater than 9 mbgl is observed in the remaining parts of the study area as shown in Fig 5.2.

5.2.1.3 Seasonal water level fluctuation (Nov.' 2020 VsMay' 2020).

Based on the pre-monsoon & post-monsoon data water level fluctuation in the study area is calculated & respective map (as shown in Fig 5.3) has also been prepared. It is observed that in the study area water level fluctuation varies from 1.8 to 5.08 meters.

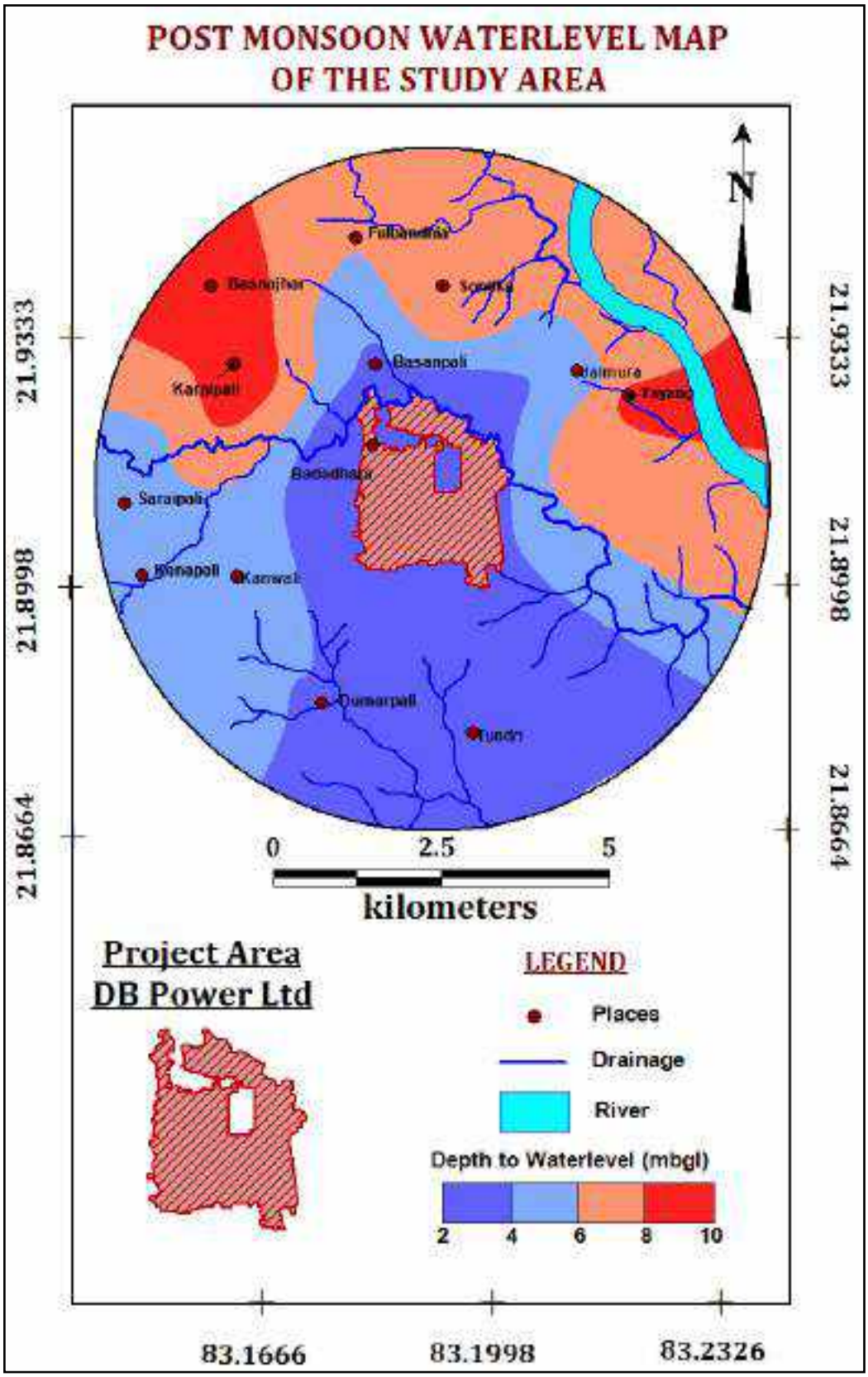


Fig.5.1: Post-monsoon Depth to Water level map (Nov'2020)

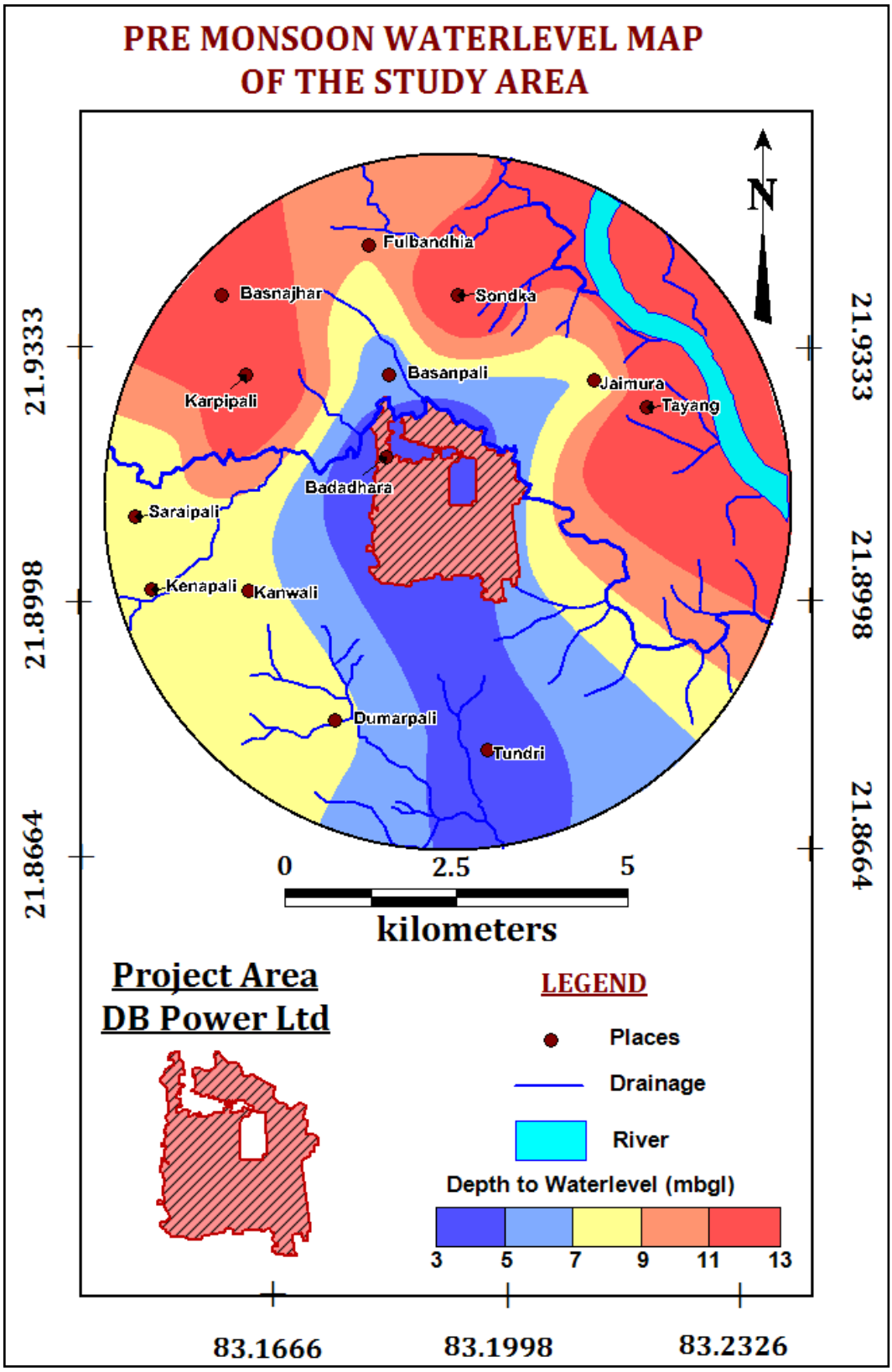


Fig.5.2: Pre-monsoon Depth to Water level map (May'2020)

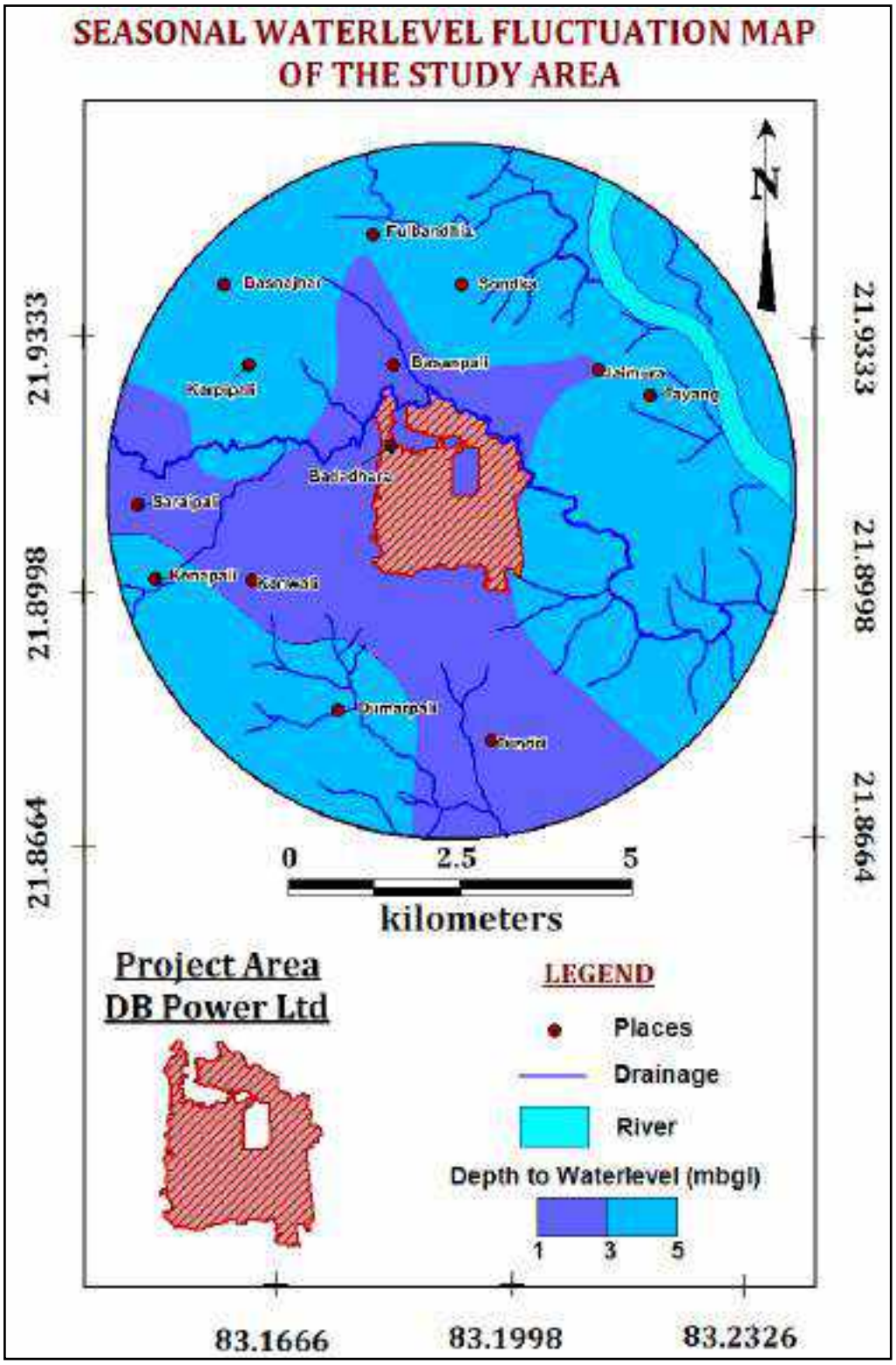


Fig 5.3: Seasonal Water Level Fluctuation map (Nov.' 2020 Vs May' 2020)

5.3 AQUIFER PARAMETERS:

Pumping test has been carried out for determination of aquifer parameters accurately. The aquifer parameters of study area covered by Sandstone are described below.

The transmissivity values of phreatic aquifer tapped in open well in general varies from 4 to 8.5 m^2/day while specific capacity ranges from 15 to 40 lpm/m/day. However for deep aquifer the transmissivity ranges from 15-32 m^2/day and at places it ranges up to 40m^2/day.

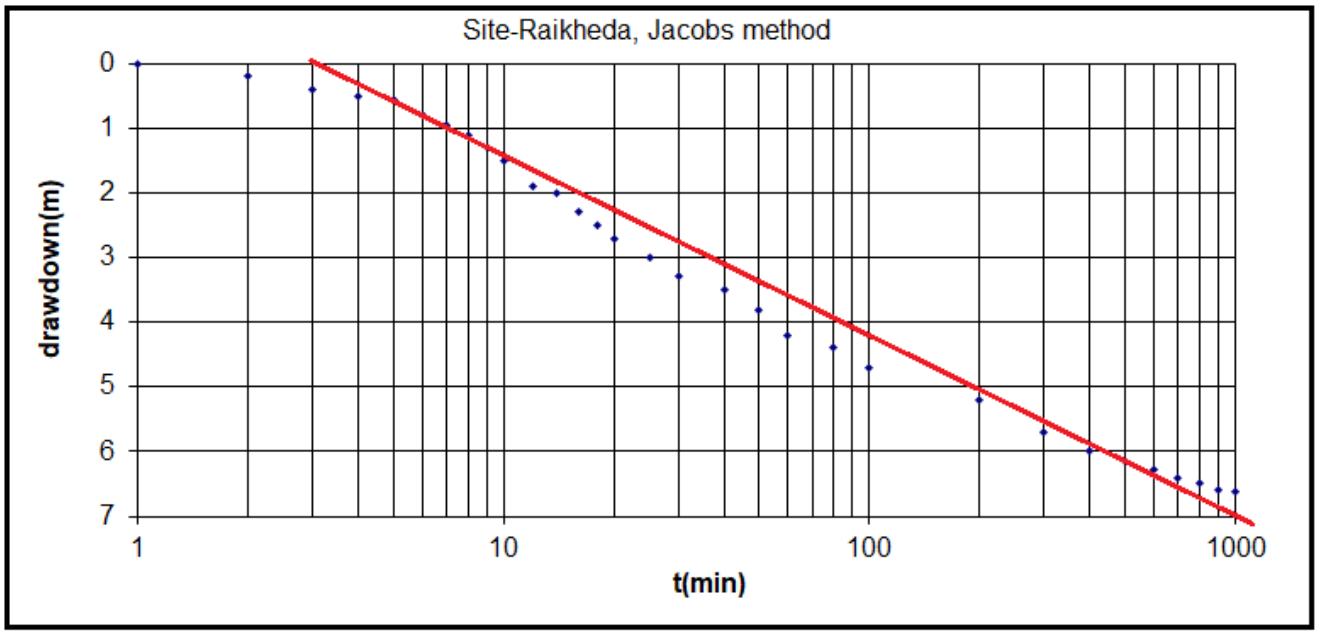
To verify the aquifer parameters of the aquifer present in the area pumping test has been carried out on a private /public bore well at Badadharha village (close to Project). The results and data interpretation is discussed below

Village	Badadharha
Block	Dabhra
District	Janjgir-Champa
State	Chattisgarh
Duration of test	1000 minutes
Capacity of pump	5 hp
Distance of OW from pump well	45 m.
Thickness of the aquifer	10
MP(magl)	0.8
SWL(mbmp)	6.5
Discharge(lps)	5

Table 5.2: Pumping Data observation well

Sl.no.	Time since pumping started (min)	Tape Reading (m)		DTW (mbmp)	Draw Down (m)	Remarks
		Hold	Cut			
1	1	20	13.50	6.50	0.00	
2	2	20	13.30	6.70	0.20	
3	3	20	13.10	6.90	0.40	
4	4	20	13.00	7.00	0.50	
5	5	20	12.95	7.05	0.55	
6	6	20	12.70	7.30	0.80	
7	7	20	12.55	7.45	0.95	
8	8	20	12.40	7.60	1.10	
9	9	20	12.20	7.80	1.30	
10	10	20	12.00	8.00	1.50	
11	12	20	11.60	8.40	1.90	
12	14	20	11.50	8.50	2.00	
13	16	20	11.20	8.80	2.30	
14	18	20	11.01	8.99	2.49	
15	20	20	10.80	9.20	2.70	
16	25	20	10.50	9.50	3.00	
17	30	20	10.20	9.80	3.30	
18	40	20	10.00	10.00	3.50	
19	50	20	9.68	10.32	3.82	
20	60	20	9.30	10.70	4.20	
21	80	20	9.10	10.90	4.40	
22	100	20	8.80	11.20	4.70	
23	200	20	8.30	11.70	5.20	
24	300	20	7.80	12.20	5.70	
25	400	20	7.50	12.50	6.00	
26	500	20	7.35	12.65	6.15	
27	600	20	7.22	12.78	6.28	

28	700	20	7.09	12.91	6.41	
29	800	20	7.00	13.00	6.50	
30	900	20	6.90	13.10	6.60	
31	1000	20	6.88	13.12	6.62	



The pumping test data has been analyzed by Jacob's straight line method of the pumping data of the observation well. The calculation is given below.

Formulae: $T= 2.3Q/4\pi\Delta s$

$K==T/b$ &

$S= 2.25\ T\ t_o/r^2$

Where,

T =kD = Transmissivity, m^2/day

K =Permeability

B= Thickness of aquifer

Q = Discharge m^3/day

r = Distance (m) between PW & OW

Δs = Slope of straight line per log cycle of time

S = Storage coefficient

t_o= time in days at zero drawdown

On the basis of above formulae, the calculated parameters are as follows.

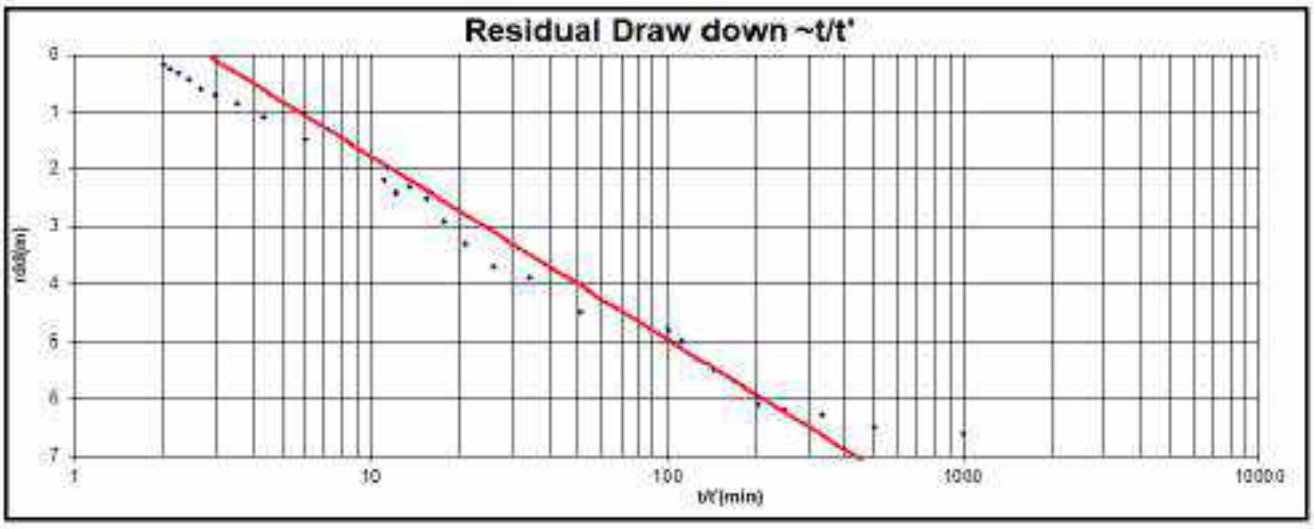
T= 30.42 m^2/day, K=2.3765 m/day&

S= 7.041 $X10^{-5}$

Table 5.3: Recuperation Data

Time since pumping started in min(t)	Time since pumping stopped in min (t')	t/t'	Tape reading (m)		DTW (mbmp)	RDD (m)	Remarks
			Hold	Cut			
1001	1	1001.00	20	6.88	13.12	6.62	
1002	2	501.00	20	7	13	6.5	
1003	3	334.33	20	7.1	12.9	6.4	
1004	4	251.00	20	7.29	12.71	6.21	
1005	5	201.00	20	7.4	12.6	6.1	
1006	6	167.67	20	7.5	12.5	6	
1007	7	143.86	20	7.66	12.34	5.84	
1008	8	126.00	20	7.89	12.11	5.61	
1009	9	112.11	16	4.1	11.9	5.4	
1010	10	101.00	16	4.5	11.5	5	
1020	20	51.00	16	5	11	4.5	
1030	30	34.33	16	5.6	10.4	3.9	
1040	40	26.00	16	5.8	10.2	3.7	
1050	50	21.00	16	6.2	9.8	3.3	
1060	60	17.67	16	6.6	9.4	2.9	

1070	70	15.29	16	6.99	9.01	2.51	
1080	80	13.50	16	7.18	8.82	2.32	
1090	90	12.11	16	7.1	8.9	2.4	
1100	100	11.00	16	7.3	8.7	2.2	
1200	200	6.00	16	8	8	1.5	
1300	300	4.33	16	8.4	7.6	1.1	
1400	400	3.50	16	8.64	7.36	0.86	
1500	500	3.00	16	8.8	7.2	0.7	
1600	600	2.67	16	8.9	7.1	0.6	
1700	700	2.43	16	9.05	6.95	0.45	
1800	800	2.25	16	9.18	6.82	0.32	
1900	900	2.11	16	9.26	6.74	0.24	
2000	1000	2.00	16	9.32	6.68	0.18	



Formulae:

$T = 2.3Q/4\pi\Delta s$, $K=T/b$&

$S = 2.25\ T\ t_o/r^2$

On the basis of above formulae, the calculated parameters are as follows.

$T = 30.42\ m^2/day$, $K=2.3765\ m/day$& $S = 7.041\ X10^{-5}$

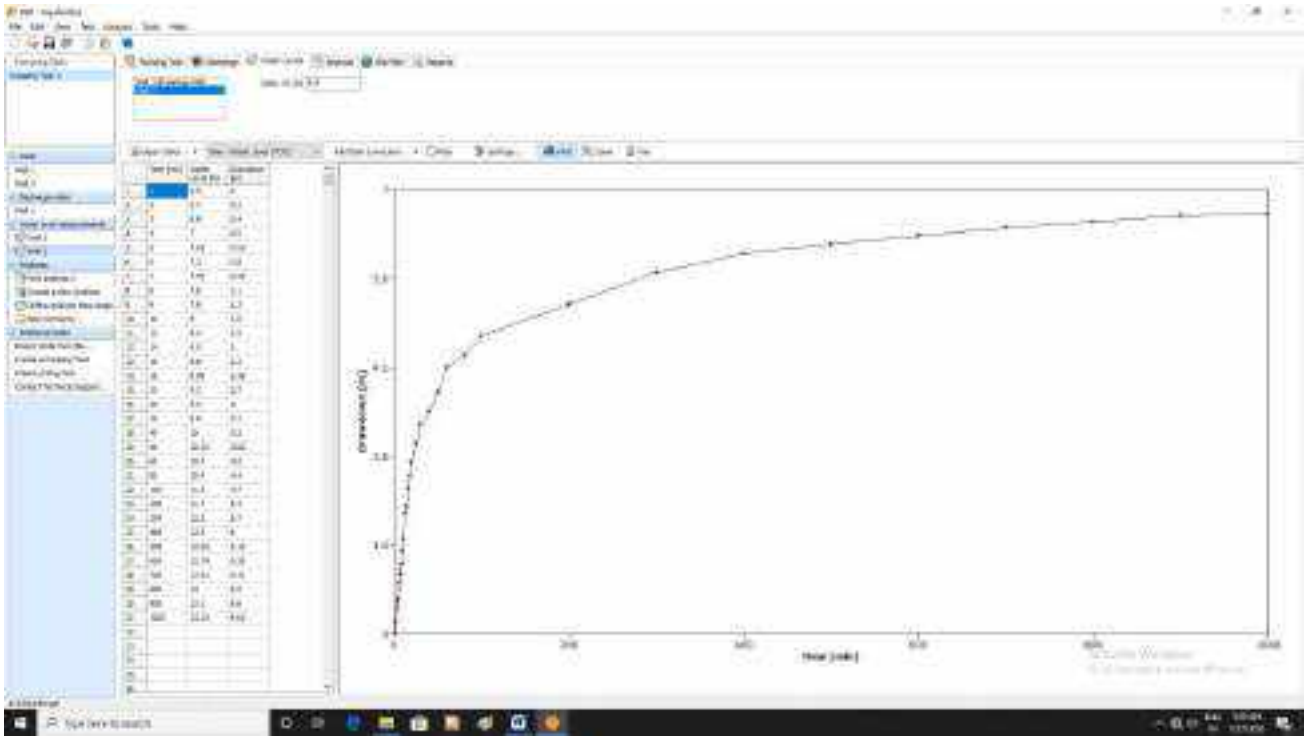


Fig 5.4: Pumping water level data plot in Aquifer test soft ware

6. SURFACE GEOPHYSICAL SURVEY

Surface geophysical survey comprised of one Vertical Electrical Sounding (VES) has been conducted at the premises of M/S DB Power Ltd, Village-Badadhara, Block-Dabhra, District-Jangir-Champa , Chhattisgarh on 10.10.2020 to know the subsurface condition in the area. The VES location is given in the location map. The VES location is given in Fig No: 6.1.

Fig6.1: Location Map of Geophysical Survey

6.1 Resistivity Survey:

Using Ohm's law electrical resistivity of sub-surface geologic formation is determined through artificially energizing the subsurface and carrying measurements on the ground surface. Contrast in resistivity value of an individual layer with the surrounding or effective presence (dependent of its relative resistivity and thickness) makes it detectable.

In the electrical resistivity method, a known amount of electrical current (I) is sent into the ground through a pair of electrode (called current electrodes) and the potential (δV) developed because of the resistance offered by the subsurface due to the passage of this current is measured across another pair

of electrodes (potential electrodes) planted into the ground. The ratio between the potential measured and the corresponding current sent into the ground yields the resistance 'R' of the ground to a depth depending upon the spacing between the two current electrodes. Through the multiplication of this value of `R' by a geometric factor a parameter called the apparent resistivity "ρ_a" is computed. Both the parameters, apparent resistivity 'ρ_a' and the resistance 'R' contain the information on the geo-electric characteristics of the subsurface. In practice, there exist several configurations but most commonly used are the Wenner and Schlumberger configurations.

In this survey microprocessor based resistivity meter CRM-500 was used. For the present study Vertical Electrical Sounding (VES) have been carried out using Schlumberger configuration.Maximum spreads were 200m (AB) for sounding.

6.2 Vertical Electrical Sounding (VES)

VES is a process by which the depth investigation is made. In this, the centre is fixed and the measurements are made by successively increasing the electrode spacing. The apparent resistivity values obtained with increasing values of electrode separations are used to estimate the thickness and resistivity's of the subsurface formations. In Schlumberger sounding arrangement (Figure-6), all the four electrodes are kept in a line symmetrically over a point '0', with inner (Potential) electrodes kept closer. For increasing the depth of investigation the current electrodes C_1 and C_2 are moved apart symmetrically from the centre point `0' keeping the potential electrodes fixed. The separation between the potential electrodes is changed only when the potential between them drops to allow value during the course of sounding. The apparent resistivity for each electrode separation is calculated by multiplying the resistance `R' with Schlumberger configuration factor 'K' (which is called as geometrical factor).

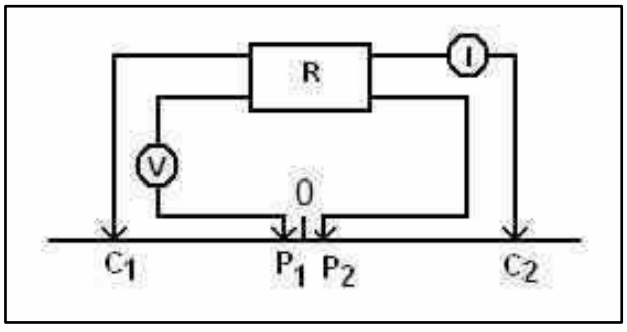


Fig 6.2 (A): Schlumberger electrode configuration

The formula is: $\rho_a = \pi R \{(C_1C_2/2)^2 - (P_1P_2/2)^2\} / P_1P_2$ **or** $\rho_a = KR$

Where ‘K’ is the geometric factor for Schlumberger configuration,

C_1C_2 is current electrode spacing

P_1P_2 is potential electrode spacing

Equipment

The geophysical methods are useful in constructing a picture of the subsurface hydrogeological conditions in totally virgin areas. It is based upon measurement of earth electrical properties. In the present study the resistivity surveys have been carried out by using Aquameter CRM 500 an indigenous microprocessor based Resistivity Meter (Fig.-6.2 B).

Aquameter CRM 500 is a high power version (40 Watt) which is useful for any type of soil specially preferred for low resistivity soil of the coastal region. It can penetrate current down to 500 meters. It is a popular instrument, because of its single button operation deep penetration, accurate and reliable result, even in adverse field conditions. The instrument has a facility to measure self-potential (SP) which is useful in mineral prospecting and environmental studies.

Fig 6.2 (B): Aquameter CRM 500

6.3 Data Analysis and Interpretation

Surface geophysical survey comprised of two Vertical Electrical Sounding (VES) has been conducted at the premises of M/S DB Power Ltd, , Village-Badadhara, Block-Dabhra, District-Jangir-Champa on

10.10.2020 to know the subsurface condition in the area. The observed resistance values from the instrument have been multiplied with geometric factor (K) to get the apparent resistivity values for each electrode spacing. The apparent resistivity values for different potential dipole were brought to single common potential dipole. The field apparent resistivity data were plotted on log-log graph paper against the half current electrode separation to get the VES curves (X axis-C1C2/2 value and Y axis apparent resistivity value).

These data of $C_1C_2/2$ and apparent resistivity were interpreted with the help of two layer master curve by curve matching technique and further checked with the help of IPI2WIN software. The final results were corroborated with the known hydrogeological conditions existing in the area. The geoelectric layer parameters (layer resistivity and layer thickness) were obtained for each VES. The field data of VES and field curves of VES are given in Table 6.1 and Fig-6.3, 6.4 & 6.5.

6.4 Discussion of result

The VES has been carried out at the premises of M/S D B Power Ltd, , Village-Badadhara, Block-Dabhra, District-Jangir-Champa, Chhattisgarh on 10.10.2020 (See fig.1). DDR-3 Resistivity Meter has been used for conducting the VES. Schlumberger configurations have been used for conducting the VES survey. The maximum current electrode spread for conducting VES was 200m (AB).

The data is plotted on double logarithmic graph paper and matched with standard curves to know the true resistivity and thickness of various layers. The data is also interpreted by Computer using IPI2WIN software to verify the results of partial curve matching. From interpreted results of VES is discussed below.

VES-1:

It is an HA type curve and it has four layer. The topmost soil layer having resistivity value of 125 Ω-m is top whereas the second layer may be weathered Sandstone with resistivity of 90 Ω-m. The third layer is hard and compact sandstone with resistivity of 410 Ω-m. The last layer may be shale having resistivity of 70 Ω-m. The thickness of topmost layer is 2.2m, second layer is 9.8m and the third layer thickness is 25m.

VES-2: It is also an HA type curve and it has four layer. The topmost soil layer having resistivity value of 105 Ω-m is top whereas the second layer may be weathered Sandstone with resistivity of 72 Ω-m. The third layer is hard and compact sandstone with resistivity of 285 Ω-m. The last layer may be shale

having resistivity of 80 Ω-m. The thickness of topmost layer is 1.4, second layer is 6.2m and the third layer thickness is 28.4m.

VES-3:

It is also an HA type curve and it has four layer. The topmost soil layer having resistivity value of 96 Ω-m is top whereas the second layer may be weathered Sandstone with resistivity of 73Ω-m. The third layer is hard and compact sandstone with resistivity of 411 Ω-m. The last layer may be shale having resistivity of 79 Ω-m. The thickness of topmost layer is 2.05, second layer is 9.2m and the third layer thickness is 26.3m.

Conclusions & Recommendations

From the interpretation of resistivity survey data we got the following outcome.

The thickness of topsoil varies from 1.4 to 2.2m with resistivity range of 96 to 125 Ω-m.

The thickness of weathered sandstone from 6.2 to 9.8m with resistivity range of 72 to 90Ω-m.

The thickness of hard sandstone from 25 to 28.4m with resistivity range of 285 to 411Ω-m.

The last layer is shale resistivity range of 70 to 80Ω-m.

At point VES-1 probable fracture zones are there in between 18 to 20m and 45 to 55m.

At point VES-2 probable fracture zones are there in between 16 to 18m and 35 to 45m.

At point VES-2 probable fracture zones are there in between 20 to 25m and 42-47m.

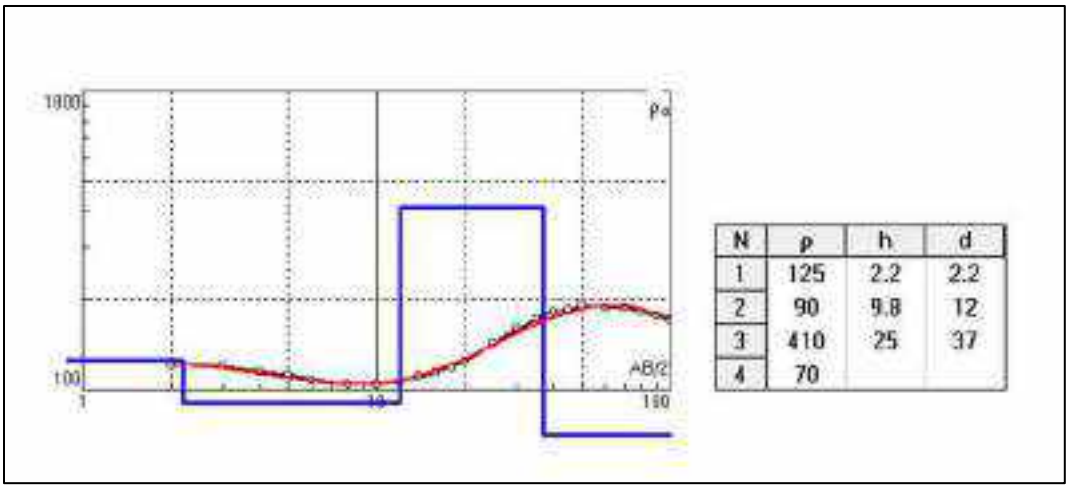
Bore hole may be drilled down to 100m to get a good amount of ground water.

Table-6.1: Interpreted Results of VES

VES No	Layer Resistivity (in Ohm-m)				Layer Thickness (in m)			Probable Fracture Zones
	ρ_1	ρ_2	ρ_3	ρ_4	h_1	h_2	h_3	
VES-1	125	90	410	70	2.2	9.8	25	18 to 20m and 45-50m
VES-2	105	72	285	80	1.4	6.2	28.4	16 to 18m and 35-45m
VES-3	96	73	411	79	2.05	9.2	26.3	20 to 25m and 42-47m

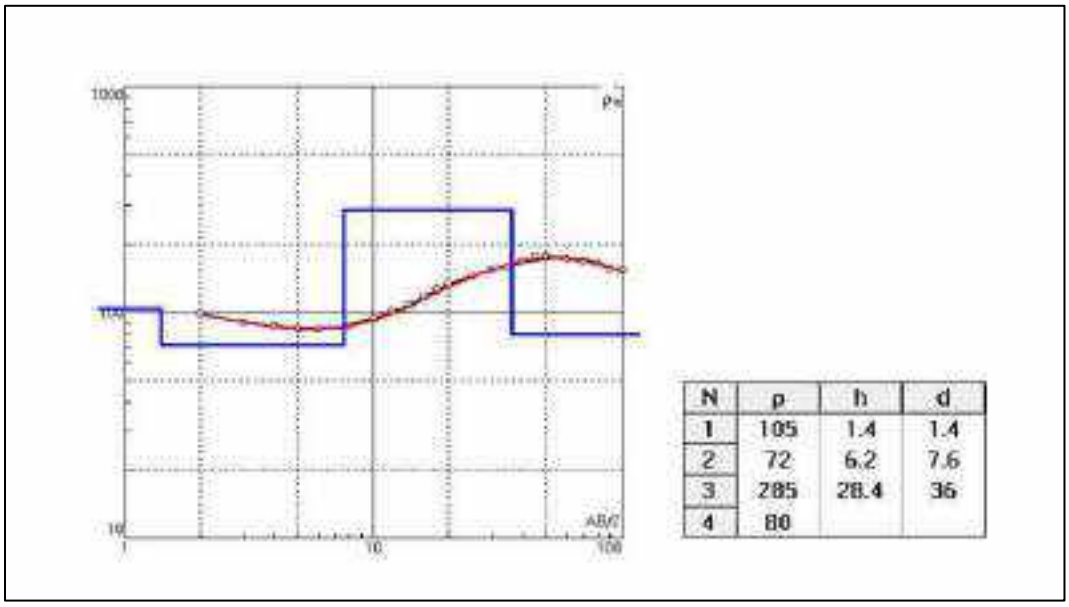
Table-6.2: VES Data					
VES1		**VES2**		**VES 3**	
Location: Badadhara (Near Urja Road, Inside plant area)		**Location:** Badadhara (Near Resevior, Inside Plant Area)		**Location:** Badadhara (Near Coal Yard, Outside of plant area)	
Latitude: N 21°54'18.6"		**Latitude:** N 21°54'54.4"		**Latitude:** N 21°54’ 44.7"	
Longitude: E 83°11'22.3"		**Longitude:** E 83°11'36.0"		**Longitude:** E 83°10' 56.4"	
Date: 10.10.2020		**Date:** 10.10.2020		**Date:** 10.10.2020	
Altitude: 234m		**Altitude:** 235m		**Altitude:** 239 m	
AB/2	**App. R**	**AB/2**	**App. R**	**AB/2**	**App. R**
2	120.00	2	98.65	2	96.23
3	120.00	3	90.90	3	88.54
4	115.00	4	87.26	4	85.34
5	112.20	5	84.92	5	81.67
6	108.00	6	84.92	6	83.23
8	104.00	8	87.26	8	85.28
10	104.00	10	93.42	10	91.45
12	105.60	12	102.76	12	99.46
14	111.00	14	108.52	14	104.78
16	114.00	16	115.00	16	113.24
18	118.00	18	126.00	18	123.54
20	124.30	20	133.00	20	130.67
25	142.40	25	144.50	25	140.56
30	161.00	30	154.00	30	151.56
35	174.00	35	158.00	35	155.98
40	183.00	40	168.00	40	166.89
45	186.00	45	176.00	45	172.34
50	192.00	50	177.23	50	174.34
60	189.00	60	172.50	60	170.23
70	188.10	70	169.00	70	167.45
80	183.00	80	164.00	80	162.34

90	176.90	90	156.00	90	154.29
100	171.00	100	154.00	100	152.39



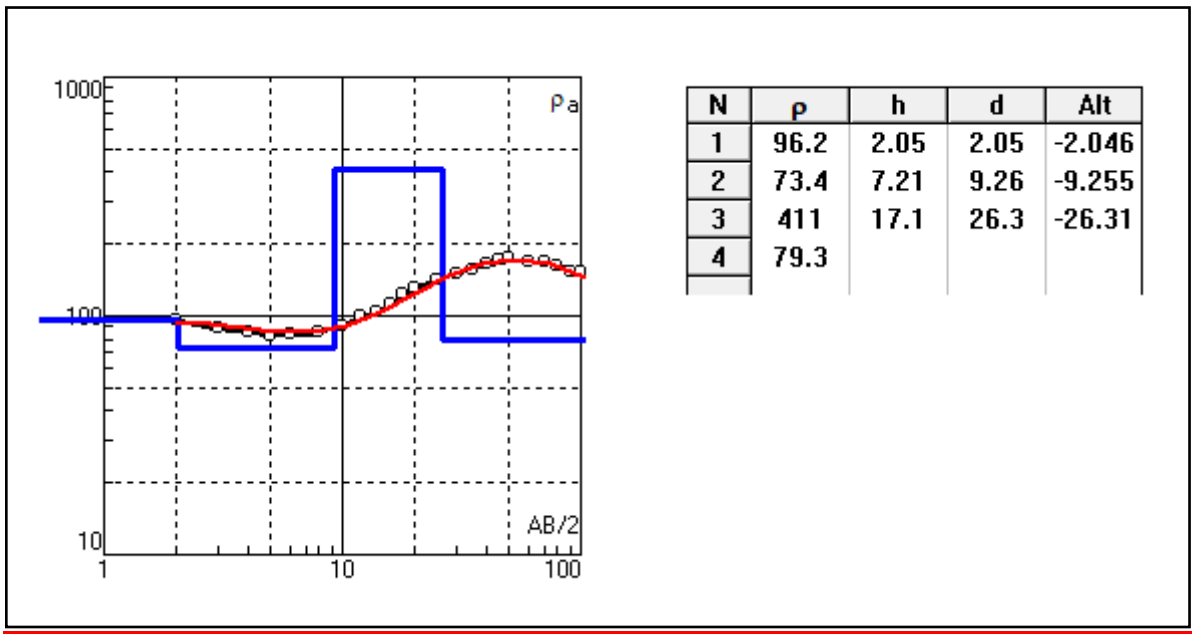
N	ρ	h	d
1	125	2.2	2.2
2	90	9.8	12
3	410	25	37
4	70		

Fig-6.3: VES Curve and interpreted results at Badadhara (Near Urja Road, Inside plant area) (VES 1)



N	ρ	h	d
1	105	1.4	1.4
2	72	6.2	7.6
3	285	28.4	36
4	80		

Fig-6.4:VES Curve and interpreted results at Badadhara (Near Resevior, Inside Plant Area) (VES 2)



N	ρ	h	d	Alt
1	96.2	2.05	2.05	-2.046
2	73.4	7.21	9.26	-9.255
3	411	17.1	26.3	-26.31
4	79.3			

Fig-6.5:VES Curve and interpreted results at Badadhara (Near Coal Yard, Outside of plant area)(VES3)

FIG 6.6: PHOTOGRAPHS OF GEOPHYSICAL SURVEY IN DIFFERENT LOCATION IN STUDY AREA

7. ARTIFICIAL RECHARGE AND RAIN WATER HARVESTING

Artificial recharge to ground water through scientifically designed structures has been proven as a viable option for augmentation of ground water resources. It also provides an opportunity to utilize the surplus monsoon run-off which otherwise lost to sea unutilized.

Artificial recharge aims at augmenting the natural replenishment of ground water storage by some method of construction, spreading of water, or by artificially changing natural conditions. It is useful for reducing overdraft, conserving surface run-off, and increasing available ground water supplies. Recharge may be incidental or deliberate, depending on whether or not it is a by-product of normal water utilization. Artificial recharge is becoming increasingly necessary to ensure sustainable ground water supplies to satisfy the needs of a multi-pronged demand. The benefits of artificial recharge can be both tangible and intangible.

The concept of rainwater harvesting involves 'tapping the rainwater where it falls'. A major portion of rainwater that falls on the earth's surface runs off into streams and rivers and finally into the sea. The technique of rainwater harvesting involves collecting the rain from localized catchment surfaces such as roofs, plain/sloping surfaces etc., either for direct use or to augment the ground water resources depending on local conditions. Construction of small barriers across small streams to check and store the running water also can be considered as water harvesting.

During monsoon season, whatever rainwater is collected in the premises of project area, i.e. through, Building/roof area, Road/Paved area, Green belt area and Open land will be utilized to recharge the ground water. It is proposed to implement rain water harvesting structures at feasible, viable and sustainable location, catchment wise by diverting the runoff that is generated from the roof area, paved area, roads and green belt area for recharging into the specified recharge structure for putting into ground water system. The runoff generated from the two catchments needs to be suitably diverted through storm water drains to the recharge structures in order to augment the ground water. Overflow water from recharge structures is to be stored into two proposed ponds to be constructed at the western fringe of the plant area as a water conservation measures. Special care needs to be taken for locating the recharge structures and water conservation storage ponds so that the ground water augmentation as well as conservation is optimal. Implementation of water conservation structures and recharge mechanism shall ensure the balance between the discharge vis-à-vis recharge relationships of the aquifer system and provide the sustainable ground water supply. Based on the site plan and the land

use pattern of the project area, the computation of runoff for each unit has been worked out and the details are tabulated below.

Total Area available for recharge – **2549521.8 sq.m.**

Rainfall – 1100 mm. (60-65 rainy days)

Formations –Shale & Sandstone.

7.1. Runoff Available for Recharge:

7.1.1: Surrounding area of 5 K.m. from Plant Boundary:

S. N.	Land use type	Area (m^2)	Rainfall (m)	Amount of water that received Through Rain (Cub meter)	Co-efficient of runoff	Quantity of Rainwater (m^3)
1.	Build - up Area	4509691	1.10	4960660.1	0.85	4216561.08
2.	Green belt area Approx.	5387960	1.10	5926756	0.15	889013.4
3.	Open land area	6741150	1.10	7415265	0.20	1483053
4.	Water Bodies	2523190	1.10	2775509	0.60	1665305.4
5.	Agriculture Land	105195540	1.10	115715094	0.30	34714528.2
6.	Total Area	**124357531**	……	……	…….	42968461.08
6.	Assuming 10% is not Suitable for recharge, hence available quantum of Rain water for Recharge is about **38671614.97 m^3** [90% **42968461.08 m^3**]					

From the above, it is observed that a total potential of **38671614.97** cum of rainfall runoff can be collected from the surrounding of 5 k.m. radius from plant boundary.

7.1.2: Recharge from Plant Complex Area:

S. N.	Land use type	Area (m^2)	Rainfall (m)	Amount of water that received Through Rain (Cub meter)	Co-efficient of runoff	Quantity of Rainwater (m^3)
1.	Construction area	1003621.28	1.10	1103983.40	0.85	938385.89
2.	Green belt area Approx.	837700.02	1.10	921470.02	0.15	138220.50
3.	Open land area	465388.1	1.10	511926.91	0.20	102385.38
4.	Raw Water Reservoir	242811.6	1.10	267092.76	0.60	160255.65
5.	Total Area	**2549521**	……	……	…….	1339247.42
6.	Assuming 10% is not Suitable for recharge, hence available quantum of Rain water for Recharge is about **1205322.67 m^3** [90% **1339247.42 m^3**]					

From the above, it is observed that a total potential of **1205322.67** cum of rainfall runoff can be harvested at feasible, viable and sustainable location annually.

Plant Complex area:

The main interest in rainwater harvesting methods is the collecting and conserving rainwater at an

early stage in the water cycle to ensure the best use of rainfall before it runs away into rivers and groundwater, or disappears as evaporation. The appropriate choice of rainwater harvesting and artificial recharge techniques depends on the amount of rainfall and its distribution, land topography, soil type, vadose zone thickness and its hydraulic characteristics, depth and type of aquifers, hydraulic parameters of aquifer systems, source and quality of recharge water, and socio-economic factors, among others; these factors tend to be location specific.

Thus, the selection of water harvesting structures and artificial recharge methods strongly depends on local conditions, which calls for proper scientific investigations prior to the design and execution of artificial recharge and/or rainwater harvesting schemes. Water harvesting methods include such widely differing practices as 'roof top water harvesting', 'land surface water harvesting' and 'groundwater harvesting'. On the other hand, a variety of methods have been developed to artificially recharge groundwater and mostly of combinations of direct surface, direct subsurface or indirect recharge techniques. Commonly used artificial recharge techniques, however, are through drainage canals, from surface water bodies like ponds and lakes, recharge through pits/shafts and tube wells/ bore wells etc.

The increasing stress on ground water needs, preventive measures like rain water harvesting structures and recharge measures are to be taken. It has been found that the plant areas of M/S DB Power Limited offers enough scope and options for rain water harvesting and recharge measures. In view of this, detailed topographical, hydro-geological and hydrological study has been undertaken in the area, so as to formulate a comprehensive recharge plan outlining measures with recommended site specific designs for rain water conservation and recharge measures along with the implementing modalities.

Since, the selection and design of artificial recharge and water harvesting structures are highly dependent on the local feasible and suitable conditions and the availability of local materials for their construction. A successful design of artificial recharge and rain water harvesting structures necessitates proper understanding of hydrology and hydro-geology of the project area.

Total recharge potential of **1205322.67** cum of rainfall runoff can be harvested at feasible, viable and sustainable location annually, based on hydrogeological condition trench and recharge pits use for ground water artificial recharge.

The plant is already constructed recharge trench & recharge reservoir to recharge the ground water of the study area.

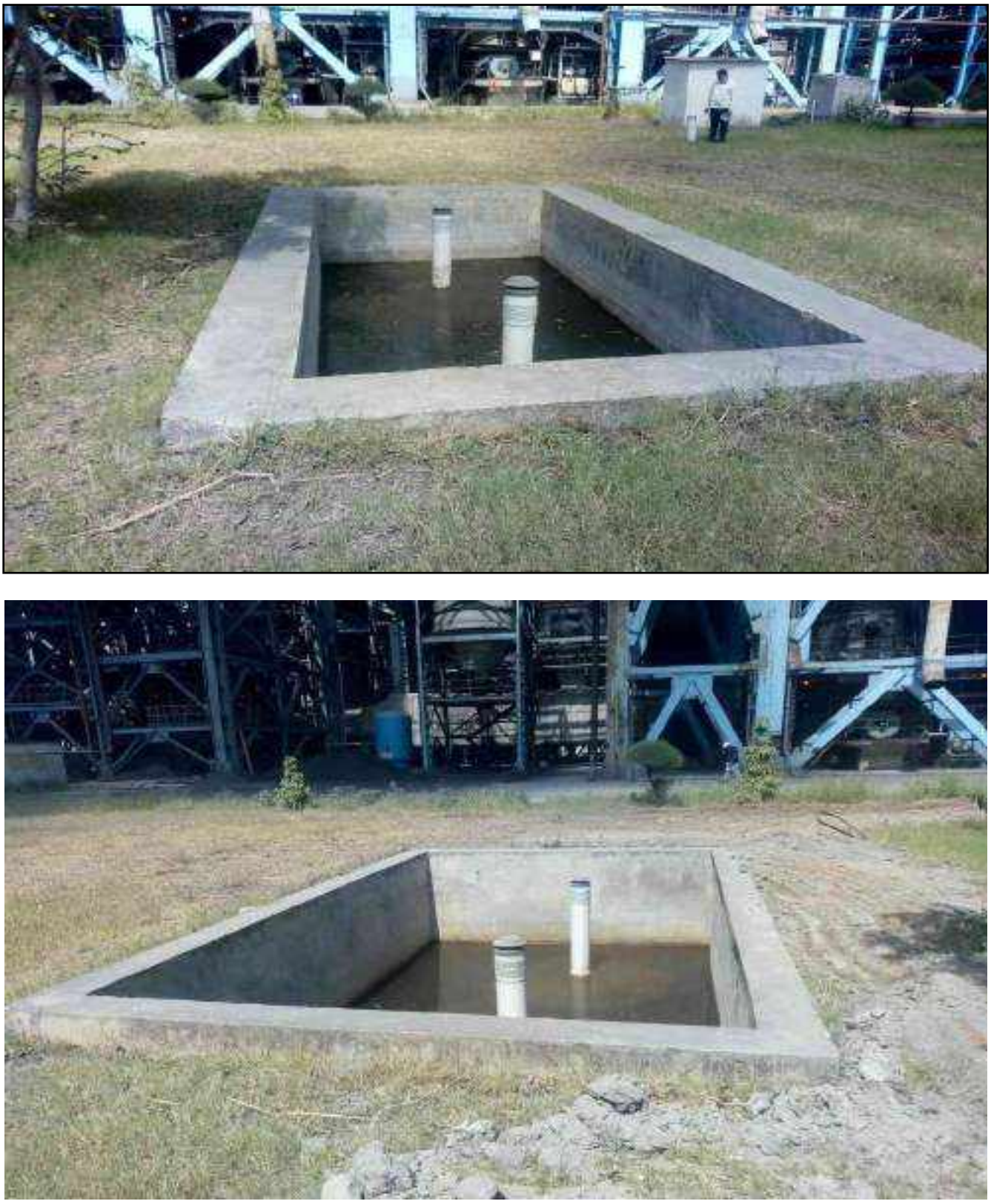


Fig 7.1: Rain water Harvesting in the plant premises

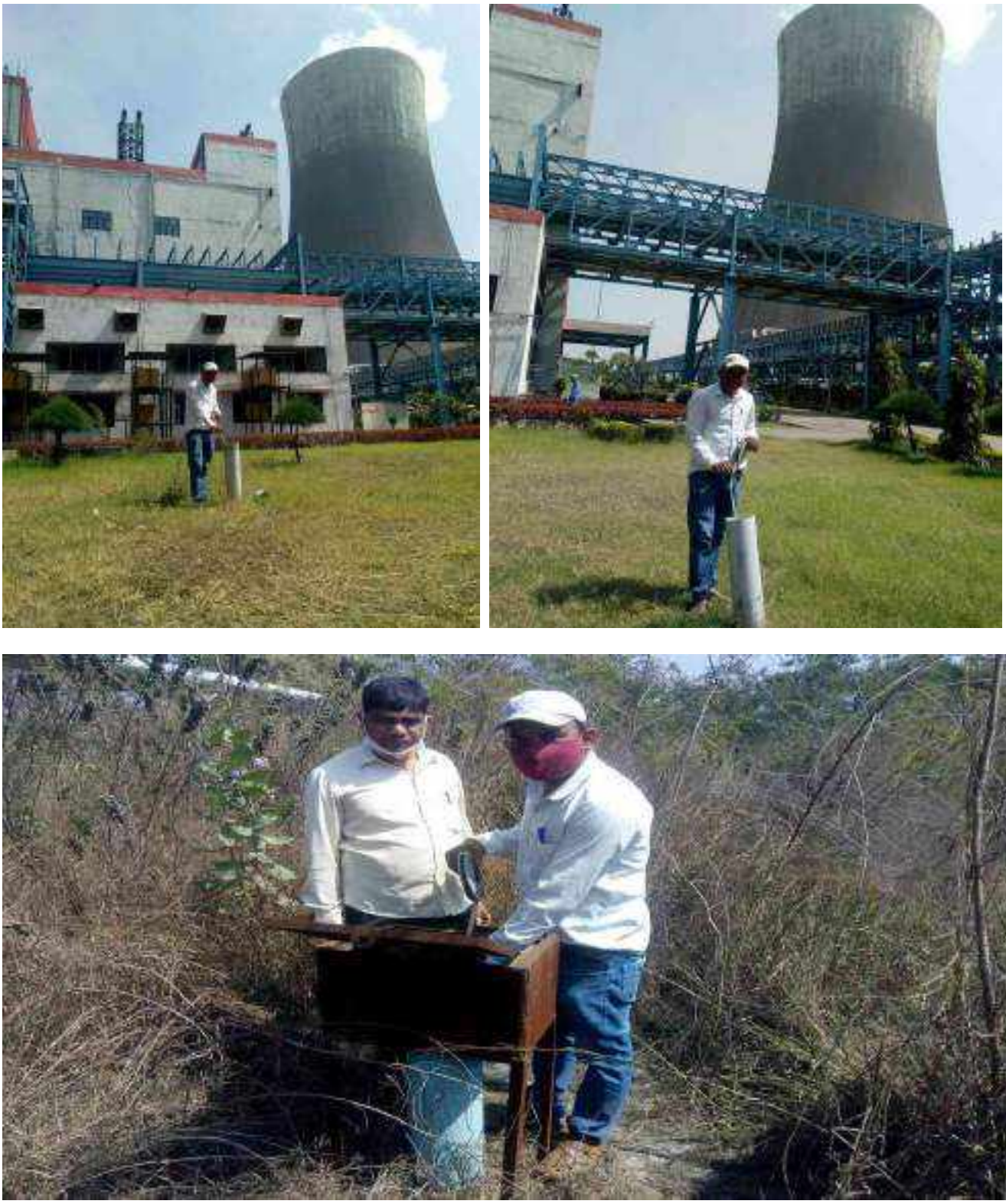


Fig 7.2: Piezometric Point for Ground water level Monitoring in the plant area

7.3: Stages of Ground water Development:

The Total Ground water Storage, net annual ground water availability (ham), ground water draft (ham), ground water for future use (ham) and stage of ground water development (%) is given in table 7.2. The net ground water available is 3599.1 ham. Existing gross ground water draft for all purpose is 1927.76 ham out of which 1598.32 ham is for irrigation and 329.44 ham is for domestic and industrial water supply. The stage of ground water development in the Dabhra tehsil is 53.56%. the non command area has the highest stage of ground water development (61.83%) followed by command area (45.21%) in the Dabhra block.

As per ground water resources data the Block Dabhra is categorized as **safe zone**.

Table: 7.2: Ground Water Resource of Dabhra Tehsil

Assessment Unit	Total Annual Recharge in Ham	Net Ground Water Availability in Ham	Existing Gross Ground Water Draft for Irrigation in Ham	Existing Gross Ground Water Draft for Domestic & Industrial Water Supply in Ham	Existing Gross Ground Water Draft for All Uses in Ham	Allocation For Domestic & Industrial Water Supply in Ham	Net Ground Water Availability for Future Irrigation Development in Ham	Stage of Ground Water Development in %
In ham								
Command	1884.52	1790.29	671.53	137.84	809.37	187.59	931.17	45.21
Non Command	1904.01	1808.81	926.79	191.6	1118.39	260.75	621.27	61.83
Total	3788.53	3599.1	1598.32	329.44	1927.76	448.34	1552.44	53.26

Ground water recharge by rainfall infiltration Method

Rrf= NAR x A x rfi, Where Rrf= Recharge from Rain fall, NAR= Normal Annual Rainfall, A= Area of unit in ha

RIF = Rain fall infiltration Factor

Total Annual water availability= Rain fall recharge + seepage from irrigation + Recharge from tanks/Ponds

Net ground water availability = total recharge – Base Flow

Total Annual Demand in Ham = Population X Average Per Capita Consumption (60) X 365/1000 X 10000

Ground Water Draft for Irrigation = Number of Ground Water Structure X Unit Draft in Ham

Ground Water Balance = Annual Utilizable GW Resource – Gross Ground Water Draft

Stage of Ground Water Development = Gross Ground Water Draft X 100/ Annual Utilizable GW Resource

8. GROUND WATER QUALITY

The suitability of ground water for drinking/irrigation/industrial purposes is determined keeping in view the effects of various chemical constituents present in water on the growth of human being, animals, and various plants and also on industrial requirement. However, many ions are very essential for the growth of plants and human body but when present in excess, have an adverse effect on health and growth. For estimation of the quality of ground water, 7 ground water samples have been collected in study area. The ground water samples were analysed for major as well as heavy chemical constituents. The ranges of different chemical constituents present in ground water are given in **Table 8.1 and location of sampling is given in fig 8.1**.

Table 8.1: Village wise chemical constituents

Village	**Desirable limit**	**Permissible limit**	Badadhar	Tundri	Kanwali	Dumarpali	Ash Pond, inside Plant Area	Pond near main gate of DB Power Plant	Reservoir Pod, inside plant area
G.P.			Badadhara	Tundri	Kanwali	Dumarpali	Ash Pond	main gate of DB Power Plant	Reservior Pond
Block			Dabhra	Dabhra	Dabhra	Dabhra	Dabhra	Dabhra	Dabhra
Dist			Janjgir-Champa	Janjgir-Champa	Janjgir-Champa	Janjgir-Champa	Janjgir-Champa	Janjgir-Champa	Janjgir-Champa
Latitude			21°55’09”	21°53’15”	21°54’07”	21°53’03”	21°54’42”	21°54’07”	21°54’54”
Longitude			83°11’05”	83°11’50”	83°09’44”	83°10’29”	83°11’36”	83°11’15”	83°11’36”
Sample taken from			Ground water	Ground water	Ground water	Ground water	Surface Water	Surface Water	Surface Water
PH Value	6.5-8.5	No relaxation	6.53	6.23	6.9	6.94	6.75	6.85	6.83
Turbidity (NTU)	1	5	1.32	0.21	0.79	0.53	0.15	0.14	0.21
Conductivity	>1	3200	1040	800	1220	1000	1360	180	300

	000								
Total Disolved Solid (mg/l)	500	2000	550	400	630	536	700	100	170
Total Hardness (as Caco3) (mg/l)	200	600	272	240	512	336	360	64	64
Calcium (Ca) (mg/l)	75	200	60.92	51.3	112.22	80.16	83.36	14.42	16.03
Calcium Hardness in (mg/l)	-	-	151.99	127.99	279.98	199.99	207.99	35.97	39.99
magnesium (As mg) (mg/l)	30	100	29.16	27.21	56.38	33.04	36.93	6.8	5.83
Magnesium Hardness(As mg) (mg/l)	-	-	120.01	112.01	232.02	136.01	152.01	28.03	24.01
Carbonates As c03	-	-	162.36	115.52	218.94	218.94	39.36	22.14	19.68
Bi-carbonates as Hco3	-	-	241.56	505.08	325.74	325.74	58.56	32.94	29.28
chloride (As Cl) (mg/l)	250	1000	23.77	16.46	32.92	20.12	16.46	5.48	3.65
Total Alkalinity (as Caco3) (mg/l)	200	600	198	141	267	267	48	27	24
Fluride (as F) (mg/l)	1	1.5	<0.1	<0.1	0.21	0.18	<0.1	<0.1	<0.1
Sulphate (As So4) (mg/l)	200	400	6.98	5.89	36.35	28.6	8.96	5.2	1.36
iron (as Fe) (mg/l)	1	No relaxation	<0.1	<0.1	0.16	0.13	<0.1	<0.1	<0.1
Nitrate (As No3) (mg/l)	45	No relaxation	<1	<1	8.56	3.31	2.36	<1	<1
Sodium (Na) (mg/l)	-	-	10	8	46.6	18	12	4	3
Potasium (K) (mg/l)			4	2	8	3	2	<1	<1

According to above table, majority of chemical constituent of all samples are within permissible limit and suitable for drinking, irrigation and industrial use,

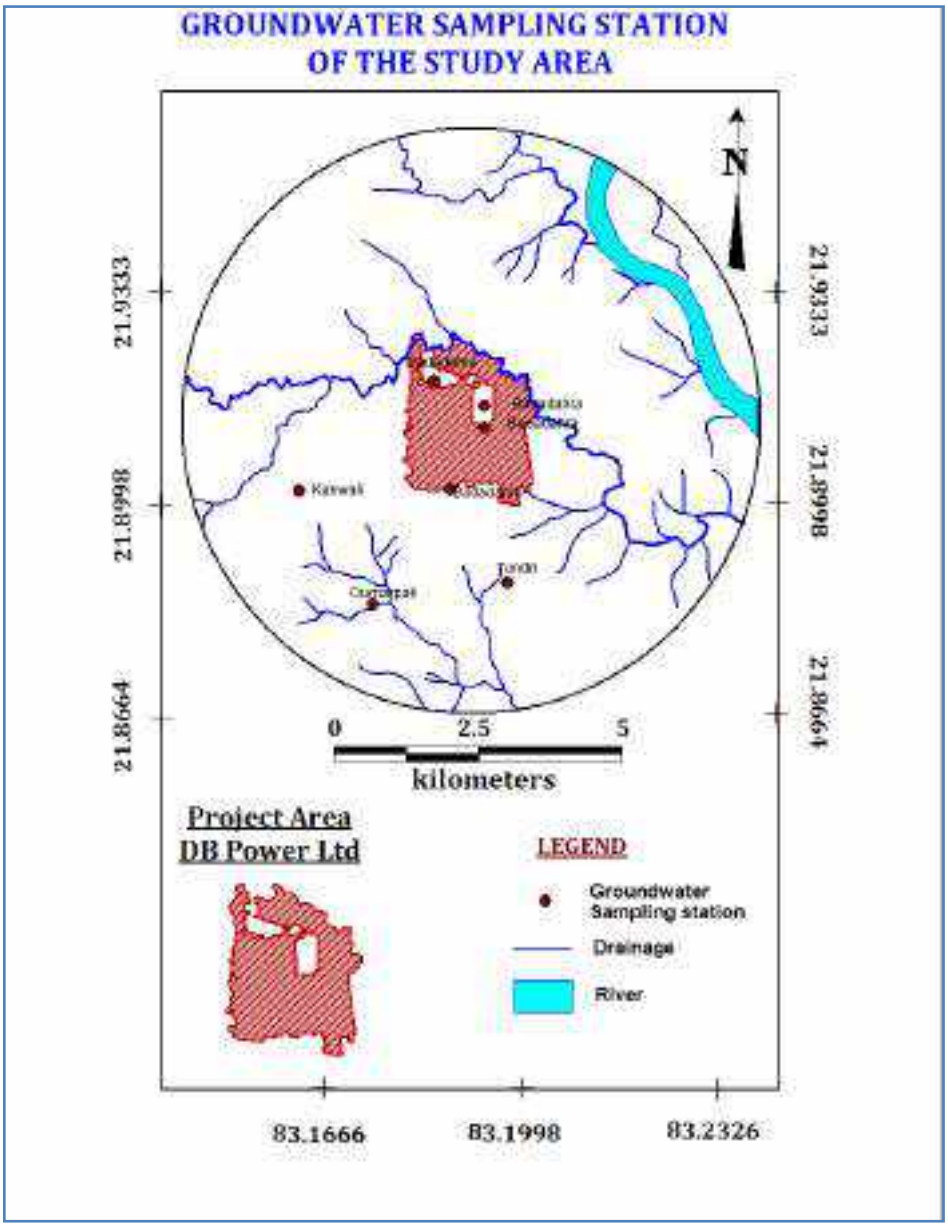


Fig 8.1 location of water sampling stations

Geochemical Classification of Ground Water

The geochemical classification of ground water, of study area has been carried out by using Piper Diagrams the ground water is of Ca/Mg-CO3/HCO_3 type. The analysis of ground water samples collected from the area suggests that type of water in the major part is bicarbonate dominating type, The type of ground water found in each ground water sample collected is given in the **Table 8.2**.

Table 8.2. The type of ground water

Station ID	Location	X coordinate	Y coordinate	Water Type	pH (lab)	El. Cond .uS/cm	TDS mg/l
MW1	Badadhara	83.185	21.919	Ca-SO4-CO3-HCO3	6.53	1040	550
MW2	Tundri	83.197	21.888	Ca-Mg-HCO3-CO3	6.23	800	400
MW3	Kanwali	83.162	21.902	Ca-Mg-CO3-HCO3	6.9	1220	630
MW4	Dumarpali	83.175	21.884	Ca-Mg-CO3-HCO3	6.94	1000	536
MW5	Ash Pond	83.185	21.919	Ca-Mg-CO3	6.75	1360	700
MW6	DB Power Plant	83.188	21.902	Ca-Mg-CO3-HCO3	6.85	180	100
MW7	Reservior Pod	83.193	21.915	Ca-Mg-CO3-HCO3	6.83	300	170

SUITABILITY OF GROUND WATER FOR DRINKING AND IRRIGATION PURPOSES

The suitability of ground water for drinking purpose

The suitability of ground water for drinking purpose is determined keeping in view the effects of various chemical constituents present in water on the biological system of human being. The standards proposed by the Bureau of Indian Standards (BIS) for drinking water (BIS-2012, revised) were used to decide the suitability of ground water that occur in study area for drinking purpose. The classification of ground water samples falling below desirable limit (DL), between desirable & maximum permissible limit (DL-MPL) and above maximum permissible limit (MPL) for drinking water purpose limit is shown in the following **Table 8.3.**

Table 8.3: Classification of Ground Water Samples for Drinking Purposes.

Parameters	Drinking water Standards (IS-10500-91, Revised 2012)		Total No. of GW Samples	Samples (< DL)		Samples (DL-MPL)		Samples (>MPL)	
	Desirable Limit (DL)	Maximum Permissible Limit (MPL)		No.	%	No.	%	No.	%

PH	6.5-8.5	No relaxation	7	1	14	6	86	0	0
TDS (mg/L)	500	2000	7	3	43	4	57	0	0
TH (mg/L)	300	600	7	4	57	3	43	0	0
Ca (mg/L)	75	200	7	4	57	3	43	0	0
Mg (mg/L)	30	100	7	4	57	3	43	0	0
Cl (mg/L)	250	1000	7	7	100	0	0	0	0
SO_4 (mg/L)	200	400	7	7	100	0	0	0	0
NO_3 (mg/L)	45	-	7	7	100	0	0	0	0

It is observed from the above **table 8.3**, that than 100 % of samples are suitable for drinking purposes. Therefore, it is concluded that the portability of ground water in study area.

The suitability of ground water for Irrigation purpose:

Water is one of the most important constituents, which is required for plant growth, which not only provides the liquid for food processing of the plants but also provides important nutrients for the growth of the plants. But when concentration of ions, are found in excess in the water, it affects the plant growth and reduces the plant yield. Therefore, it is necessary to know the quality of the water before applying in the field, so that the maximum crop yield can be obtained.

Sodium Adsorption Ratio (SAR)

SAR is an expression pertaining to cation makes up of water and soil solution and is used for characterizing the sodium hazard of irrigation water. The main problem with high sodium concentration is its effect on soil permeability & water irrigation. Sodium also contributes directly to the total salinity of the water and may be toxic to sensitive crops such as fruit trees. SAR is calculated from the following equation-

$$SAR = \frac{Na^{+}}{\sqrt{(Ca^{2+} + Mg^{2+})/2}}$$

Where the concentration of cations are expressed in meq/L.

Residual Sodium Carbonate (RSC)

Water containing carbon dioxide on way gets saturated with carbon dioxide and forms bicarbonates. The excess bicarbonates of Mg and Ca are precipitated out as carbonates. This produces impermeability to the top soil. Bicarbonate concentration of water has been suggested as additional criteria of suitability of irrigation water. Residual sodium carbonate is determined by using the following formula.

RSC = (CO3+ HCO3) - (Ca+Mg)

The suitability of ground water of study area for irrigation purpose was considered on the basis of U. S Salinity diagram in which electrical conductivity value in μS/cm at 25°C upto 2250 μS/cm at 25°C is plotted on one axis and the SAR values upto 10 on the other. The electrical conductivity and the corresponding SAR & RSC values of each ground water sample collected from the study area is given in the **Table 8.4**, and the EC and SAR values are plotted in **Wilcox Diagram (Fig 8.2)** and **Piper (Fig 8.3).**

The number of ground water samples based on Sodium Absorption Ratio (SAR) characteristics falling under Good, Good to Permissible, Doubtful & Bad (Unsuitable) categories is shown in the following **Table 8.4.**

From the Table 8.4, it is observed that 100% of samples show SAR values below 10 and falling in the Low Sodium (alkali) Hazard Zone (S1). Such type of water can be used for irrigation on almost all soils with little danger of development of sodium exchangeable problem. Out of 7 samples collected from study area all samples having EC above > 2250 μS/cm at 25° .

The High Salinity Water (C3) cannot be used on soils with poor drainage. Even with adequate drainage, special management for salinity control may be required and plants with good salt tolerance should be selected.

Table 9.4: Classification of ground water for irrigation based on SAR values

EC microsiemens/cm at 25°C		SAR Value			
		<10 (S1)	10-18 (S2)	18-26 (S3)	>26 (S4)
	Quality	Good	Good to Permissible	Doubtful	Bad (Unsuitable)
	Total No. of GW Samples	No. of samples	No. of samples	No. of samples	No. of samples

< 100	-	-	-	-	-
100-250 (C1)	1	1	-	-	-
250-750 (C2)	1	1	-	-	-
750-2250 (C3)	5	5	-	-	-
2250-5000 (C4)	-	-	-	-	-
> 5000	-	-	-	-	-
Total	7	7			
Overall Percentage		100%			

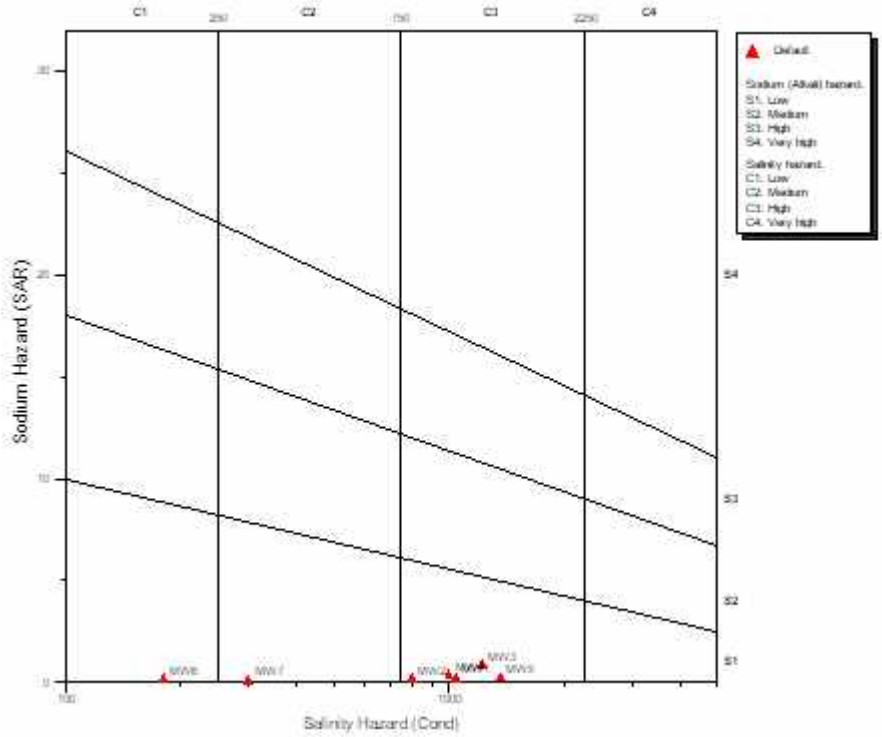


Fig 8.2 Wilcox Diagram

The Very High Salinity Water (C4) is not at all suitable for irrigation under ordinary conditions, but may be used occasionally if the soil is permeable by providing adequate drainage and irrigation water must be applied in excess to provide considerable leaching and very salt tolerant crops should be selected.

Based on above **table 8.4**, ground water samples are classified with respect to salinity and sodium hazard and are presented in **Table 8.5.**

Table 8.5: Classification of ground water samples with respect to salinity and sodium hazards

Type of Classification	Characteristics	No. of samples falling	%
C1S1		1	14
C1S2			
C2S1	Medium salinity and low sodium water	1	14
C3S1	High salinity and low sodium water	5	72
C4S1	Very high salinity and low sodium water		
Total		**7**	**100**

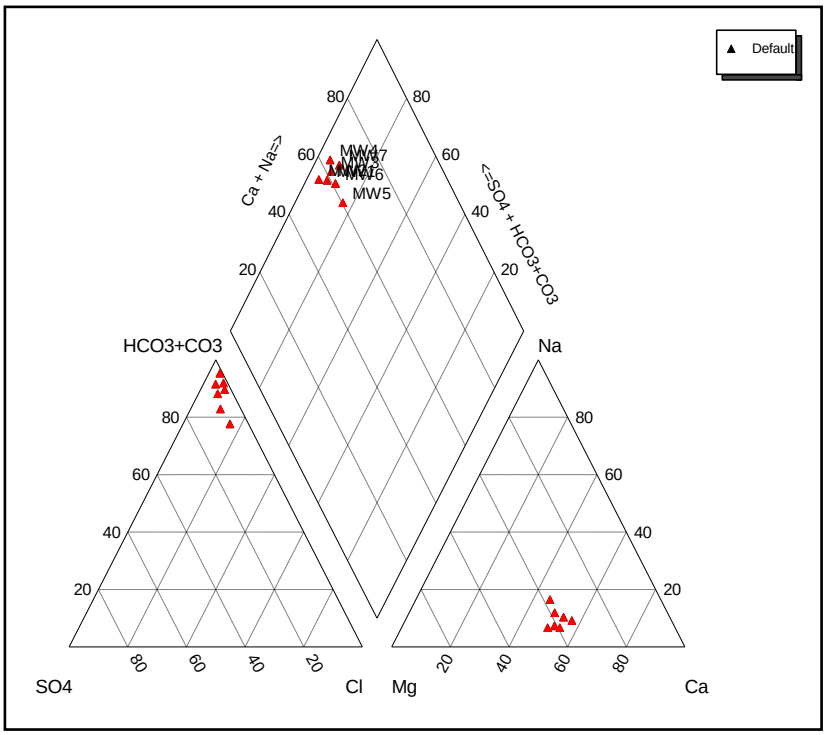


Fig 8.3: Trainer piper diagram

The iso-conductivity map of ground water has been prepared and presented as **Fig 8.4**. On perusal of the iso-conductivity, it is observed that the electrical conductivity for shallow Aquifer in study area ranges from 180 μMhos/cm (Pond near main gate DB power plant) to 1360μMhos/cm (Ash pond), the electrical conductivity for shallow aquifer is within Permissible Limit (750-2250 μMhos/cm @ 25°C) Fig 8.4.

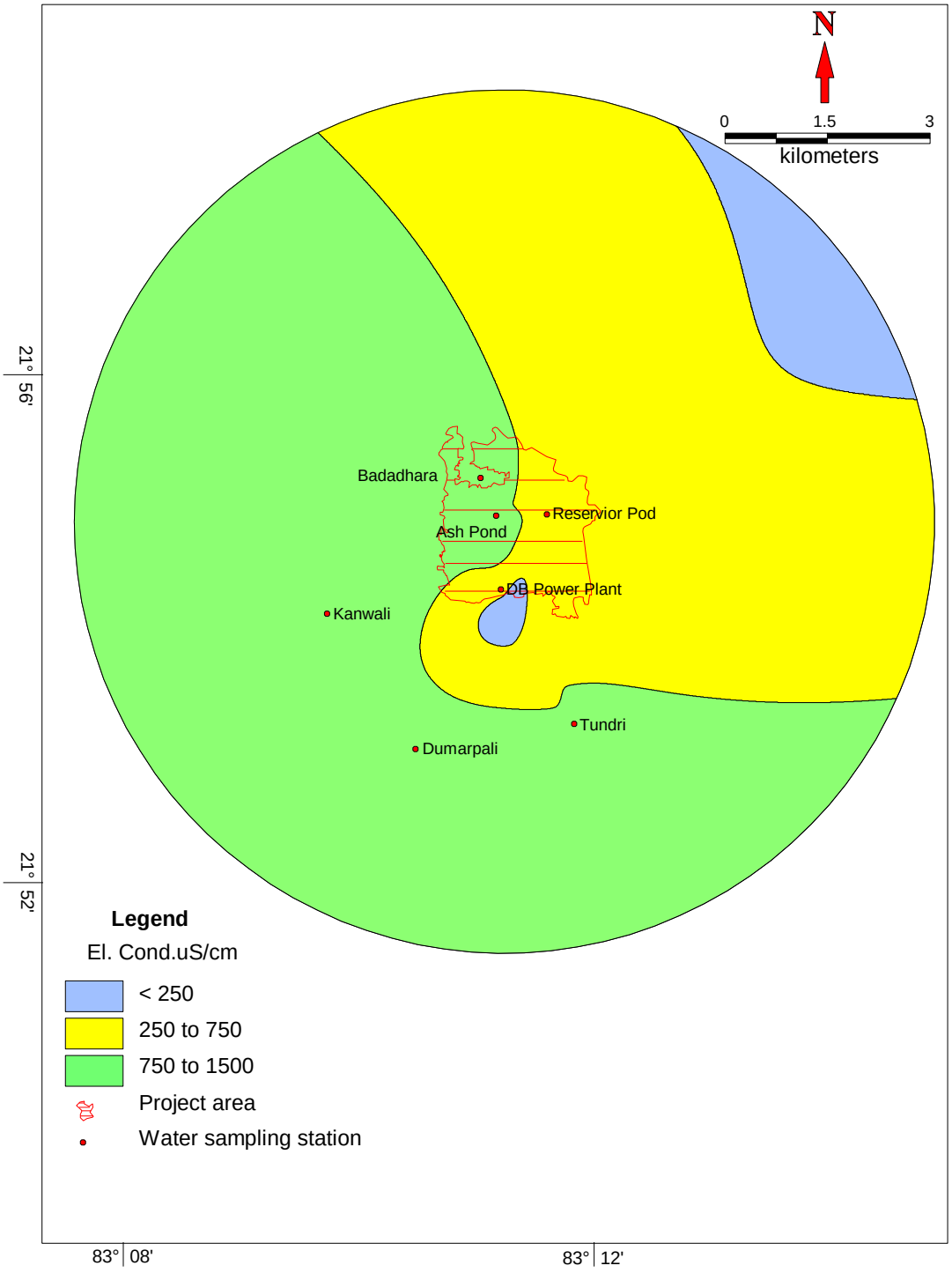


Fig 8.4: Iso-conductivity map of ground water

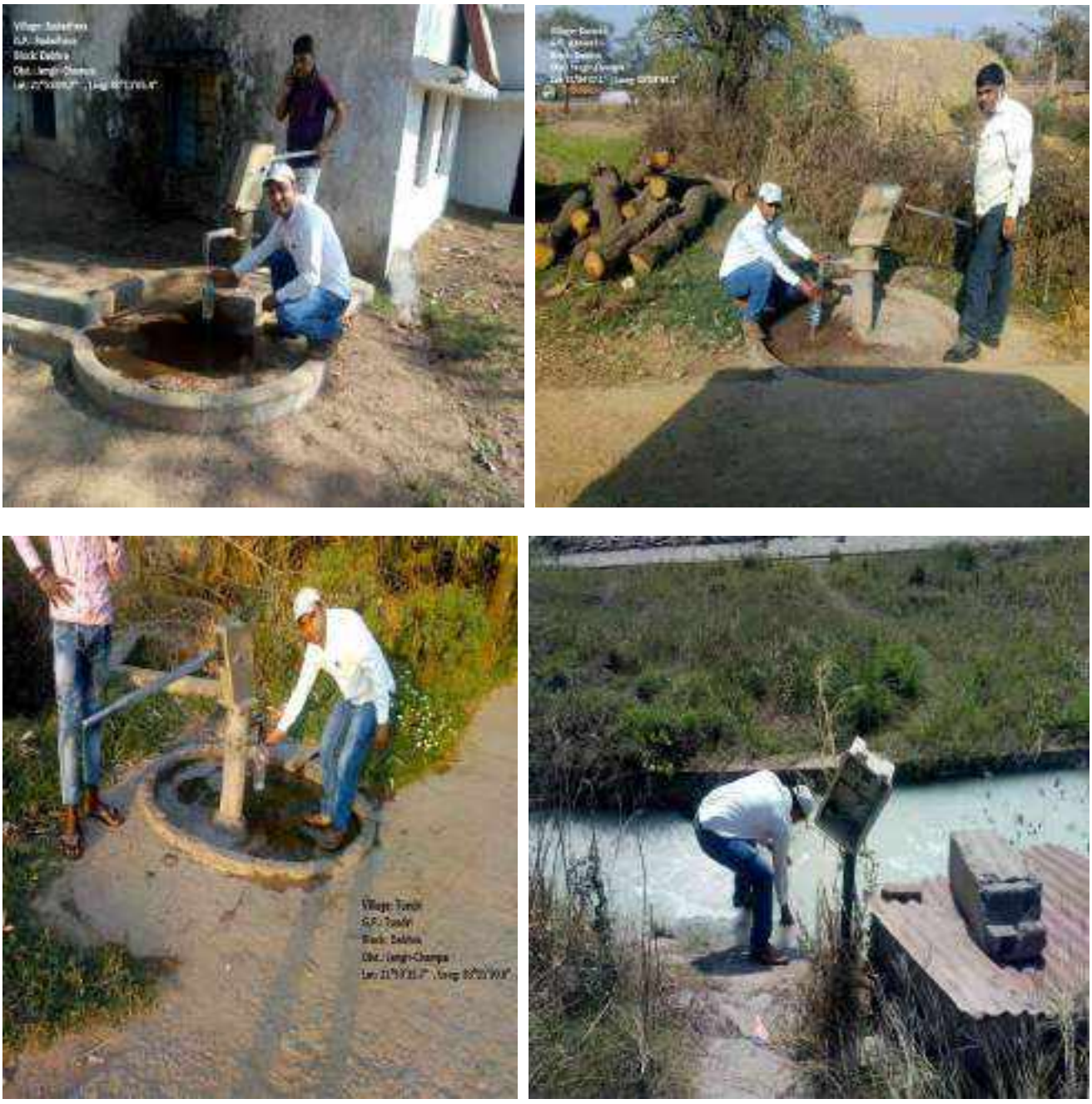


Fig 8.5: Water Sampling in Plant premises and buffer Zone of the Study Area

9. CONCLUSIONS & SUMMARY

DB Power Limited is a coal-based thermal power plant located at Village: Badadarha, Block: Dabhra, Janjgir-Champa district in the state of Chhattisgarh. The plant has produced thermal power having capacity of 1200 MW (2*600 MW).

The area is drained by tributaries of Mand River. The project area is in the interfluves zone of Dantar Nala, Pathari Nala & Mand River.

The study area is characterized by flat undulating terrain with regional slope to the north-east and south west. The average elevation in the southern portion is around 280m while in the north is 275 mamsl. The average land slope of the area is works out about 4 per km from toposheets (1:50000scale), Survey of India.

Geo-morphologically the study area comes under Pediplain, Denudation Hills & Floods Plan. The Physiography of the basin is controlled by geological formations namely Sandstone and shale.

In the area, ground water occurs under phreatic or unconfined condition in weathered portion of rocks and semi-confined to confined conditions in fractures/cavernous part of rocks i.e. Sandstone & shale at depths.

In the Post monsoon period it is observed that the overall depth to water level remains between 1.6 and 9.10 meters below ground level. The post-monsoon depths to water level range of 4 to 6 mbgl are observed at Kenapali, Saraipali, Jaimura & Kanwali villages. Ground water levels more than 6 mbgl are observed in the villages Tayang, Karpipali, Fulbandhia & Basnajhar Villages. Water level less than 4 mbgl are observed in the remaining parts of the study area.

In the Pre monsoon it is observed that the overall depth to water level remains between 3.40 to 13.18 meters below ground level. The pre-monsoon depth to water levels ranges Below 5 mbgl is observed in Badadhara & tundri villages. Water levels is between 5 - 10 mbgl are observed in the villages namely Amapali, Basanpali, Saraipali, Kanwali, Dumerpali & Jaimura villages. Water level greater than 9 mbgl is observed in the remaining parts of the study area

In the study area water level fluctuation varies from 1.8 to 5.08 meters.

The flow direction is of two directions i.e. in western, central and northern part of the study area it is towards East Direction and in southern part of the study area it is towards North-East direction indicating the surface water divide in the central portion of the study area near to project area.

The shallow aquifers of the area are mostly developed by way of dug wells in the area with depth ranges from 7 to 16 m. In general the yield of dug wells ranges from 25 to 40m^3/day. Deeper aquifer in the area mainly formed of Raipur group of rocks constituted of Raigarh formation comprising Sandstone and shale.

In the area the yield ranges between1 to 5 lps in Central, Northern, North-Eastern & North-western indicating the area is covered by Sandstone while in major part of the area it is below 1 lps which is covered with shale.

The aquifer parameters of the study area covered by sandstone for deep aquifer the transmissivity values of phreatic aquifer tapped in open well in general varies from 4 to 8.5m^2/day while specific capacity ranges from 15 to 40 lpm/m/day. However for deep aquifer the transmissivity ranges from 15-32 m^2/day and at places it ranges up to 40m^2/day.

Total recharge potential of **1205322.67** cum of rainfall runoff can be harvested at feasible, viable and sustainable location annually, based on hydrogeological condition trench and recharge pits use for ground water artificial recharge. The plant is already constructed recharge trench & recharge reservoir to recharge the ground water of the study area.

The detailed chemical analysis for water samples drawn at seven locations of plant study area (Ash Dyke ponds, reservoir pond and various villages) for non-metallic ingredients like pH, Turbidity, TDS, TSS, CaCO3, Ca, Cl, Mg, SO4 & SiO2 and metallic ingredients like, Hg,,Mn,Zn, Fe, & Cr etc. were done in-2020.

From the chemical analysis of water it is observed that than 100 % of samples are suitable for drinking purposes.

It is observed that 100% of samples show SAR values below 10 and falling in the Low Sodium (alkali) Hazard Zone (S1). Such type of water can be used for irrigation on almost all soils with little danger of development of sodium exchangeable problem

The geochemical classification of ground water, of study area has been carried out by using Piper Diagrams the ground water is of Ca/Mg/Na-HCO_3 Cl type. The analysis of ground water samples

collected from the area suggests that type of water in the major part is bicarbonate dominating type, The suitability of ground water of study area for irrigation purpose was considered on the basis of U. S Salinity diagram in which electrical conductivity value in μS/cm at 25°C upto 5000 μS/cm at 25°C is plotted on one axis and the SAR values upto 30 on the other. The electrical conductivity and the corresponding SAR & RSC values of each ground water sample collected from the study area.

It is observed that 100% of samples show SAR values below 10 and falling in the Low Sodium (alkali) Hazard Zone (S1). Such type of water can be used for irrigation on almost all soils with little danger of development of sodium exchangeable problem**.** Out of 15samples collected from study area is having EC above > 2250 μS/cm at 25°.

The High Salinity Water (C3) cannot be used on soils with poor drainage. Even with adequate drainage, special management for salinity control may be required and plants with good salt tolerance should be selected.

The Very High Salinity Water (C4) is not at all suitable for irrigation under ordinary conditions, but may be used occasionally if the soil is permeable by providing adequate drainage and irrigation water must be applied in excess to provide considerable leaching and very salt tolerant crops should be selected.

On perusal of the iso-conductivity, it is observed that the electrical conductivity for shallow Aquifer in study area ranges from 180 μMhos/cm (Pond near main gate DB power plant) to 1360μMhos/cm (Ash pond), the electrical conductivity for shallow aquifer is within Permissible Limit (750-2250 μMhos/cm @ 25°C).

The present study reveals that there is no adverse impact of Ash Pond on ground water regime of the area both on water levels as well as water quality.

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Mobile No. : +91 9424203354, +91 7000664898, +91 9424203408
Email : cgwrtestinglab@gmail.com, cgwr.raipur@gmail.com Website : www.cgwr.in

TEST REPORT

ULR - TC681318000001960P

TEST REPORT NO:CGWR/WLT/4586

Customer Name and Address-
M/S. D.B. POWER LTD.
NANDELI ROAD, VILL.-BADADARHA,
DIST-JANJGIR CHAMPA (C.G.)

Date of Reporting : 31/03/2021
SRF No: CGWR/SRF/WTL/1414
Job Order No: CGWR/WTL/4586
Date of receipt sample: 25/03/2021
Start Date of Testing : 26/03/2021
End Date of Testing : 30/03/2021

Sample detail : GROUND WATER	Sample ID: Village-Badadhara N21°55'09.7" E83°11'05.4"	Sample Quantity: 1Ltr	Container : Plastic

Environment Condition -: Temp27°C / Humidity-53%

Sl. No	PARAMETERS	TEST METHOD	UNIT	DRINKING WATER IS:10500-2012		TEST RESULT
				DESIRABLE	MAXIMUM	
A.	*Chemical Parameter*					
1.	pH	APHA 23rd Edition 2017- 4500-H+ A.	-	6.5 to 8.5	No relaxation	6.53
2.	Turbidity	APHA 23rd Edition 2017 -2130 B.	NTU	1	5	1.32
3.	Conductivity	APHA 23rd Edition 2017- 2510 A.	µs/cm	>1000	3200	1040
4.	Total Dissolve Solids	APHA 23rd Edition 2017-2540 C.	mg/l	500	2000	550
5.	Total Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	200	600	272
6.	Calcium as Ca	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	75	200	60.92
7.	Calcium Hardness	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	-	-	151.99
8.	Magnesium as Mg	APHA 23rd Edition 2017- 2340-C	mg/l	30	100	29.16
9.	Magnesium Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	-	-	120.01
10.	Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	162.36
11.	Bi-Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	241.56
12.	Chloride	APHA 23rd Edition 2017- 4500- Cl- B.	mg/l	250	1000	23.77
13.	M- Alkalinity	APHA 23rd Edition 2017 -2320 B.	mg/l	200	600	198
14.	Fluoride as F	APHA 23rd Edition 2017- 4500-F D.	mg/l	1.0	1.5	<0.1
15.	Sulphate as SO4	APHA 23rd Edition 2017- 4500 SO4 - E.	mg/l	200	400	6.98
16.	Iron	APHA 23rd Edition 2017 -3500--B	mg/l	0.3	No relaxation	<0.1
17. .	Nitrate	IS 3025 (Pt.34):1988/RA 2003	mg/l	45	No relaxation	<1
18.	Sodium	APHA- 23rd Edition 2017-3500 Na-B	mg/l	-	-	10
19.	Potassium	APHA- 23rd Edition 2017- 3500 K-B	mg/l	-	-	4

Reviewed by

ChinmayeeMohanty (Sr. Chemist)

Center For Ground Water Recharge
Testing Laboratory
NABL Accreditated Lab
Certificate No:- TC-6813

Authorized Signature

SaritaPanigrahi (QM)

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Mobile No. : +91 9424203354, +91 7000664898, +91 9424203408
Email : cgwrtestinglab@gmail.com, cgwr.raipur@gmail.com Website : www.cgwr.in

TEST REPORT

ULR - TC681318000000001965P

TEST REPORT NO:CGWR/WLT/4591

Customer Name and Address-
M/S. D.B. POWER LTD.
NANDELI ROAD, VILL -BADADARHA,
DIST-JANJGIR CHAMPA (C.G.)

Date of Reporting : 31/03/2021
SRF No: CGWR/SRF/WTL/1414
Job Order No: CGWR/WTL/4591
Date of receipt sample: 25/03/2021
Start Date of Testing : 26/03/2021
End Date of Testing : 30/03/2021

Sample detail : SURFACE WATER | Sample ID: Pond Near main gate of DB Power Plant - Badadahra N21°54'07.4" E 83°11'15.2" | Sample Quantity: 1Ltr | Container : Plastic

Environment Condition -: Temp27°C / Humidity-53%

Sl. No	PARAMETERS	TEST METHOD	UNIT	DRINKING WATER IS:10500-2012		TEST RESULT
A.	*Chemical Parameter*			DESIRABLE	MAXIMUM	
1.	pH	APHA 23rd Edition 2017- 4500-H+ A.	-	6.5 to 8.5	No relaxation	6.85
2.	Turbidity	APHA 23rd Edition 2017 -2130 B.	NTU	1	5	0.14
3.	Conductivity	APHA 23rd Edition 2017- 2510 A.	µs/cm	>1000	3200	180
4.	Total Dissolve Solids	APHA 23rd Edition 2017-2540 C	mg/l	500	2000	100
5.	Total Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	200	600	64
6.	Calcium as Ca	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	75	200	14.42
7.	Calcium Hardness	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	-	-	35.97
8.	Magnesium as Mg	APHA 23rd Edition 2017- 2340-C	mg/l	30	100	6.8
9.	Magnesium Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	-	-	28.03
10.	Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	22.14
11.	Bi-Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	32.94
12.	Chloride	APHA 23rd Edition 2017- 4500- Cl- B.	mg/l	250	1000	5.48
13.	M- Alkalinity	APHA 23rd Edition 2017 -2320 B.	mg/l	200	600	27
14.	Fluoride as F	APHA 23rd Edition 2017- 4500-F D.	mg/l	1.0	1.5	<0.1
15.	Sulphate as SO4	APHA 23rd Edition 2017- 4500 SO4 - E.	mg/l	200	400	5.2
16.	Iron	APHA 23rd Edition 2017 -3500--B	mg/l	0.3	No relaxation	<0.1
17.	Nitrate	IS 3025 (Pt.34):1988/RA 2003	mg/l	45	No relaxation	<1
18.	Sodium	APHA- 23rd Edition 2017-3500 Na-B	mg/l	-	-	4
19.	Potassium	APHA- 23rd Edition 2017- 3500 K-B	mg/l	-	-	<1

Reviewed by

ChinmayeeMohanty (Sr. Chemist)

Center For Ground Water Recharge
Testing Laboratory
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Authorized Signature

SaritaPanigrahi (QM)

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Mobile No. : +91 9424203354, +91 7000664898, +91 9424203408
Email : cgwrtestinglab@gmail.com, cgwr.raipur@gmail.com Website : www.cgwr.in

TEST REPORT

ULR - TC681318000000l961P

TEST REPORT NO:CGWR/WLT/4587

Customer Name and Address-
M/S. D.B. POWER LTD.
NANDELI ROAD, VILL -BADADARHA,
DIST-JANJGIR CHAMPA (C.G.)

Date of Reporting : 31/03/2021
SRF No: CGWR/SRF/WTL/1414
Job Order No: CGWR/WTL/4587
Date of receipt sample: 25/03/2021
Start Date of Testing : 26/03/2021
End Date of Testing : 30/03/2021

Sample detail : GROUND WATER | Sample ID: Village-Tundri N21°53'15.7" E83°11'50.0" | Sample Quantity: 1Ltr | Container : Plastic

Environment Condition -: Temp27°C / Humidity-53%

Sl. No	PARAMETERS	TEST METHOD	UNIT	DRINKING WATER IS:10500-2012		TEST RESULT
A.	*Chemical Parameter*			DESIRABLE	MAXIMUM	
1.	pH	APHA 23rd Edition 2017- 4500-H+ A	-	6.5 to 8.5	No relaxation	6.23
2.	Turbidity	APHA 23rd Edition 2017 -2130 B.	NTU	1	5	0.21
3.	Conductivity	APHA 23rd Edition 2017- 2510 A.	µs/cm	>1000	3200	800
4.	Total Dissolve Solids	APHA 23rd Edition 2017-2540 C.	mg/l	500	2000	400
5.	Total Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	200	600	240
6.	Calcium as Ca	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	75	200	51.30
7.	Calcium Hardness	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	-	-	127.99
8.	Magnesium as Mg	APHA 23rd Edition 2017- 2340-C	mg/l	30	100	27.21
9.	Magnesium Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	-	-	112.01
10.	Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	115.52
11.	Bi-Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	505.08
12.	Chloride	APHA 23rd Edition 2017- 4500- Cl- B.	mg/l	250	1000	16.46
13.	M- Alkalinity	APHA 23rd Edition 2017 -2320 B.	mg/l	200	600	141
14.	Fluoride as F	APHA 23rd Edition 2017- 4500-F D.	mg/l	1.0	1.5	<0.1
15.	Sulphate as SO4	APHA 23rd Edition 2017- 4500 SO4 - E.	mg/l	200	400	5.89
16.	Iron	APHA 23rd Edition 2017 -3500--B	mg/l	0.3	No relaxation	<0.1
17.	Nitrate	IS 3025 (Pt.34):1988/RA 2003	mg/l	45	No relaxation	<1
18.	Sodium	APHA- 23rd Edition 2017-3500 Na-B	mg/l	-	-	8
19.	Potassium	APHA- 23rd Edition 2017- 3500 K-B	mg/l	-	-	2

Reviewed by

ChinmayeeMohanty (Sr. Chemist)

Center For Ground Water Recharge
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Certificate No:- TC-6813

Authorized Signature

SaritaPanigrahi (QM)

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CENTRE FOR GROUND WATER RECHARGE TESTING LABORATORY

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Mobile No. : +91 9424203354, +91 7000664898, +91 9424203408
Email : cgwrtestinglab@gmail.com, cgwr.raipur@gmail.com Website : www.cgwr.in

TEST REPORT

ULR - TC681318000000 1962P

TEST REPORT NO:CGWR/WLT/4588

Customer Name and Address-
M/S. D.B. POWER LTD.
NANDELI ROAD, VILL -BADADARHA,
DIST-JANJGIR CHAMPA (C.G.)

Date of Reporting : 31/03/2021
SRF No: CGWR/SRF/WTL/1414
Job Order No: CGWR/WTL/4588
Date of receipt sample: 25/03/2021
Start Date of Testing : 26/03/2021
End Date of Testing : 30/03/2021

Sample detail : GROUND WATER	Sample ID: Village-Kanwali N21°54'07.1" E 85°09'44.1"	Sample Quantity: 1Ltr	Container : Plastic

Environment Condition -: Temp27°C / Humidity-53%

Sl. No	PARAMETERS	TEST METHOD	UNIT	DRINKING WATER IS:10500-2012		TEST RESULT
A.	*Chemical Parameter*			DESIRABLE	MAXIMUM	
1.	pH	APHA 23rd Edition 2017- 4500-H+ A.	-	6.5 to 8.5	No relaxation	6.90
2.	Turbidity	APHA 23rd Edition 2017 -2130 B.	NTU	1	5	0.79
3.	Conductivity	APHA 23rd Edition 2017- 2510 A.	µs/cm	>1000	3200	1220
4.	Total Dissolve Solids	APHA 23rd Edition 2017-2540 C.	mg/l	500	2000	630
5.	Total Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	200	600	512
6.	Calcium as Ca	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	75	200	112.22
7.	Calcium Hardness	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	-	-	279.98
8.	Magnesium as Mg	APHA 23rd Edition 2017- 2340-C	mg/l	30	100	56.38
9.	Magnesium Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	-	-	232.02
10.	Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	218.94
11.	Bi-Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	325.74
12.	Chloride	APHA 23rd Edition 2017- 4500- Cl- B.	mg/l	250	1000	32.92
13.	M- Alkalinity	APHA 23rd Edition 2017 -2320 B.	mg/l	200	600	267
14.	Fluoride as F	APHA 23rd Edition 2017- 4500-F D.	mg/l	1.0	1.5	0.21
15.	Sulphate as SO4	APHA 23rd Edition 2017- 4500 SO4 - E.	mg/l	200	400	36.35
16.	Iron	APHA 23rd Edition 2017 -3500--B	mg/l	0.3	No relaxation	0.16
17.	Nitrate	IS 3025 (Pt.34):1988/RA 2003	mg/l	45	No relaxation	8.56
18.	Sodium	APHA- 23rd Edition 2017-3500 Na-B	mg/l	-	-	46.6
19.	Potassium	APHA- 23rd Edition 2017- 3500 K-B	mg/l	-	-	8

Reviewed by

ChinmayeeMohanty (Sr. Chemist)

Center For Ground Water Recharge
Testing Laboratory
NABL Accreditated Lab
Certificate No:- TC-6813

Authorized Signature

SaritaPanigrahi (QM)

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Mobile No. : +91 9424203354, +91 7000664898, +91 9424203408
Email : cgwrtestinglab@gmail.com, cgwr.raipur@gmail.com Website : www.cgwr.in

TEST REPORT

ULR - TC681318000000196 3P

TEST REPORT NO:CGWR/WLT/4589

Customer Name and Address-
M/S. D.B. POWER LTD.
NANDELI ROAD, VILL -BADADARHA,
DIST-JANJGIR CHAMPA (C.G.)

Date of Reporting : 31/03/2021
SRF No: CGWR/SRF/WTL/1414
Job Order No: CGWR/WTL/4589
Date of receipt sample: 25/03/2021
Start Date of Testing : 26/03/2021
End Date of Testing : 30/03/2021

Sample detail : GROUND WATER	Sample ID: Village-Dumarpali N21°53'03.1" E 85°10'29.1"	Sample Quantity: 1Ltr	Container : Plastic

Environment Condition -: Temp27°C / Humidity-53%

Sl. No	PARAMETERS	TEST METHOD	UNIT	DRINKING WATER IS:10500-2012		TEST RESULT
A.	*Chemical Parameter*			DESIRABLE	MAXIMUM	
1.	pH	APHA 23rd Edition 2017- 4500-H+ A.	-	6.5 to 8.5	No relaxation	6.94
2.	Turbidity	APHA 23rd Edition 2017 -2130 B.	NTU	1	5	0.53
3.	Conductivity	APHA 23rd Edition 2017- 2510 A.	µs/cm	>1000	3200	1000
4.	Total Dissolve Solids	APHA 23rd Edition 2017-2540 C.	mg/l	500	2000	536
5.	Total Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	200	600	336
6.	Calcium as Ca	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	75	200	80.16
7.	Calcium Hardness	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	-	-	199.99
8.	Magnesium as Mg	APHA 23rd Edition 2017- 2340-C	mg/l	30	100	33.04
9.	Magnesium Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	-	-	136.01
10.	Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	218.94
11.	Bi-Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	325.74
12.	Chloride	APHA 23rd Edition 2017- 4500- Cl- B.	mg/l	250	1000	20.12
13.	M- Alkalinity	APHA 23rd Edition 2017 -2320 B.	mg/l	200	600	267
14.	Fluoride as F	APHA 23rd Edition 2017- 4500-F D.	mg/l	1.0	1.5	0.18
15.	Sulphate as SO4	APHA 23rd Edition 2017- 4500 SO4 - E.	mg/l	200	400	28.6
16.	Iron	APHA 23rd Edition 2017 -3500--B	mg/l	0.3	No relaxation	0.13
17.	Nitrate	IS 3025 (Pt.34):1988/RA 2003	mg/l	45	No relaxation	3.31
18.	Sodium	APHA- 23rd Edition 2017-3500 Na-B	mg/l	-	-	18
19.	Potassium	APHA- 23rd Edition 2017- 3500 K-B	mg/l	-	-	3

Reviewed by

ChinmayeeMohanty (Sr. Chemist)

Center For Ground Water Recharge
Testing Laboratory
NABL Accreditated Lab
Certificate No:- TC-6813

Authorized Signature

SaritaPanigrahi (QM)

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Email : cgwrtestinglab@gmail.com, cgwr.raipur@gmail.com Website : www.cgwr.in

TEST REPORT

ULR - TC681318000000l964P

TEST REPORT NO:CGWR/WLT/4590

Customer Name and Address-
M/S. D.B. POWER LTD.
NANDELI ROAD, VILL -BADADARHA,
DIST-JANJGIR CHAMPA (C.G.)

Date of Reporting : 31/03/2021
SRF No: CGWR/SRF/WTL/1414
Job Order No: CGWR/WTL/4590
Date of receipt sample: 25/03/2021
Start Date of Testing : 26/03/2021
End Date of Testing : 30/03/2021

Sample detail : SURFACE WATER	Sample ID: Ash Pond -Badadahra N21°54'42.3" E 83°11'36.4"	Sample Quantity: 1Ltr	Container : Plastic

Environment Condition -: Temp27°C / Humidity-53%

Sl. No	PARAMETERS	TEST METHOD	UNIT	DRINKING WATER IS:10500-2012		TEST RESULT
A.	*Chemical Parameter*			DESIRABLE	MAXIMUM	
1.	pH	APHA 23rd Edition 2017- 4500-H+ A.	-	6.5 to 8.5	No relaxation	6.75
2.	Turbidity	APHA 23rd Edition 2017 -2130 B.	NTU	1	5	0.15
3.	Conductivity	APHA 23rd Edition 2017- 2510 A.	µs/cm	>1000	3200	1360
4.	Total Dissolve Solids	APHA 23rd Edition 2017-2540 C.	mg/l	500	2000	700
5.	Total Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	200	600	360
6.	Calcium as Ca	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	75	200	83.36
7.	Calcium Hardness	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	-	-	207.99
8.	Magnesium as Mg	APHA 23rd Edition 2017- 2340-C	mg/l	30	100	36.93
9.	Magnesium Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	-	-	152.01
10.	Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	39.36
11.	Bi-Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	58.56
12.	Chloride	APHA 23rd Edition 2017- 4500- Cl- B.	mg/l	250	1000	16.46
13.	M- Alkalinity	APHA 23rd Edition 2017 -2320 B.	mg/l	200	600	48
14.	Fluoride as F	APHA 23rd Edition 2017- 4500-F D.	mg/l	1.0	1.5	<0.1
15.	Sulphate as SO4	APHA 23rd Edition 2017- 4500 SO4 - E.	mg/l	200	400	8.96
16.	Iron	APHA 23rd Edition 2017 -3500--B	mg/l	0.3	No relaxation	<0.1
17.	Nitrate	IS 3025 (Pt.34):1988/RA 2003	mg/l	45	No relaxation	2.36
18.	Sodium	APHA- 23rd Edition 2017-3500 Na-B	mg/l	-	-	12
19.	Potassium	APHA- 23rd Edition 2017- 3500 K-B	mg/l	-	-	2

Reviewed by

ChinmayeeMohanty (Sr. Chemist)

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Testing Laboratory
NABL Accreditated Lab
Certificate No:- TC-6813

Authorized Signature

SaritaPanigrahi (QM)

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Email : cgwrtestinglab@gmail.com, cgwr.raipur@gmail.com Website : www.cgwr.in

TEST REPORT

ULR - TC68131800000001965P

TEST REPORT NO:CGWR/WLT/4592

Customer Name and Address-
M/S. D.B. POWER LTD.
NANDELI ROAD, VILL -BADADARHA,
DIST-JANJGIR CHAMPA (C.G.)

Date of Reporting : 31/03/2021
SRF No: CGWR/SRF/WTL/1414
Job Order No: CGWR/WTL/4592
Date of receipt sample: 25/03/2021
Start Date of Testing : 26/03/2021
End Date of Testing : 30/03/2021

Sample detail : SURFACE WATER	Sample ID: Reservior Pond - Badadahra N21°54'54.4" E 83°11'36.0"	Sample Quantity: 1Ltr	Container : Plastic

Environment Condition -: Temp27°C / Humidity-53%

Sl. No	PARAMETERS	TEST METHOD	UNIT	DRINKING WATER IS:10500-2012		TEST RESULT
A.	*Chemical Parameter*			DESIRABLE	MAXIMUM	
1.	pH	APHA 23rd Edition 2017- 4500-H+ A.	-	6.5 to 8.5	No relaxation	6.83
2.	Turbidity	APHA 23rd Edition 2017 -2130 B.	NTU	1	5	0.21
3.	Conductivity	APHA 23rd Edition 2017- 2510 A.	µs/cm	>1000	3200	300
4.	Total Dissolve Solids	APHA 23rd Edition 2017-2540 C	mg/l	500	2000	170
5.	Total Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	200	600	64
6.	Calcium as Ca	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	75	200	16.03
7.	Calcium Hardness	APHA 23rd Edition 2017- 3500-Ca-B	mg/l	-	-	39.99
8.	Magnesium as Mg	APHA 23rd Edition 2017- 2340-C	mg/l	30	100	5.83
9.	Magnesium Hardness	APHA 23rd Edition 2017- 2340-C	mg/l	-	-	24.01
10.	Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	19.68
11.	Bi-Carbonate	APHA 23rd Edition 2017 -2320 B.	mg/l	-	-	29.28
12.	Chloride	APHA 23rd Edition 2017- 4500- Cl- B.	mg/l	250	1000	3.65
13.	M- Alkalinity	APHA 23rd Edition 2017 -2320 B.	mg/l	200	600	24
14.	Fluoride as F	APHA 23rd Edition 2017- 4500-F D.	mg/l	1.0	1.5	<0.1
15.	Sulphate as SO4	APHA 23rd Edition 2017- 4500 SO4 - E.	mg/l	200	400	1.36
16.	Iron	APHA 23rd Edition 2017 -3500--B	mg/l	0.3	No relaxation	<0.1
17.	Nitrate	IS 3025 (Pt.34):1988/RA 2003	mg/l	45	No relaxation	<1
18.	Sodium	APHA- 23rd Edition 2017-3500 Na-B	mg/l	-	-	3
19.	Potassium	APHA- 23rd Edition 2017- 3500 K-B	mg/l	-	-	<1

Reviewed by

ChinmayeeMohanty (Sr. Chemist)

Center For Ground Water Recharge
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